

Conference Proceedings

The Online, Open and Flexible Higher Education Conference

Hosted by Università Telematica Internazionale UNINETTUNO,
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Enhancing European Higher Education;
“Opportunities and impact of new modes of teaching”

Enhancing European Higher Education “Opportunities and impact of new modes of teaching”

Overview of papers on enhancement of European Higher Education as presented during the Online, Open and Flexible Higher Education Conference in Rome, October 2016

Editors

George Ubachs | Managing director EADTU
Lizzie Konings | Logistics Project Officer EADTU

EADTU, October 2016

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Foreword

Welcome to the OOFHEC2016 in Rome

The EADTU Online, Open and Flexible Higher Education Conference (OOFHEC2016) is also this year bringing together key players in the transformation of higher education in the 21st century. Within the scope this year of “Enhancing European Higher Education; “Opportunities and impact of new modes of teaching” EADTU and our host Uninettuno welcome you in Rome for an inspiring conference. This Conference, will provide you as participant and speaker, the platform for sharing expertise and gaining new partnerships and friends in setting the next steps in the future of higher education in Europe. We are happy you decided to join the OOFHEC2016 conference and welcome you in Rome.

The Scope of OOFHEC2016

These proceedings contain papers of the OOFHEC2016, hosted by Uninettuno at Auditorium Antonianum in Rome, in October 2016.

The Scope of the conference is **Enhancing European Higher Education; “Opportunities and impact of new modes of teaching”**.

Over the past years, universities have intensified a deeper transformation of teaching and learning in higher education, based on e-learning and online education. New modes of teaching and learning create new opportunities for enhancing the quality of the learning experience for on campus students, for reaching out to new target groups off campus and for offering freely accessible open education through the internet (OERs, MOOCs). They support the quality, visibility and reputation of the institution.

European higher education is now also challenged by developments as larger student numbers and yet keeping an excellent quality level; by the growing demand in society for continuing professional education for innovation in businesses; and by the movement for open education. Recently, the refugee crisis has led to an emergency situation that additionally challenges the higher education sector. Many thousands of people have to be successfully integrated or educated for rebuilding their countries, when returning. Generations and possibly countries will be lost, if higher education is not provided for them. Flexible education is an essential part of the solution.

Higher education can meet these challenges if the systems are resilient enough. Therefore, higher education should be modernised, making use of new technologies. Through new modes of teaching and learning the three complementary areas in higher education are made adaptive to meet the challenges described: (1) blended and online degree education will allow higher quality degree education for larger student groups, who will even belong to smaller communities and enjoy intensive education, linked to research and innovation; (2) flexible continuous education and continuous professional development online, including new types of short learning programmes, will prepare students for innovation and entrepreneurship in business; and (3) online open education through OERs and MOOCs will enrich citizens in order to participate better to society at large.

Presenters outline their work under the following main themes:

- National and institutional policies in the changing pedagogical landscape
- Empowering universities for excellence in higher education, improving the quality of higher education
- The modernisation agenda for European universities: education for innovation and entrepreneurship/intrapreneurship
- Blended degree education on campus
- Flexible continuing education (incl. CPD) and new types of courses (short learning programmes) to accommodate 25+ students
- Open education (OERs and MOOCs)
- Curriculum networking and mobility
- Quality assurance in online, open and flexible education and MOOCs
- Knowledge resources in online education
- Internationalisation, distance education and short learning programmes
- Learning analytics and learning technologies
- Social inclusion and higher education for minorities (refugees, migrants)
- Euro-Mediterranean cooperation

The conference is well attended by representatives from more than a 100 universities from 30 different countries all over the world and with participation of higher education institutional policymakers, governmental bodies involved in innovating HE, deans and directors, educational innovators, university staff and umbrella organisations in higher education. All with a passion for research, improving teaching, learning and support services and driven by innovating education.

With regards

George Ubachs

Managing Director EADTU

Keynote speakers

We thank our keynote speakers for their inspiring contributions to the OOFHEC2016 Conference.



Mark Lester

Director of Partnerships at
FutureLearn



Anders Flodström

Education Director of EIT
Digital, a member of the CXO
group and the Management
Committee



Julie Anderson

Policy officer in the European
Commission's higher
education policy team in DG
Education and Culture



Lluís Pastor

Director of the eLearnCenter,
the Universitat Oberta de
Catalunya research and
innovation center in the field
of eLearning



Dr Mansoor Al Awar

Chancellor Hamdan Bin
Mohammed Smart University
(HBMSU) Dubai



Fr. Michael Perry

Minister General of the Order
of Friars Minor, Gran
Cancelliere della Ponticia
Università Antonianum



Anja Oskamp

President of EADTU and
rector of Open University of
the Netherlands (OUNL)



Bart Rienties

Reader in Learning Analytics
at the Institute of Educational
Technology at the Open
University UK



Maria Amata Garito

Rector and President of the
International Telematic
University UNINETTUNO



Stamenka Uvalić-Trumbić

Senior Advisor for
International Affairs to CHEA
(Council for Higher Education
Accreditation, USA)



Yves Punie

Senior scientist at the
European Commission
Institute for Prospective
Technological Studies (JRC
IPTS Sevilla)



Sir John Daniel

Former Vice-Chancellor, UK
Open University



Mark Brown

Mark Brown is Chair in Digital Learning and Director of the National Institute for Digital Learning (NIDL) at Dublin City University (DCU)



Stefania Giannini

Italian Minister of the Education, University and Research

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Noël Vercruysse, StoHO- Studiecentrum Open Hoger Onderwijs, Belgium

Petra Poulková, Czech Association of the Distance Teaching Universities, Czech Republic

Seamus Fox, National Institute for Digital Learning, Ireland

Teija Lehto, Tampere University of Applied Sciences, Finland

Fanny Aguirre de Morreira, Universidad Técnica Particular de Loja, Ecuador

Susanne Koch, Norwegian Agency for Digital Learning in Higher Education, Norway

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Sapienza University of Rome, Italy

Recommendations for OER Integration in Austrian Higher Education

Martin Ebner¹, Michael Kopp², Christian F. Freisleben-Teutscher³, Ortrun Gröbinger⁴, Katharina Rieck⁵, Sandra Schön⁶, Peter Seitz⁷, Maria Seissl⁸, Sabine Ofner⁹, Claudia Zimmermann¹⁰, Charlotte Zwiauer¹¹

¹Educational Technology, Graz University of Technology; ²University of Graz; ³University of Applied Sciences St. Pölten; ⁴University of Innsbruck; ⁵Austrian Science Fund; ⁶Salzburg Research; ⁷Federal Ministry of Science, Research and Economy; ⁸University of Vienna; ⁹Federal Ministry of Science, Research and Economy; ¹⁰University of Graz; ¹¹University of Vienna, Austria

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Xavier Mas-Garcia
eLearn Center, Universitat Oberta de Catalunya, Catalonia

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Pierre Gedeon¹, Josiane Gedeon², Mohamed Sidir³
Notre Dame University-Louaize, Lebanon¹; University of Picardie Jules Verne, France^{2/3}

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Christien Bok
SURFnet, The Netherlands

Cultural dynamics of Education, Science and Social Representations in the worldwide research landscape and contemporary media scenario

Annamaria Silvana de Rosa

European/International Joint PhD in S.R. & C. Research Centre and Multimedia Lab
Sapienza University of Rome, Italy
annamaria.derosa@uniroma1.it

Laura Dryjanska

European/International Joint PhD in S.R. & C. Research Centre and Multimedia Lab
Sapienza University of Rome, Italy
laura.dryjanska@uniroma1.it

Martina Latini

European/International Joint PhD in S.R. & C. Research Centre and Multimedia Lab
Sapienza University of Rome, Italy
martina.latini20@gmail.com

Aminat Ramazanova

European/International Joint PhD in S.R. & C. Research Centre and Multimedia Lab
Sapienza University of Rome, Italy
aminat.ramazanova@uniroma1.it

Abstract

Aim: The study examines how the thematic areas of Education and Science are positioned in the literature produced worldwide by the research community inspired by the Social Representations theory*. The dynamic between the reified universe (science) and the consensual common sense knowledge through educational and communication systems has been the founding focus of the theory (Moscovici, 1961/1976; Moscovici & Duveen, 2000) and it remains its core element after more than 50 years of the literature development.

Data sources and Method: Extracted from more than 10,000 texts - filed in the SoReCom "A.S.de Rosa" @-; (de Rosa, 2014b, 2015, 2016, 2016 forthcoming; de Rosa, Dryjanska & Bocci, 2016a, 2016b, forthcoming).- we have analysed the sources related to education, science, social representations and communication through the lens of a systematic meta-theoretical analysis using the Grid designed by de Rosa

Exploratory Hypotheses:

We expect that the results will show:

- at what extent the thematic areas of Education and Science are interrelated or treated as distinct objects of empirical research, reproducing a split between "reified" and "consensual" universes of knowledge;
- the socio-cultural contexts (with different ideologically oriented policies and specific societal issues) and the time dimension affect both the agenda of education and science popularisation and the way it is constructed through media.

*<http://www.europhd.eu/SoReComJointIDP>: ITN-People MSCA-IDP 2013

Keywords: education, science, social representations, meta-theoretical analysis, media

1. Introduction

This paper features a study that examines how the thematic areas of Education and Science are positioned in the literature published throughout the world by the academic community inspired by the Social Representations theory introduced by Moscovici (1961/1976; Moscovici & Duveen, 2000) more than fifty years ago.

It is based on an empirical meta-theoretical analysis of the literature on Social Representations, within the framework of a specific project aimed at taking stock of the scientific field, mapping its development, the related research methods, the thematic areas and their impact on the various applied fields within the multi-generational community of scientists and across different geo-cultural contexts. In particular, the specific thematic objects of education and science belong to the focus on “Taking stock of the literature in the thematic field of “Science, Social Representations and Communication”.

This contribution presents a selection of results of a research project carried out within the EC-approved SoReCom-Joint-ID (<http://www.europhd.eu/SoReComJointIDP>) built on the top of an on-going project led since more than 20 years (1994) by A.S. de Rosa at the *European/International Joint PhD on Social Representations and Communication Research Centre and Multimedia Lab* (de Rosa, 1994, 2002, 2013a, 2013b; de Rosa, 2014b, 2015, 2016, 2016 forthcoming; de Rosa, Dryjanska, Bocci, 2016, forthcoming).

2. Theoretical Framework

The theory of social representations has been defined as a supra-disciplinary field due to its great consistency in terms of epistemological and theoretical inspiration (de Rosa, 1994, 2002, 2013a, 2013b). Its rich diversity is evident:

- from the paradigmatic point of view - as developed by the “structural approach” to S.R and central core theory; by the “social positioning approach”, guided by the socio-dynamic perspective; by the “monographic” and “anthropological” approaches; by the “dialogical”, “conversational” and “biographical-narrative” approaches, and by the integrating “modelling” approach;
- in terms of methodological approaches (qualitative, monographic, anthropological, experimental, descriptive, structural, visual-figurative, multi-methodological, etc.) developed by the network research teams in a synergic and complementary way;
- from the thematic point of view - as expressed in the variety of research topics. These relate to hot societal issues in contemporary society, including: Science and Social Representations (S.R.); Culture, Globalization and S.R.; Communication, Media and Social Representations; Collective Memory, Identity, Gender, Politics, Health, the Environment, Education, Economics and Finance, Marketing and Organizational Contexts, Risk and Community Life;
- with respect to the applied contexts and domains of expert and lay knowledge production and transmission: education, health, economics, environment, tourism, politics, organisations, media industry, etc.

Since the inception of the theory, the dynamic between the reified universe (science) and the consensual common sense knowledge through educational and communication systems has been the founding focus (Moscovici, 1961/1976). Social representations are the product of interaction and communication, taking their particular form and shape at any moment as a consequence of the specific balance of these processes of social influence (Moscovici, 2001):

Social representation is a system of values, ideas and practices with a twofold function: first, to establish an order which will enable individuals to orientate themselves in their material and social world and to master it; and secondly to enable communication to take place among the members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their world and their individual and group history (Moscovici, 1976, p. xiii).

There is a long history of application of the theory of social representations in the field of education, given the importance of communication in both. In particular, the theory has an added value in taking into account the effects of not only the institution and the group, but also the relationships between these two on the shaping of the contents of social representations (Räty & Snellman, 1998). In this context, the relationships to the school system include the dimension of expertise and the dimension of socio-educational position, associated with cultural capital (Bourdieu & Passeron, 1977).

Tuval and Orr (2009) emphasize that a theory whose main subject is common sense enables the researcher to investigate incompatibilities within societal thinking and doing, offers a unique perspective to investigate verbal and active elementary school representations, by which some children are identified as normative and others as outsiders who are distinctively treated and represented with a variety of outcast labels.

A fundamental function of the theory of social representations concerns the capacity of a person to explain the inexplicable, turning what unfamiliar into the familiar, which plays a crucial role in the context of science at large, and in particular education (Adnessi & Carugati, 2010).

3. Methodology

This contribution concentrates on “interviewing” publications on social representations by retrieving data and meta-data, in order to explore to what extent in different thematic areas the paradigmatic conjunction of social representation with other theories and constructs has stimulated the impetus for a methodological pluralism that can be pursued by scholars that do not comply with the dominant trend.

The tool that enables such “interviewing” is the meta-theoretical grid of analysis (de Rosa, 2013), organized on two levels. This paper features the results stemming from the first level, aimed at reviewing literature with a traditional bibliographic approach. It allows organizing information on authors and countries in which their institutions are located, years of publication, whether the publication is a journal, conference presentation or book, language of the publication, type of paper (theoretical, empirical). This kind of information is commonly used to map the diffusion of the Social Representation theory and its development over time and space, in a sort of epidemiology of knowledge.

Subsequently, the retrieved abstracts and keywords of publications have been subject to textual analysis, using IRAMUTEQ (Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires) software, developed by Pierre Ratinaud (2009). Classical textual statistics, descending hierarchical classification and similarity analysis obtained offer a deeper insight into the symbolic content derived from textual materials as an important kind of research data (Camargo, 2013).

We expect that the results will show at what extend the thematic areas of Education and Science are interrelated or treated as distinct objects of empirical research, reproducing a split between “reified” and “consensual” universes of knowledge. We also anticipate that the socio-cultural contexts (with different ideologically oriented policies and specific societal issues) and the time dimension affect both the agenda of education and science popularisation, as well as the way it is constructed through media.

4. Results

The publications classified under the thematic areas of Education and Science were extracted from a larger number of 10,902 bibliographic references (as of July 2016), of which 9,743 items specifically related to social representations and communication (including also books, book chapters, conference presentations, web documents, manuscripts, university reports, Master and PhD theses, etc.) filed in the repositories of the SoReCom “A.S. de Rosa” @-Library (de Rosa, 2014b, 2015, 2016, 2016 forthcoming; de Rosa, Dryjanska, Bocci, 2016, forthcoming; de Rosa, Dryjanska & Bocci, 2016, forthcoming).

As of September 2016, the publications classified under the thematic areas of Education and Science summed up to 2296. The world map in Figure 1 below offers an overview of the dissemination of the publications on social representations in the field of science, based on the country in which the institution of the first author is located.

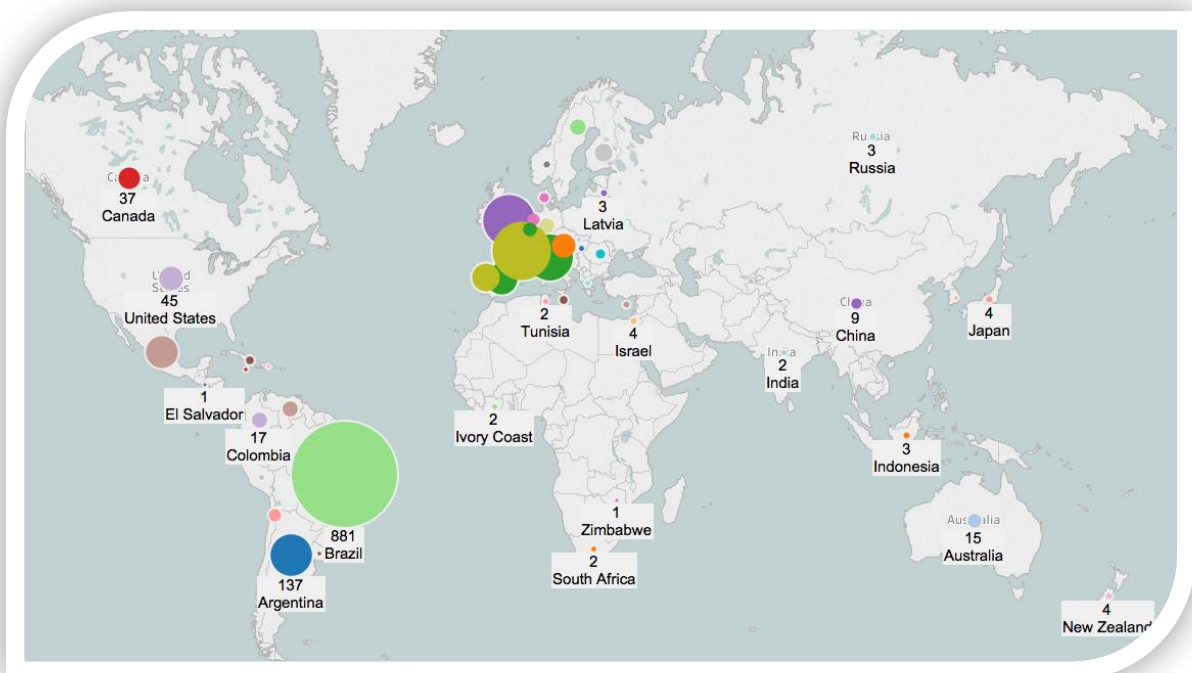


Figure 1: Science, Social representations and Communication filed in the repositories of the SoReCom “A.S. de Rosa” @-Library by the “Author’s Institution Country” across the world

It is evident that in the field of science, social representations and communication, the geo-cultural contexts of Europe and Latin America play a key role. Figure 2 demonstrates that in Europe (the theory’s homeland) especially France and United Kingdom constitute significant settings, most probably due to the fact that the former provided institutional arrangements for Moscovici, the founder of the theory who since beginning paid attention to science and communication; while the latter is home to such researchers

as Bauer and Gaskell who dedicated their efforts to research on social aspects of biotechnology and science at large.

A zoom on the geo-cultural context of Latin America (known as the most fertilised scenario) demonstrates the crucial role of Brazil with a very rich production on social representations, science and communication. This may be partially explained by the general growth trend in this country, thanks to bi-annual scientific conferences on social representations that take place there and result in numerous presentations. The other countries, Argentina and Mexico, also have a consolidated tradition and a number of prominent authors who publish on the topic of education, as shown in Figure 3 below.

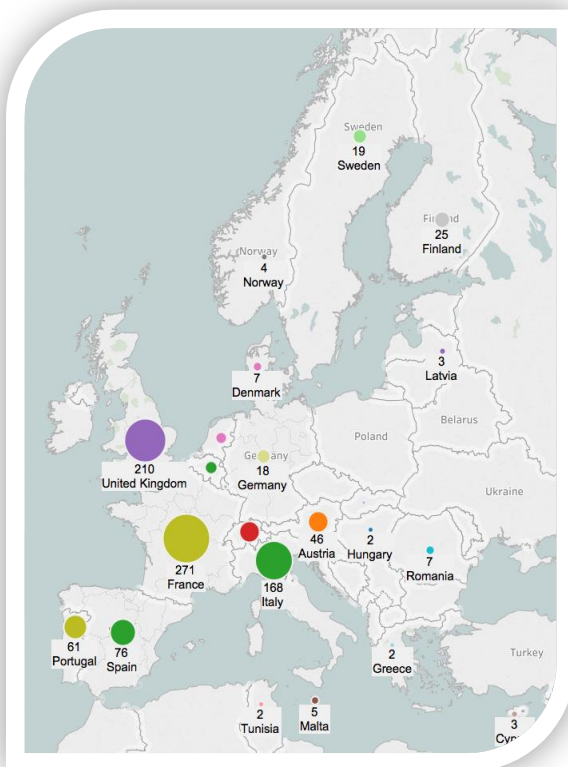


Figure 2: Science, Social representations and Communication filed in the repositories of the SoReCom "A.S. de Rosa" @-Library by the "Author's Institution Country" across Europe

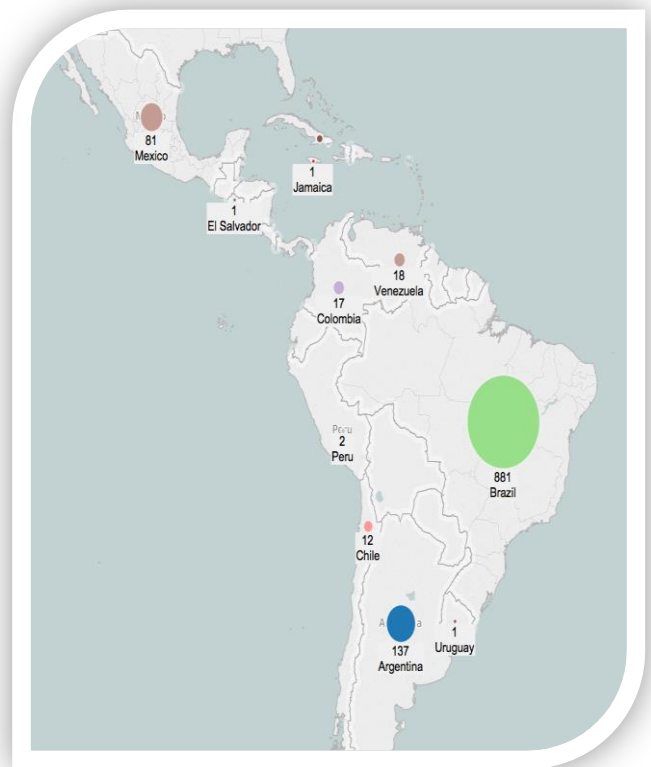


Figure 3: Science, Social representations and Communication filed in the repositories of the SoReCom "A.S. de Rosa" @-Library by the "Author's Institution Country" across Latin America

Figures 4,5, 6 and 7 below illustrate respectively the dissemination of Social Representations literature concerning Science, Education and Communication respectively in North-America (USA and Canada) and in the new emerging scenarios for the diffusion of this scientific literature in other continents (Asia and Africa).



Figure 4: Science, Social representations and Communication filed in the repositories of the SoReCom “A.S. de Rosa” @-Library by the “Author’s Institution Country” across North America

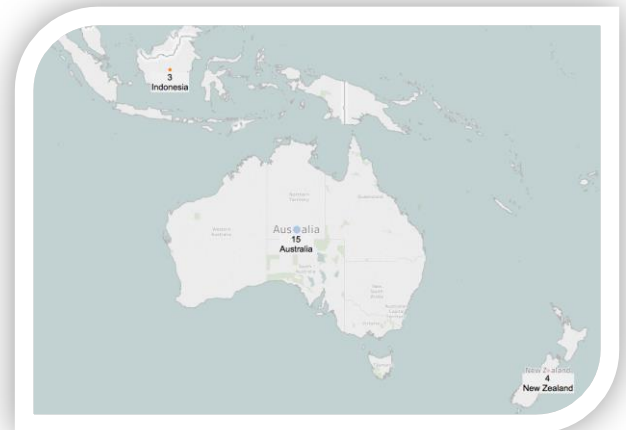


Figure 5: Science, Social representations and Communication filed in the repositories of the SoReCom “A.S. de Rosa” @-Library by the “Author’s Institution Country” across Oceania



Figure 6: Science, Social representations and Communication filed in the repositories of the SoReCom “A.S. de Rosa” @-Library by the “Author’s Institution Country” across Asia



Figure 7: Science, Social representations and Communication filed in the repositories of the SoReCom “A.S. de Rosa” @-Library by the “Author’s Institution Country” across Africa

The textual analysis using IRAMUTEQ software was carried out by deleting not recognized forms, numbers and articles, which resulted in 655 texts, 103,310 occurrences, 5,531 forms and 1882 hapax, ensuring the stability of analysis. The descending hierarchical analysis produced the following three clusters:

1. Education, professionalization, and their context and target/actors;
2. Communication, science and system of knowledge transmission;

3. Social representations and common-sense knowledge: the raw of social psychology.

Among these clusters, of specific interest to this contribution is certainly the first one. However, looking at the corpus on science, social representations and communication enables us to note how it is positioned. Indeed, it accounts for 66.7% of the corpus, demonstrating the importance attributed to education and school context in the field of social representations.

Figure 8 below shows the dendrogram produced as a result of the descending hierarchical analysis (DHC), resulting in three clusters with the most significant words for each one of them.

The Figures 9,10 and 11 below illustrates the word clouds for each of the three cluster 1, 2, and 3 detected by the descending hierarchical analysis (DHC).



Figure 8: DHC dendrogram



Figure 9: Cluster 1. Education, professionalization, and their context and target/actors



Figure 10: Cluster 2. Communication, science and system of knowledge production and transmission



Figure 11: Cluster 3. Social representations and common-sense knowledge: the raw of social psychology

In order to better comprehend the distribution of clusters, correspondence factorial analysis situates each one on a factorial plane. In Figure 12 below, it is possible to observe that the first cluster's position on the negative side of the X and Y axes singles it out as clearly distinct from cluster dedicated to a theoretical reflection on social representations and common sense understood as the raw material of social psychology, yet sharing common elements with communication, science and system of knowledge transmission.

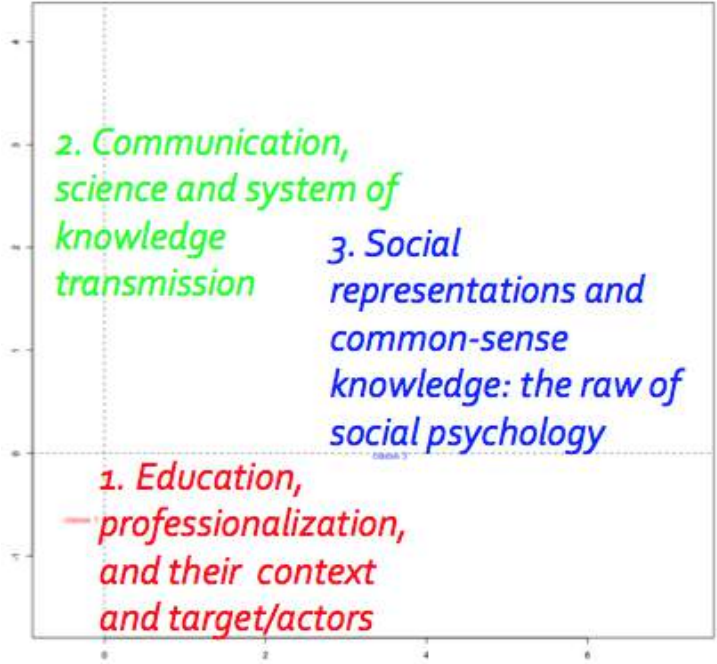


Figure 12: Distribution of clusters

The first cluster, interpreted as “Education, Professionalization and their contexts and target/actors” refers to:

- the different levels and institutional contexts for knowledge socialization (“school”, “university”, “family”) and target/ actors (“child”, “student”, “teacher”, “parent”) of education,
- also as professionalization (“professional”, “practice”, “learn”) especially in the sector of health.

It is also crucial to pay attention to the second factor, as it reveals cultural dynamics of science. Moreover, it is positioned on the negative side of the X-axis just like the first factor centred on education, which reveals some common features of the two inter-related themes.

The second cluster, interpreted as “Communication, Science and System of Knowledge Production and Transmission” is focused on science communication, starting from the seminal work on psychoanalysis (Moscovici, 1961/1976) to the more recent studies on the public understanding of the science and technology like in biotechnology, biogenetic modified foods, impact of new technologies, etc.

The interest concentrates on the system of knowledge production (“survey”, “chapter”, “author”, “sociology”) and transmission involving “medium” (“mass media”, “press”, “news”, “radio”, “newspaper”, “journalism”) addressed to the public and stimulating several processes (“emergence”, “attention”, “coverage”, “resistance”) and the three canonical system of communication (“diffusion”, “propagation”, “propaganda”).

In order to gain a deeper understanding of clusters, it is necessary to consider the illustrative variables. Figure 13 shows their distribution as a result of correspondence factorial analysis, with the most significant ones written in larger font.

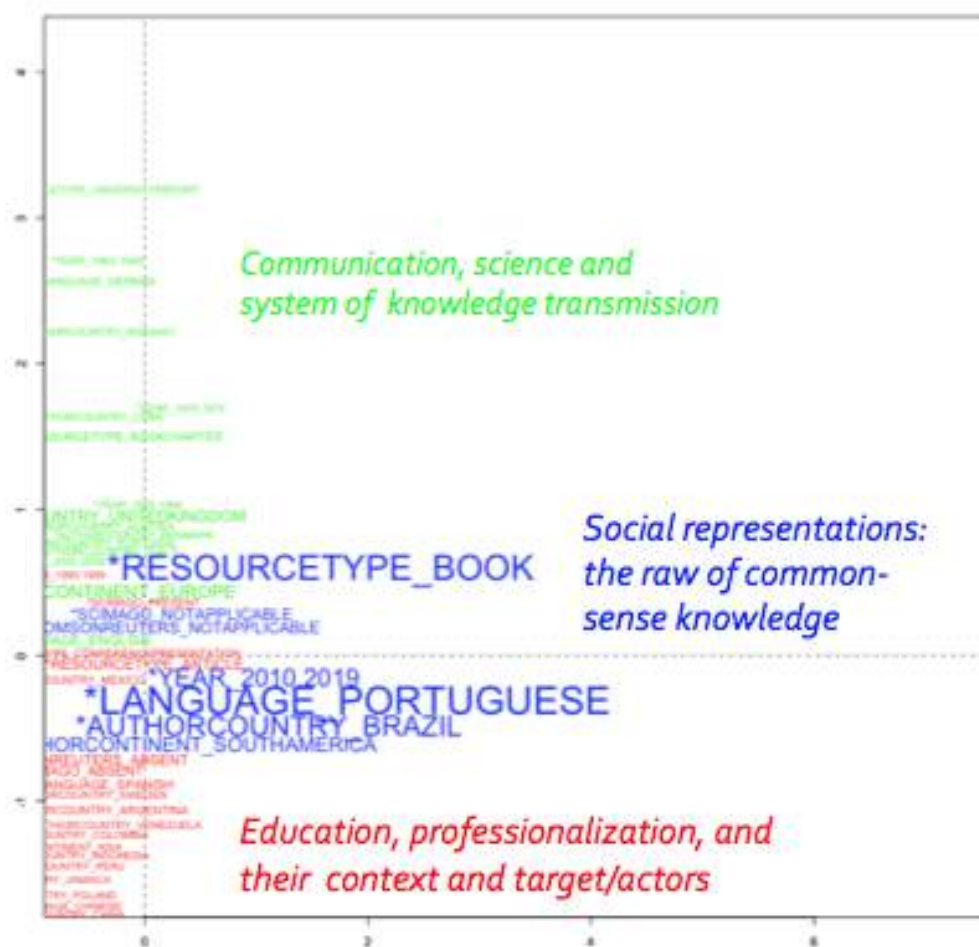


Figure 13: Distribution of illustrative variables

The significant positioning on the first cluster (“Education, Professionalization and their contexts and target/actors”) of the illustrative variables, shows:

- the dissemination of the Social Representations theory in Latin America and the specific interest for the area of Education by authors from Argentina, Mexico, Venezuela, Colombia, and in some cases also by European authors from Sweden, Spain and France and from Asia,
- the resource type is especially based on journal articles (in some cases also present in the bibliometric data bases Scimago-Scopus and Thompson & Reuters) and conference presentations,
- in Spanish and French as language of publication,
- over two decades 1990-1999 and 2000-2009.

On the other hand, the significant positioning on the second cluster (“Communication, Science and System of Knowledge Production and Transmission”) of the illustrative variables, shows that:

- communication and the dynamics of expert knowledge and common sense (as core interest of the Social Representations theory) is significantly related to literature produced in Europe in particular by authors from United Kingdom, Italy, Portugal, Germany, Norway, Austria, Denmark, but also authors from Cuba,
- resource type refers mainly to Book chapters, Books, and publications in some cases included in the bibliometric database Thompson & Reuter-Web of Science, besides University Report,

- the years of publication for this cluster cover transversally all four decades since the 1960-1969, 1970-1979, 1980-1989 until 2000-2009, with the unique exception of the last one since 2010.

Similarity analysis shows the links between significant words that organize different clusters. Given the interest in cultural dynamics of education, it is interesting to consider “education” as the semantic centre, as demonstrated in Figure 14 below.

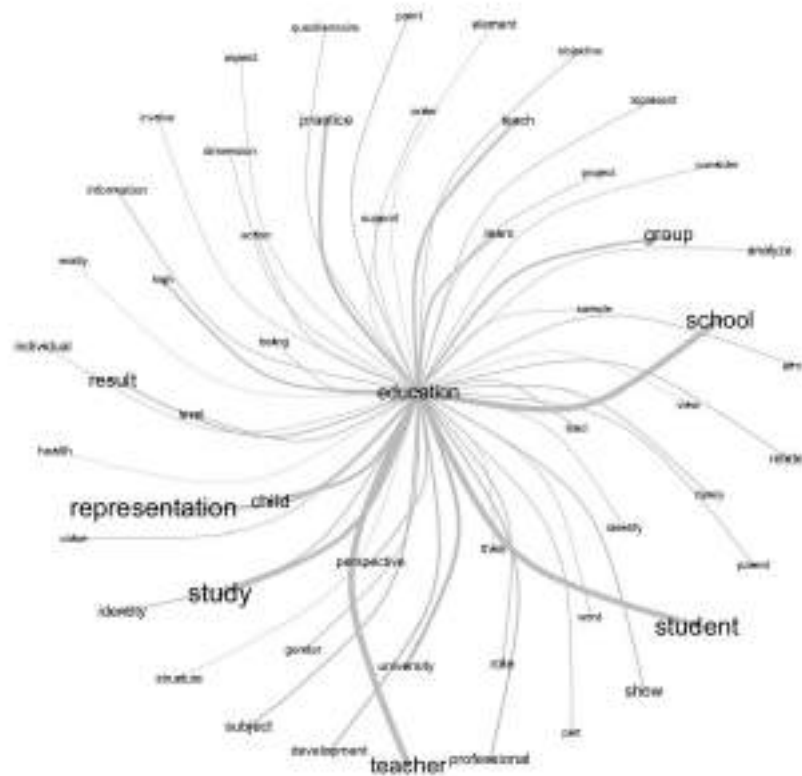


Figure 14: Similarity analysis centred on “education”

We may observe the strongest links with already mentioned key actors of education, such as “teacher”, a “student” and a “child”, as well as its common context – “school”. Moreover, activity related to “study” takes a relevant position, probably given the interest of social representations in practices and behaviour. Finally, the frequent reference to “representation” further illustrates the relevance of the theory, which attracts not only academicians, but also professionals, especially in the field of education, on various levels, starting from elementary school, through high school and to university. The theory has also been successfully employed when it comes to training professionals, such as nurses, as well as lay people, in order to inform and sometimes even transform their practices related to health, hygiene and other issues. Concerning the second cluster, it is worthwhile to turn to similarity analysis centred on the “medium”, more commonly referred to as different types of media, as shown in Figure 15 below.

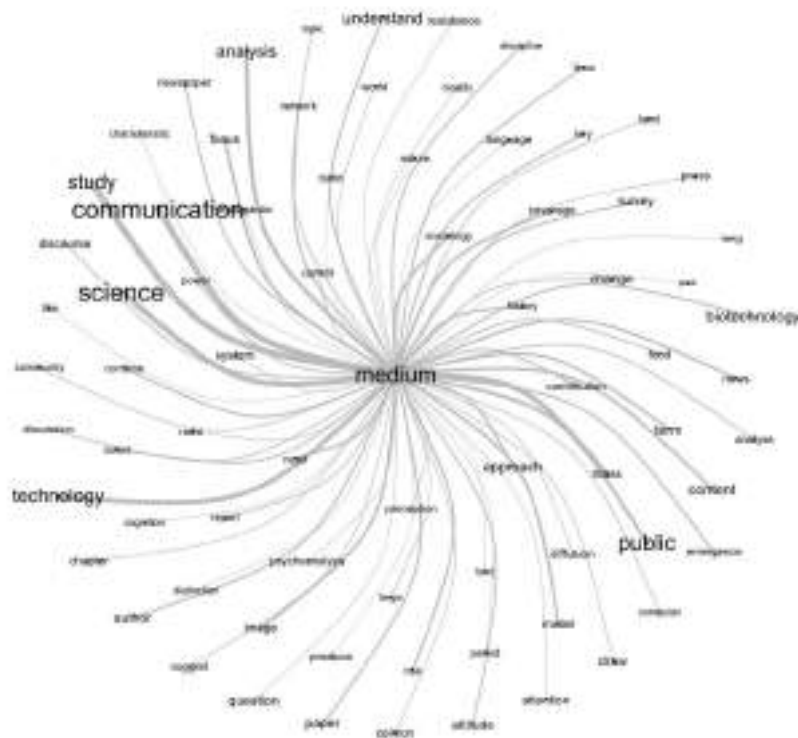


Figure 15: Similarity analysis centred on “medium”

In case of media, obviously the strongest link concerns “communication”, the core interest of the theory of social representations. There is also the significant role of “mass” media in the modern world, where besides face-to-face interpersonal communication, innovative vehicles of meaning, through the Internet, such as social networks, websites, portals, forums and others, enable sharing and shaping of representations. Finally, the interest in “science” introduces again the realm of education, often concerning the “study” and “analysis” of topics related to “technology”. The process of making unfamiliar familiar becomes necessary especially when dealing with complex scientific discoveries, which potentially have an impact on daily life of the “public” at large, the target of most media.

5. Discussion

A careful consideration of cultural dynamics related to publications on science, social representations and communication reveals a confirmation of the exploratory hypotheses.

The expected inter-relation of the thematic areas of Education and Science, nevertheless treated as distinct objects of empirical research indeed reproduces a split between “reified” and “consensual” universes of knowledge. In the context of education, the main actors such as teachers, students and professionals are all involved in the act of transmitting knowledge, during which social representations play a key role. The common-sense reasoning has to be taken into account when teaching and learning, especially if practices rooted in collective memory are challenged, also in such spheres as health and hygiene. Especially in more traditional societies, as evidenced by illustrative variables, successful education strategies have to deal with common social representations. However, the cultural dynamics between “reified” and “consensual”

universes of knowledge is not limited to education, but also closely related to science. Latest discoveries that concern everyday socio-cultural practices, such as eating or traveling, need to be properly communicated to the general public. How this process occurs is the focus of the second factor, where the relationship between experts and the public tends to be mediated by different channels.

Also the explorative hypothesis concerning the socio-cultural contexts (with different ideologically oriented policies and specific societal issues) and the time dimension has been partially confirmed. The inter-relatedness of the factors centred on “Education, Professionalization and their contexts and target/actors” and “Communication, Science and System of Knowledge Production and Transmission” proves that socio-cultural and temporal contexts affect both the agenda of education and science popularisation and the way it is constructed through media. While there is a marked interest in education, with numerous studies carried out in Latin America, in particular Argentina, Mexico, Venezuela and Colombia, in some cases this concern is also shared by European authors from Sweden, Spain and France, and some from Asia. Such dynamic, applied knowledge tends to be disseminated in the form of journal articles and conference presentations. On the other hand, a more theoretical and conceptual interest in social representations and communication of science finds a more fertile ground in Europe, in particular by authors from the United Kingdom, Italy, Portugal, Germany, Norway, Austria and Denmark, but also authors from Cuba. Books and book chapters appear as more suitable publication form in this case, probably allowing authors to develop at greater length the theoretical reflections illustrated by empirical studies.

6. Conclusion

To conclude, education appears as a privileged field for the study of transformations of social knowledge, enabling the researchers to explore “how social representations are constructed and how they develop and are transformed in the heart of social groups, and to illuminate the role of these constructions in the relations of these groups and their representations (Gilly, 1989, p. 384). Education scientists in this scientific community are therefore faced with a double challenge (Chaib, 2015). On the one hand, they sustain that the theory of social representations, with its emphasis on the importance of common-sense knowledge, might constitute an alternative to psychologically based theories of learning. On the other hand, they look at the theory with new eyes, evaluating its ability to integrate new elements such as the Internet, globalisation and multiculturalism.

The genesis of social representations involves the classification and conceptualization of an unfamiliar phenomenon, such as a techno-scientific endeavour, into a set of well-known categories. This process can be effectively accomplished with the use of metaphors (Christidou, Dimopoulos, & Koulaidis, 2004) and numerous non-verbal channels. Therefore, a promising direction for further studies of the cultural dynamics of Education, Science and Social Representations in the worldwide research landscape and contemporary media scenario, would surely benefit from adopting the modelling paradigmatic approach (de Rosa, 2013, 2014a), which takes into account iconic aspects, while integrating diverse methods, related hypotheses and data analysis strategies.

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Recommendations for OER Integration in Austrian Higher Education

Martin Ebner

Educational Technology, Graz University of Technology, Austria
martin.ebner@tugraz.at

Michael Kopp

University of Graz, Austria
michael.kopp@uni-graz.at

Christian F. Freisleben-Teutscher

University of Applied Sciences St. Pölten, Austria
cfreisleben@fhstp.ac.at

Ortrun Gröbinger

University of Innsbruck, Austria
ortrun.groeblinger@uibk.ac.at

Katharina Rieck

Austrian Science Fund, Austria
katharina.rieck@fwf.ac.at

Sandra Schön

Salzburg Research, Austria
sandra.schoen@salzburgresearch.at

Peter Seitz

Federal Ministry of Science, Research and Economy, Austria
Peter.Seitz@bmwfw.gv.at

Maria Seissl

University of Vienna, Austria
maria.seissl@univie.ac.at

Sabine Ofner

Federal Ministry of Science, Research and Economy, Austria
Sabine.Ofner@bmwfw.gv.at

Claudia Zimmermann

University of Graz, Austria
claudia.zimmermann@uni-graz.at

Charlotte Zwiauer

University of Vienna, Austria
charlotte.zwiauer@univie.ac.at

Abstract

Open Educational Resources (OER) are considered an important instrument to increase access and to facilitate the reuse of learning content. Educational institutions, especially those in Higher Education, play a crucial role in the production of OER, since they are the main producers of learning materials. To foster this production, a national strategy or at least a national commitment to OER is necessary. Moreover, due to the very strict copyright law in Austria, this achievement is of high importance and necessity.

In this publication, we will introduce recommendations for the integration of OER in all Higher Education institutions in Austria; these were developed by a national workgroup consisting of different stakeholders (government, library, funder, Higher Education and special interest groups). The overall aim is to achieve sustainability for the educational sector, especially with regard to the usage of learning materials by different lecturers as well as institutions. The cooperation among various stakeholders on different levels needs to be in the centre of all further efforts, which should be based upon six explicit requirements:

1. Mandatory commitment to OER
2. Establishment of a nationwide information platform for exchange and cooperation
3. Establishment of nationwide educational programmes for different stakeholders
4. Establishment of national OER badges
5. Targeted financial and structural promotion of OER
6. Establishment of OER strategies within each institution and as a comprehensive approach

Each requirement will be described in more detail and a roadmap will illustrate how OER can be successfully integrated at Higher Education institutions in the next ten years.

Keywords: Open Educational Resources, white paper, national strategy

1. Introduction

In 2002, the UNESCO announced its initiative “Free Educational Resources”, and the UNESCO International Institute for Educational Planning (IIEP) thus endorsed “Open Educational Resources (OER)” in the explicit “wish to develop together a universal educational resource available for the whole of humanity, to be referred to henceforth as Open Educational Resources” (D’Antoni, 2006). The initial idea was to provide open educational material to anyone, worldwide. One of the first OER milestones was the start of the “MIT OpenCourseWare” in 2002, hosted by the Massachusetts Institute of Technology (MIT). Nowadays, the MIT provides a huge repository of lecture recordings, videos and further educational content (Lerman et al., 2008). In 2007, the questionnaire about OER of the OECD and a first review about the growing OER movement by the William and Flora Hewlett Foundation drew attention to the new, but quickly growing initiative (Atkins et al., 2007). OLCOS and Bazaar, two OER projects co-financed by the European Commission, started in the same year, followed by the Open University in the United Kingdom and their platform “OpenLearn” (Lane, 2008). It should be noted that even though the OER movement began more than 10 years ago, it still has not quite reached the broad public.

In this publication, we would like to illustrate today’s situation regarding OER in Austria with a special focus on Higher Education. We start with an introduction of OER as well as the very strict copyright law in Austria. Afterwards, we present the conclusions reached by a stakeholder group focused on OER that published its recommendations in a white paper (Ebner et al., 2016c).

2. Use and production of Open Educational Resources (OER)

In Central Europe, especially in German-speaking countries, a very strict copyright law protects the rights of artists, musicians and authors. Obviously, the intention is to preserve their intellectual property, yet this law also applies when such content is used for educational purposes. We would like to give a short example: If a lecturer produces content for a lecture and provides it to the students (maybe even digitally via any Learning Management System), students are not allowed to use it in any way other than for their personal learning process. In other words, any form of reuse, sharing or even saving the content on another information system constitutes a criminal offence. As a result, every single student needs to get personal permission from the author to use the content in any way that goes beyond the read-only mode. There are also several other scenarios in which the concerns for infringements of the copyright law complicate or constrain the process of teaching.

Open Educational Resources could provide a solution to this problematic situation. Since they are available for free, they are of high value for educational purposes. “Open” according to Ebner & Schön (2011) means that educational content

- is available for free
- is usable for free (can be changed or remixed) and
- is licensed with an open licence.

Geser (2007) compiled a list in 2007 about what the benefits of OER will be:

1. OER offer a broad range of subjects and topics to choose from, so this will lead to more flexibility in using materials for teaching and learning
2. OER will help to save time in the long run due to the possibility of reuse
3. OER will help to increase the value of educational content
4. OER will assist collaboration and cooperation as well as innovation (Ebner et al., 2016a)
5. OER will support user-centred learning.

2.1 Types of OER licences

As mentioned above, any kind of OER is not only freely available but must also hold an open licence. There are different varieties of open licensing, but the most well-known worldwide are the “Creative Commons licences”, or shortly “CC-licences”. The most obvious advantage of those licences is that they are available in many countries and respect the national laws. Furthermore, CC allows for the combination of different options by the author:

- BY: In the case of reuse of the content, the author has to be named.
- ND (“no derivation”): The content must not be changed in any case.
- NC (“non-commercial”): The content must not be used for commercial purposes.
- SA (“share alike”): The new, remixed content must be shared with the same origin licence.

A well-known example is the licence of the popular encyclopaedia Wikipedia, which is distributed under CC BY-SA 4.0. In general the licences CC BY, CC 0 and CC BY-SA should be used in the sense of OER.

2.2 OER in Higher Education

The use of OER in Higher Education is of high interest, even though there are many known problems (Ebner et al., 2016b). Nevertheless, a cutting edge study conducted in the German-speaking countries of Europe (Ebner et al., 2015) pointed out that universities are the biggest producers of educational content in

comparison to other educational sectors (primary, secondary and adult education). The authors also stated that this high output of content is mostly due to a lack of appropriate books and handouts. In other words, many of today's lecturers prepare their own teaching materials. So it would seem that there is a reasonable chance for OER to be established directly by the producers themselves.

3. OER in Austria's Higher Education System

First experiences with digital educational content in Austrian Higher Education were gathered around the turn of the millennium, supported by the Federal Ministry of Science with essential funding. With the fostering of e-learning as the overarching goal, funding was also contingent on the promotion of the reuse of teaching and learning materials. As a result, the reuse of such materials was encouraged in a total of 49 projects (Ebner et al., 2015). These early steps can be seen as a first attempt to integrate OER in Higher Education. During the last ten years, several OER flagship projects within Austrian Higher Education institutions followed. Some pathbreaking initiatives deserve to be mentioned here:

In 2005, the University of Klagenfurt introduced the so called "OpenCourseWare" as part of its institutional strategy. Modelled after the OpenCourseWare project of the Massachusetts Institute of Technology, the University of Klagenfurt made courseware freely accessible by using Creative Commons licences. Unfortunately, this project is no longer active due to financial restrictions.

Probably the first university in the German speaking region in Europe, the Graz University of Technology published a distinct institutional OER strategy in 2010 (Ebner & Stöckler-Penz, 2010). In cooperation with Salzburg Research, this university also edited the first textbook on teaching and learning with technologies as an OER in 2011. The second edition was published in 2013, and this textbook is generally considered the first one of its kind in the German speaking region (Ebner et al., 2014).

In 2013, an international consortium (including the Graz University of Technology) offered the first open online course about OER, named "COER13" (Arnold et al., 2015). More than 1,000 participants enrolled for the course, which shows that there is a lot of interest for this topic. Due to its great success, the course was subsequently offered on two additional occasions. One principal component of the course was the so-called "OER cheat sheet" that was created for school teachers and offers a good overview of how to use and produce OER using Creative Commons licences.

Since 2014, the University of Graz and the Graz University of Technology have run their own platform for massive open online courses (MOOCs), which is called "iMooX" (Kopp & Ebner, 2015). All course materials offered on the platform are available under Creative Commons licences and can be reused and modified. University lecturers as well as school teachers are able to make full use of it. Since this is a rather unique initiative, the MOOC-platform is under the patronage of UNESCO.

Other Austrian universities have also begun to recognise the advantages of OER: For example, the Johannes Kepler University Linz offers a freely available learning software in mathematics named "GeoGebra", which is used worldwide. The Technical University in Vienna established a platform that provides free educational materials concerning the topics "renewable energy" and "energy efficient buildings". Additionally, Austria already hosted two conferences on OER: the first one was initiated in 2008 by Salzburg Research, the second one was organised in 2011 by a consortium of universities located in the Austrian province of Styria. The projects mentioned above indicate that a vivid OER community within the Austrian Higher Education institutions already exists. However, at the moment this community is mostly driven by a few pioneers. As a result, OER are not (yet) an integral part of academic teaching. There are several reasons: First of all, the use and the production of OER comes down to motivation. Many academics still refrain from using

educational materials that they have not produced themselves, because they believe that these materials do not have sufficient quality and/or do not fit the needs of their specific teaching situation. Simultaneously, educational materials are often considered the property of the producers. Academics invest a lot of time and effort in producing their teaching content, so many of them do not want others to use their materials.

In addition to personal reasons, the motivation to use and produce OER also depends on the conditions created by the universities. Suitable labour contracts that encourage an enabling environment for the use and production of OER are helpful, as is the establishment of a common spirit to share and reuse the materials of colleagues. This means that fostering OER is primarily a task for the management level at universities. Academics need to be informed about the potential of OER, they need to be trained to use and produce OER and they need a supporting environment where the use and production of OER is appreciated and honoured.

The production of OER is time-consuming and costly. In addition to proper working conditions, the financing of OER activities thus plays an important role. Since Austrian universities do not levy tuition fees, higher education is predominantly financed by the government. In this context, the relevant ministries have become increasingly aware of their responsibilities. Several OER projects have been co-financed by the Federal Ministry of Education, including applications for mobile devices, schoolbooks and guides on how to use and produce OER (Baumgartner et al., 2016). The Federal Ministry of Science, Research and Economy, which is responsible for the higher education sector, has so far concentrated their funding on open access activities (which are – at least technically – closely related to OER) (Bauer et al., 2015). It was also the Federal Ministry of Science, Research and Economy that initiated the OER white paper for Higher Education institutions, which is the basis for this paper.

In order to meet the challenge of transferring OER activities from project status to regular operation, it seems the next step would be to address the potentials of OER and to develop a strategic approach to integrate OER in academic teaching. Therefore, these fields of action will be described in more detail in the following two subchapters.

3.1 Potentials of OER

As mentioned above, Austrian academics do not have a common understanding of how to use and produce OER. Many of them are not familiar with OER or have never even heard about them – therefore, they do not feel prompted to engage in their use and production (Ebner et al., 2016b). Explaining the potentials of OER is considered to be a major step in order to create interest in them. And indeed, there are many potentials to be taken into account:

- OER increase access to free education. In the past, scientific results and educational materials were made available with the help of public libraries. Nowadays, most information is retrievable on the internet. In order to allow for the legal use of educational resources by the digital society, OER are ideal.

When using Creative Commons licences, the options of legal usage and modification of OER are clearly defined. Educational materials that are not licensed in a specific way are generally subject to copyright laws (at least in Austria). This means that lecturers as well as students must not use these materials without asking permission from the author (which is rather laborious and in many cases downright impossible). Thus, OER facilitate access to and (re-)use of educational materials.

- Because they can be used for free und legally modified, OER provide substantial support to open learning scenarios. They foster open types of learning like working with (e-)portfolios or working in learning groups. OER enable a participatory learning culture as well as the cooperation between educational institutions and educational sectors. Moreover, OER enhance didactical innovations like the inverted classroom concept or game based learning.
- It is often assumed that there is a problem with OER quality. In truth, this does not seem to be the case. It can be expected that educational materials produced by academics are generally of high quality. If these materials are then made available on the internet, their quality even increases, because the materials can be freely accessed, commented on and assessed publicly by experts and other users. This entails that the original creators of OER have a greater motivation to adhere to high quality standards in comparison to lecturers who only use their scripts and presentations in the lecture hall. If suitable OER are not available, this is usually not because of a lack of quality in existing material but due to the fact that the needed resource has not yet been created (Clements & Pawlowski, 2012).
- Academics increase their competencies to use and produce OER by using and producing them. Dealing with OER expands the didactic opportunities for lecturers as well as students. Thus, OER are an essential aspect of high quality teaching. Since OER are often used or produced in group settings with students, they can foster the active participation of students in class. Additionally, the usage and production of OER often requires further research on the topic, which leads to increased knowledge gain.
- Although OER are not automatically barrier-free they make a valuable contribution to inclusion. Since they can be modified legally, people with special needs clearly profit from OER because these materials can easily be adapted (by themselves or by others) for their needs.
- OER may also strengthen the collaboration between Higher Education institutions and corporations, especially start-ups in the fields of innovation and research. Following an open access strategy, many of these companies have a policy of sharing their results. The availability of scientific findings in the form of OER could thus lead to an increased exchange of information that would benefit both sides. Furthermore, educational materials produced as OER may be used by companies as part of their continuing education programmes.
- OER improve the publicity of Higher Education institutions. At the moment, they can still take advantage of the “first mover bonus” since there are currently not many universities that work with OER. Additionally, there is always the opportunity to use OER projects as showcases to attract new students.

To sum it up, the potentials of OER can be classified into five main categories (Falconer et al., 2016): reputation building, efficiency/income generation, open access to knowledge, enhancing pedagogy and the technological momentum. UNESCO clearly states that these potentials significantly contribute to the success of Higher Education institutions (Butcher, 2011, p. 40): “As educational systems and institutions make strategic decisions to increase their levels of investment in design and development of better educational programmes, the most cost-effective way to do this is to embrace open licensing environments”. Thus, the commitment to OER implies increased investment in teaching and learning, and promises to increase efficiency and productivity by harnessing new ways of developing better programmes, courses and materials.

3.2 Strategic approach

Flagship OER projects are a good basis for the successful development of new materials. As pointed out above, there have been many promising OER projects in Austria, several still ongoing. At the moment, most of them are focused on the education of pupils and adults, but not students. Even though there are a few projects in the field of Higher Education, they are not yet cross-linked and hence they do not follow a collective strategy.

In order to promote the use of OER in the European Union, the European Commission has called for the development of OER strategies on a national level (European Commission, 2012). In the case of Austria, this implies that OER would be anchored within the national strategy of Higher Education, which is not an easy task. Again, there is the problem that academics are not very familiar with OER. This concerns the management level as well as academic lecturers and scientists. Thus, the first step would be to introduce decision makers and lecturers to OER and to convince them of their benefits (Ebner & Schön, 2013). Since Higher Education institutions are not managed as companies, it is very important to not only convince the management but also decision makers at all institutional levels. Simultaneously, early adopters of OER need to be supported so that they can act as multipliers among their colleagues. Additionally, the strategic implementation of OER has to play a role in the negotiations between the Federal Ministry of Science, Research and Economy and Higher Education institutions. In Austria, public universities (but not the other Higher Education institutions) negotiate their budgets (which are financed mostly at taxpayers' expense) every three years. These negotiations lead to performance agreements, which contain the main activities that should be accomplished during the next three years. In the future, the usage and development of OER should be included among those activities.

At the same time, it is necessary to make OER discernible and to characterize them as such. It would not be useful to establish a central place or space to save them, but it would make sense that each Austrian Higher Education institution provides their own technical infrastructure where OER can be stored and found. However, it is important that these infrastructure systems are compatible with each other. A corresponding pilot project – a cooperation between the University of Vienna, the University of Graz, Graz University of Technology and the University of Innsbruck – will start in 2016. Another relevant step is to render OER visible to potential users. In Austria, this will be attempted with another project, conducted by the so called “Forum neue Medien in der Lehre Austria (FNM-A)”. This association has 40 Higher Education institutions as members and seeks to foster technology-enhanced learning in Higher Education. The project is co-funded by the Federal Ministry of Science, Research and Economy and will establish different “labels” for OER. These labels will indicate that the teaching and learning materials are distributed under a certain Creative Commons licence. Nevertheless, the labels will not refer to the quality of the content, but since the creators are academic teachers, it can be assumed that the materials will be of high quality.

The strategic implementation of OER in the field of Higher Education also requires appropriate institutional and financial support. The usage and production of OER should be considered as conditions for the financing of Higher Education institutions by the government. In addition, Higher Education institutions are called upon to promote and support OER by themselves. This can be done by implementing appropriate strategic measures but also by a redistribution of budgetary funds in favour of OER (Ebner & Schön, 2013). Since the Federal Ministry of Science, Research and Economy has already recognized the potentials of OER, it has initiated the development of an OER white paper. A workgroup was set up for this purpose, consisting of members of the Federal Ministry of Science, Research and Economy, members of Higher Education institutions, members of the association “Forum neue Medien in der Lehre Austria” and experts

who have already elaborated a white paper concerning the open access movement in Austria (Ebner et al., 2016c). Under the guidance of the “Forum neue Medien in der Lehre Austria”, the white paper about OER was developed within six months in 2016. Since then, it has been presented to several important stakeholders in Higher Education and it has instigated a fruitful discussion, which will be an excellent basis for the implementation of OER in Higher Education.

4. Recommendations for OER integration

The white paper was published (in German) in May 2016 under the Creative Commons licence CC BY and it is available as a PDF¹. The central focus of the white paper is to formulate recommendations for a successful OER integration. In sum, there are six essential points:

1. **Mandatory commitment to OER**

To jump-start the integration process of OER in Austrian Higher Education, it is necessary that all the involved stakeholders strongly commit to OER. This is especially important for the Federal Ministry of Science, Research and Economy and the management of Higher Education institutions. Subsequently, those who use and produce OER (which predominantly involves academic teachers) should be convinced of the value of OER.

2. **Establishment of a nationwide information platform for exchange and cooperation**

Since OER are as of yet not very well known among Austrian academics, information campaigns are considered to be helpful in explaining the potentials of OER. Therefore, an information platform should be established, which not only provides information about what OER are and how they work, but also acts as a nationwide hub where knowledge and experiences in the field of OER can be exchanged. The stipulation of uniform standards for long-term archiving of OER is another advantage of such a platform.

3. **Establishment of nationwide educational programmes for different stakeholders**

Since Austrian academics are not familiar enough with the usage and production of OER, it is necessary to foster their competencies in this field. Training programmes should be offered; this can be done in the form of workshops and/or video lectures combined with classroom discussions (following the flipped classroom principle).

4. **Establishment of national OER badges**

OER should be designated as such by a central governing body. It is recommended to use three different labels indicating the Creative Commons licence that applies: Gold label means that CC BY or CC 0 has been used, silver label denotes CC BY-(NC)-SA and bronze label signifies CC BY-(NC)-ND. It must be emphasised that the labels only refer to the type of licensing and that no quality criterion concerning the content is connected with them. Such labels are expected to foster the exchange of OER between Higher Education institutions, because institutions as well as academic teachers and students are able to tell which educational materials are classified as OER without any further examination.

5. **Targeted financial and structural promotion of OER**

The target-oriented promotion of OER is essential for their integration in Higher Education. This could be achieved by institutional measures: Funding by the Federal Ministry of Science, Research and Economy should be contingent on the contractual arrangement that newly developed educational materials must be produced as OER. Higher Education institutions should honour the usage and the production of OER

¹ http://fnm-austria.at/fileadmin/user_upload/documents/Buecher/2016_fnma-OER-Empfehlungen_final.pdf

as a valuable contribution to the quality of teaching, so that using and producing OER fosters the career opportunities of academics. Those who deal with OER in Higher Academic institutions should be encouraged, not restrained. The implementation of these measures needs financial support. Thus, additional funding should be provided by the government and the existing budget of Higher Education institutions should be restructured in favour of OER.

6. Establishment of OER strategies within each institution and as a comprehensive approach

As a first step and in consideration of all stakeholders, a nationwide OER strategy should be developed. After this, the licensing of educational materials as OER as well as the free access to OER should become part of the internal strategy of every Higher Education institution. This can be achieved by following the recommendations mentioned above.

The white paper for OER integration in Austrian Higher Education concludes with a roadmap, which contains an array of proposed actions for the period of the next ten years.

Until the end of 2017, the following steps shall be implemented: several networking meetings with all stakeholders from the field of Higher Education, the responsible ministries, school and adult education and from industry and commerce; the establishment of a nationwide platform for the exchange of OER; the establishment of OER labels and the implementation of a nationwide OER strategy including appropriate financing models.

In 2018, each Higher Education institution shall develop its own OER strategy, building upon the nationwide strategy.

Finally, in the period from 2019 to 2025, the following measures shall be implemented: comprehensive OER training programmes for academics; targeted funding and support for the usage and production of OER; information campaigns about OER including conferences and contests on OER.

5. Conclusion

In this publication, we tried to shed light on how OER work and what strategies should be considered in order to successfully implement them at Higher Education institutions, aiming to raise the quality of teaching and learning (with special focus on Austria). For several reasons mentioned above, OER are a promising possibility for the sustainable distribution of learning material. Therefore, a white paper developed by a stakeholder group states recommendations for the integration of OER in Higher Education institutions. Follow-up projects should help to foster nationwide OER activities as well as the establishment of a national OER strategy. Nonetheless, the process will be a rather arduous one, because it will be necessary to raise awareness among the academic staff and to produce new and appropriate learning materials.

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Future Scenarios for Digital Learners: Sociotechnological and sociocultural trends will transform the current educational ecosystem

Xavier Mas-Garcia

eLearn Center, Universitat Oberta de Catalunya, Catalonia.

xmas@uoc.edu

Abstract

A study coordinated by the UOC's eLearn Center sought to identify drivers of change with a real impact on higher education and to determine the digital behaviour of potential students and learners.

The study included educational, technological, sociological and ethnographic perspectives. Specifically, it was based on ethnographies of digital learners; desk research on reports from international renowned companies and institutions; and interviews with international experts from corporations, universities, schools and public administration. Thus, the study analysed which technologies and sociotechnological trends are going to transform people's life, patterns of socialization, forms of collaboration, businesses and consumption models, and how.

The study considered trends such as the outbreak of a second digital divide based on the domain of digital competence, the existing skills gap between graduates and labour market demand, the need for immediacy of consumers, the hybridization between physical and digital worlds, and the expansion of the sharing economy. In regard to higher education, the study helps to comprehend to what degree of intensity these challenges will alter the current educational ecosystem, which new scenarios will be faced by the higher education system, to which extent the role of the university as a producer of knowledge and educational agent must be rethought, and which new approaches to training and business models should be considered.

Keywords: digital learners, educational trends, sociocultural trends, living and learning technologies, lifelong learning, higher education challenges

1. Introduction

Education has been shaken by the winds of change for the last two decades. New educational ideas and new pedagogical approaches are being proposed in educational practice, research and innovation. E-learning 2.0, PLEs, connectivism, rhizomatic learning, MOOCs and the flipped classroom are some examples. The source of this wave of change lies in many of the educational reform movements of the 20th century (Trilla, 2007), but it is also the result of the widespread use of ICTs, which greatly increase the potential for applying and developing old ideas and approaches. With good reason, Anderson (2010) discusses pre-Net and Net-aware theories of learning.

However, these much heralded educational changes do not appear to have found their niche in today's education systems, and especially at universities, where they are often used as complementary tools (Gros

& Noguera, 2013; Noguera, 2013) and where many of the still prevailing ideas on education, such as uniformity of education and the teacher's authority, are in contrast to the transformation of significant aspects of the knowledge society, such as copyright, digital identity and information management (Bartolomé & Grané, 2013).

The truth is that apart from education, all areas of human activity (the economy, culture, entertainment, communication, consumption, production, etc.) have long since been transformed as a result of the changes imposed by the rhythms, rules, scales, magnitudes and devices of the digital society. However, the driving force behind these changes has not only been the evolution of technology and knowledge in each sector, but also a response to more profound impulses and inertias. This means sociocultural and sociotechnological trends and macrorends, such as contribution², hybridisation³, experimentation⁴ (Fundación Telefónica, 2012), ubiquity, individualisation, the network society and the fast-moving society, among others (Moyano, Bouchet, Paniagua & Mas, 2016).

The consolidation of these macrorends and their penetration into the social fabric are changing every facet of peoples' daily lives, laying the foundations for a new culture that is transforming – often disruptively – the economy, production, leisure and entertainment, ways of socialising, communication, transportation, politics, the media and health, among many other areas. But will education be an exception to this, with its traditional forms (the class/group, classrooms, lessons, teachers, materials, qualifications, degrees, etc.) remaining intact as objects and rules from an ancient liturgy?

These changes in personal, social and professional habits in daily life are shaping a new profile of lifelong learners, who are defined by sharing skills, habits and expectations based on digital culture and society. In this study, we refer to these people as “digital learners”.

In order to identify their impact on the ecosystem of education and to suggest possible scenarios for education for a timeframe in around 2020, this study examines the evolution of these macrorends and analyses the characteristics of “digital learners”. Its results and conclusions outline a scenario of change with new rules, values and needs. This poses a major challenge to the current university system, as it must adapt if it wants to maintain its leading role in individuals' training throughout their lives.

In this paper, we set out the main findings and factors of change that can seriously alter the current *status quo* at universities and in education in general.

² This refers to collaborative activities, reciprocity, shared knowledge, etc. As embodied in the sharing economy.

³ This is the combination of dimensions and areas of activity. For example, hybridisation between the physical and digital, between the personal and professional, between private and public, etc.

⁴ This relates to direct and personal experience and to emotional and experiential impact. An example would be the experience economy.

2. Objectives of the study and methodology

Future Scenarios for Digital Learners. Trends in the digital experience of Internet users and its impact on online higher education (FS4DL) (Moyano et al., 2016)⁵ is a study commissioned by the eLearn Center of the Universitat Oberta de Catalunya (Open University of Catalonia, UOC) and the Creafutur Foundation⁶, which is jointly designed and coordinated by the two institutions. From the institutional point of view, it is part of a more extensive series of reports consisting of two further studies which were all carried out in order to guide the UOC's institutional strategy for the future of online higher education. Each study is independent of the others, and taken as a whole they cover different but complementary areas: the digital society and digital learners, educational trends and best practices in the application of emerging pedagogies, and educational technology platforms of the future (Table 1).

Table 1: Studies commissioned by the UOC on the campus of the future

Study	Focus
<i>Future Scenarios for Digital Learners. Trends in the digital experience of Internet users and its impact on online higher education</i> (Moyano et al., 2016)	Society and students (digital learners, sociocultural and sociotechnological trends).
<i>Next Generation Pedagogy: IDEAS for Online and Blended Higher Education</i> (Guàrdia, Witthaus, Padilla & Girona, 2016)	Emerging pedagogies (educational trends, best practices in higher education).
<i>Next Generation Learning Architecture</i> (Merriman, Coppeto, Santanach, Shaw & Aracil, 2016)	Technological environments (future of LMS).

The specific objectives of the study can be summarised as follows:

- *To obtain knowledge about digital learners' experience of using the Internet and digital technology throughout their lives (...) in different areas.*
- *To identify factors of change and lines of development in the sociotechnological and educational environment, enabling descriptions of new scenarios for the use of digital technology in educational and professional contexts.*

(Moyano et al., 2016)⁷.

In methodological terms, FS4DL is a qualitative study consisting of three phases in which different methods are applied according to the type of results expected in each one (Table 2).

⁵ Original title in Spanish: *Escenarios de futuro para los digital learners. Tendencias sobre la experiencia digital de los usuarios de la red y su impacto en la educación superior en línea.*

⁶ <http://www.creafutur.com/en>

⁷ English translation by the author.

Table 2: Structure of the study

	Phase 1. Needs	Phase 2. Trends	Phase 3. Exploration
Methodology	Ethnography	Desk Research Interview with experts	Workshop experts
Source of the data	• Diary of experiences and semi-structured interview • 24 participants (Barcelona, Madrid, Mexico City, Bogotá) • 50% women / 50% men • <i>Targets'</i> age: 13-18 / 19-25 / 26-35	• Analysis of more than 60 secondary sources⁸ • Semi-structured interviews with five international experts	• Description of scenarios based on two trends selected • 13 participants from the UOC staff (faculty, specialist experts and middle management staff)
Anticipated results	Characteristics and profiles of digital learners: skills, needs, motivations, habits and ideas about the use of technology in everyday life and in online education.	Sociocultural and sociotechnological macro trends and micro trends; factors of change impacting on education.	Future scenarios depending on the materialisation of trends.

2.1 Phase 1: Needs

The first phase consists of an ethnographic study of a sample of 24 participants selected because they represent the majority target age group of digital learners *likely* to be studying at the UOC in the 2020 timeframe. For this reason, the youngest age group is pre-university age and the oldest are no older than 35 years old⁹. From a generational perspective, these targets are, very broadly speaking, individuals belonging to Generation Y (born between the early 1980s and the late 1990s) and Generation Z (born in the late 1990s) ("Generation", n.d.) who, as discussed below, play a key role in shaping the sociotechnological and sociocultural macro trends identified in the study. The selection criterion for origin was the university's internationalisation strategy.

The objective of this phase was to determine the characteristics of digital learners in terms of their use of digital technology both in their daily lives in general and in educational situations, to know their position as regards online education, and to identify profiles or groups with different characteristics within the same group.

2.2 Phase 2: Trends

Phase 2 is the core of the study. This part focuses on identifying the sociocultural and sociotechnological macro trends and micro trends that are likely to shape all areas and dimensions of human activity, from daily life to the transformation of the various sectors and areas of knowledge, immersing them in digital culture. This phase consists of two actions. First, in order to identify trends and factors of change in various areas of human activity, a desk research based on international articles and reports was carried out. Second, five

⁸ Gardner Reports, BBC Research, Horizon Reports, European Commission, articles from scientific journals and other sources of diverse origin.

⁹ According to figures for the 2012-2013 academic year, 75% of UOC students are under 40 years old (Universitat Oberta de Catalunya, 2016).

semi-structured interviews were conducted with international experts linked to digital technology and education, but from different perspectives such as schools, higher education, the corporate world and public administration. The participants were:

- **David White.** Head of Technology-Enhanced Learning at the University of the Arts London. UK.
- **Harold Jarche.** Expert in educational models and learning technologies. Canada.
- **Anusca Ferrari.** European Schoolnet, formerly European Commission. Researcher in learning and technologies and expert on digital competence. Italy.
- **Boris Mir.** Director at the Institut Escola Les Vinyes. Catalonia.
- **Jaime Casap.** Chief Education Evangelist at Google Inc. USA.

The purpose was to identify vectors of educational change in the digital society, in order to relate them with the trends identified.

2.3 Phase 3: Exploration

Finally, phase 3 consisted of a workshop involving 13 experts from the UOC, and specifically teachers and specialist professionals from different areas of the organisation and training programmes. The objective of this phase was to identify four possible future scenarios, in order to reflect during the workshop on how each one could affect the characteristics of digital learners, education in general, online training and the institution itself. In order to obtain these scenarios, two of the trends identified in phase 2 were selected. Those with the highest degree of uncertainty about whether they would materialise were prioritised. From the intersection of these two trends, polarised between the maximum and minimum probability of realisation, four quadrants corresponding to four possible scenarios emerge (Figure 1).

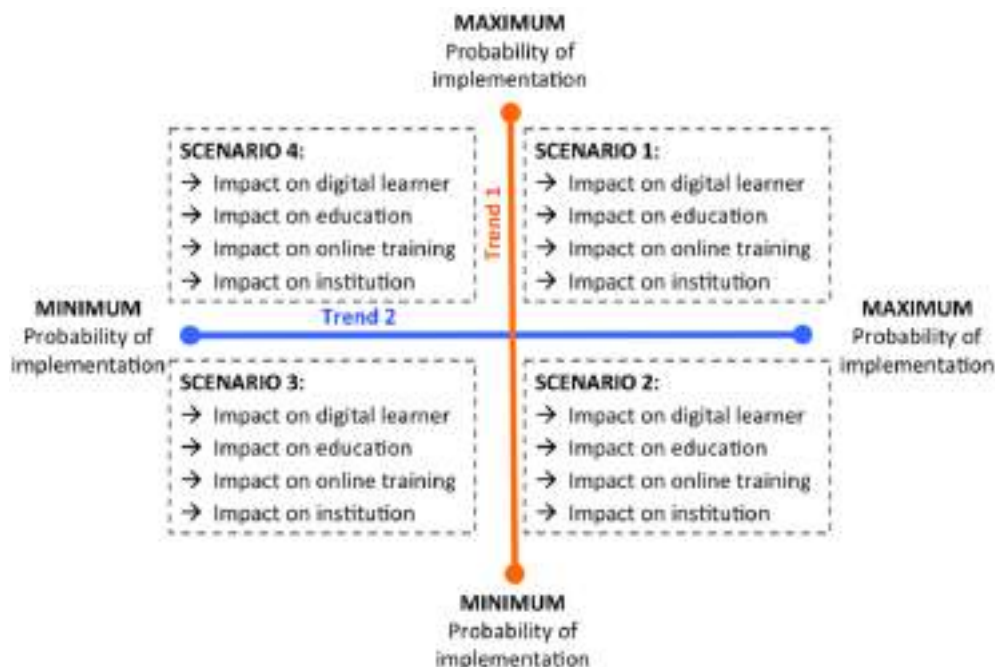


Figure 1: Mechanism for identifying the future scenarios

As shown in Figure 1, each scenario contains four aspects discussed by the participants in the workshop (see Figure 3 in section 3.4).

3. Findings

We present the most important results in terms of the subject and the issues raised in this article. We selected all the insights and factors for change that could provide information and data for consideration of the sociocultural and sociotechnological context in which the education ecosystem will develop over the coming years¹⁰.

Accordingly, we organised the results as follows:

- **Digital learners.** Origin: phase 1 (ethnographies) (Moyano et al., 2016, 19-62) and phase 2 (desk research) (Moyano et al., 2016, 66-74).
- **Contributions by experts.** Origin: phase 2 (interviews) (Moyano et al., 2016, 75-80).
- **Trends and factors of change.** Origin: phase 2 (interviews and desk research) (Moyano et al., 2016, 81-124) .
- **Future scenarios.** Origin: phase 3 (identification of trends and quadrants).

3.1 The profile of the digital learners

In the results of the ethnographic studies conducted with the 24 participants selected, we generally found that they were individuals who use a wide variety of devices and applications. However, the participants from Latin America tend to have more devices than the European participants. In the age target groups, the oldest tend use applications and services for professional use and direct consumption to the widest extent.

What they value most about the online tools they use is that they have a clear and simple format which provides extensive and well-organised content that is also entertaining, visual and easy to follow; it provides access to information swift, free and comprehensive; and enables easy communication (Moyano et al., 2016, 26-28).

However, the most interesting point is the identification of two very different profiles for the use of digital content and technology, and their attitude in an educational situation. In the study they are called “travellers” and “tourists”. The former are the smallest group, and are characterised by being self-reliant, with initiative, active on social media, skilled in information management and focused on experimentation. On the other hand, the latter group, which constitute the majority, are individuals who need to be guided, who use technology in a traditional way and who are sensitive to infoxication, and who feel more comfortable with conventional educational methods (Table 3). Interestingly, the literature also contains similar patterns regarding the use of information and digital technology. These include David White’s model, which makes the distinction between digital visitors and digital residents to describe two styles of behaviour on the Internet and when using technology¹¹. Furthermore, Kennedy, Judd, Dalgarno & Waycott

¹⁰ The references provided for the results shown are from secondary sources consulted in the study. However, for in-depth consideration of each one and to see the full results, we recommend consulting the original report (Moyano et al., 2016), which we will be referencing, indicating the pages related to the results presented.

¹¹ David White is one of the international experts interviewed in the study we present here. His model of digital residents and visitors describes the way users engage with the Internet and digital technology. According to this model, anyone can assume the role of resident or visitor depending on the context and situation in which they find themselves, although some individuals may generally tend towards one behaviour or another. The digital visitor is characterised by engaging in occasional and highly guided web access to undertake a specific task or achieve a concrete and often instrumental objective. For example, searching for information, downloading documents,

(2010), in their study of the use of digital technology among higher education students at several Australian universities, also identify four distinct groups, one of which – the largest (45%) – is characterised by its basic and restricted use. In the same vein, Mas (2014, 273-274) identifies a similar pattern characterised by a group with basic uses (searching for information on the Web, downloading audiovisual content, accessing social media and using instant messaging) that are used extensively, and another group engaging in complex uses (creating and editing content, video calls, active participation on social media and publication of content on the Internet) to a lesser extent. In this case, the context was an exploratory study conducted with a sample of students from the UOC.

Table 3: Characteristics of the “traveller” and “tourist” profiles (Moyano et al., 2016, 33-37)

	“TRAVELLER” profile	“TOURIST” profile
What they do	• They consult several pages of information and compare them. • They manage information independently. • They are opinion formers; they like to assert themselves in front of their friends. • They download apps from their favourite platforms. • They use a tablet and smart TV for browsing and the computer for formal work. • They use several devices. • They are self-motivated.	• They search for information on Google. • They look but do not compare information. • Most use a single device (laptop or PC). • They only download very functional apps. • If they are involved in online education, this is because face-to-face education is impossible. • They register for MOOCs because of social imitation but soon forget about them.
What attracts them	• ICTs. • Being continuously updated. • Being pragmatic and self-taught. • The absence of limits: no teacher or building. • Building for themselves. • Being able to choose, participate and give their opinion. • Effort. • Knowledge for knowledge’s sake.	• Having things organised for them. • Being guided and directed. • Simple and clear content. • Having clear roles and hierarchies. • Being constantly stimulated. • Having qualifications. • Having limits. • Immediacy.
How they feel	• Autonomous. • Motivated. • Flexible and clever. • Sure of themselves. • Vocational. • Pleased at doing things for themselves.	• They need external stimuli to motivate themselves. • Sense of obligation. • Sure of themselves. • Need for external recognition. • They are influenced by the relevance of the mark.

To complete the profile of digital learners, we have added some results from phase 2 (desk research). In specific terms, they are related to the characteristics of generations X and Z, and their impact on the consumer and labour markets (Moyano et al., 2016, 66-74). To highlight the importance of these two generations, we must remember that they will account for 50% of the labour market in 2020 (EY, 2015) and

publishing content, sending and receiving messages, etc. However, the role of the resident is much more active as they live and act on the Internet on an open basis, sharing information and their own production with other users and making intensive use of social networks (White & Le Cornu, 2011).

that, in the same year, 40% of consumers will belong to Generation Z (Finch, 2015)¹². In terms of their professional development and employment, these generations are individual entrepreneurs, vocational and committed to the environment (Figure 2).

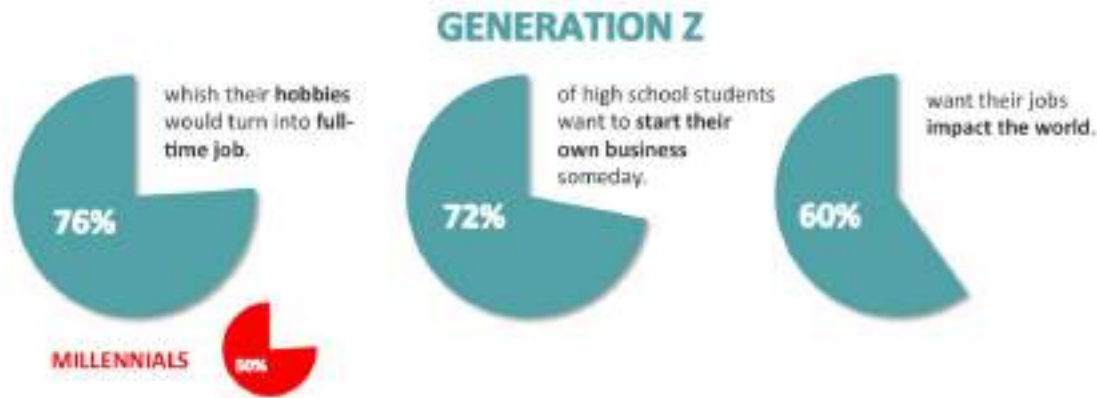


Figure 2: Data on the profile of Generation Z in relation to values linked to professional development (Moyano et al., 2016, 69) (Sparks & Honey, 2014)¹³

Moreover, the distinguishing features of these generations, and Generation Z in particular, are related to the strong integration of digital technology into their lives. They are therefore individuals with predominantly digital consumption habits who prefer to buy most of their products online (Sparks & Honey, 2014). At the same time, they tend to use multiple devices during the day, and perform various tasks while watching television (J.Walter Thompson Intelligence, 2015). Their Internet behaviour is characterised by not being limited to consuming content, but also creating it, and preferring visual content to text. The social media in which they participate most are Instagram, YouTube and Snapchat (Vision Critical, 2015). They also use the Internet and digital technology for learning, with over 50% of Generation Z using YouTube and other social media to carry out research on the Internet (Marketo, 2014).

3.2 Contributions from experts

Apart from the specific contributions by each expert, the discourse of the five experts interviewed constructs a narrative about educational change. Expressed in different ways and approached from different perspectives, the resulting narrative could be summarised as follows:

- a) Existing traditionally-based educational systems are obsolete and new training methods that meet the needs of new learners and the professional world are needed.
- b) They must be flexible educational systems, based on skills, challenges and problem-solving.
- c) Education must be more open, social and collaborative, and fully immersed in digital culture.
- d) Education must be personalised and learners must have a central role in their own learning process.

¹² “Generation Y” are individuals born between the early 1980s and the late 1990s, and Generation Z are those born in the late 1990s (“Generation”, n.d.).

¹³ English translation by the author.

- e) There will no longer be exclusive accreditation of formal education, especially in higher education.

In this sense, David White suggests designing online courses not only for individuals with a “digital visitors” profile – in the way that traditional education is designed – but also for “residents”. This would involve applying an Internet training model that is much more social, open and experiential, and designed for a profile of a digital learner who is used to working openly on the Internet and using all digital media intensively¹⁴. In addition, White reflects on the role of content in online education. In specific terms, he argues that it is not as closely related to creating original content as curating it, because students expect to find the added value of education to consist of guidance from an expert who leads them to the best content on the Internet. Meanwhile, Boris Mir says that schools will inevitably be digital, but that this will be the result of the evolution of society rather than legislative changes. Harold Jarche also believes in this central role of society and says that major changes in education come from students rather than the institutions themselves. It appears that limited capacity for reaction of educational institutions as described by the experts is not only related to their difficulty with changing educational models to suit the habits, needs and values of the digital society, but also to a predictable loss of their social monopoly on the accreditation and supply of training in favour of other bodies. In this respect, Boris Mir forecasts the decline of universities starting at the time at which they no longer have exclusive powers to provide accreditation for training. In the same vein, Jaime Casap says that universities are not ready to accommodate young people from Generation Z, who learn skills and abilities on their own initiative. He also adds that the most disruptive change that he anticipates in education will come when organisations no longer hire people based on the qualifications of their future employees and instead do so according to an assessment of their actual abilities and skills. This opinion is also shared by Anusca Ferrari. Reinforcing this idea, Casap forecasts that education is changing its approach and that the models of the future will focus on human skills, i.e. creativity, the ability to solve problems and carry out projects and collaboration, among other areas. However, this entire skill set is part of digital competence, which Ferrari says currently includes – among other things – the ability to understand the implications of publishing on the Internet, privacy, and solving problems by using typical tools of digital environments. (Moyano et al., 2016, 76-80).

All this undoubtedly suggests an evolution towards more experiential forms of learning, which are personalised and completely immersed in digital culture.

3.3 Macrotrends and key factors of change

The desk research carried out identified five macrotrends and 19 microtrends (Table 4) in the sociocultural and sociotechnological sphere. They contain 37 factors of change¹⁵, from which – in the context of this paper – we selected the 10 insights that we consider will change most intensely the educational ecosystem by 2020. These were:

- 1) **The boom in software-driven businesses.** Consumers become digital and traditional industries change strategy. Corporations and consumers are increasingly immersed in a digital environment, following the path towards an increasingly digital economy. Companies and organisations realise

¹⁴ See White & Le Cornu (2011).

¹⁵ See Moyano et al. (2016, 81-124).

that their customers have changed the way they access goods and services. Many of them invest in software, establish themselves on the Internet through sites and mobile applications, and modify their sales strategies and delivery systems (Moyano et al., 2016, 84-85).

- 2) **Skills gap and the second digital divide.** There is a skills gap between individuals leaving the formal education system and the demands of the labour market, especially in terms of technological, creative and business skills (Moyano et al., 2016, 124). There is also a new digital divide, based not on access to technology, but instead on effective and advanced mastery of it. By way of an example, 40% of the active population of the European Union does not have a suitable command of digital competence and 14% have no digital competence, whereas 90% of jobs in the near future will require a command of this competence to varying degrees (Ansip, 2015; Moyano et al., 2016, 92).
- 3) **Automation vs. Creativity.** We are at the beginning of a second “Machine Age” in which technology is displacing human labour, and not only in rudimentary tasks. In this context, only creative jobs require the added value of human involvement, because they are resistant to computerisation. An indication of this trend is that, in the United Kingdom, the number of workers employed in this type of job increased by 83.5% between 1997 and 2013 (Creative & Cultural Skills, 2015, Moyano et al., 2016, 96).
- 4) **Ubiquity and hybridisation.** The boundary between personal, professional and academic life disappears, as does the boundary separating the physical and the digital world, the public and the private, the individual and the social. This is a totally ubiquitous environment in which mobile devices, apps, cloud computing and augmented reality mean that any human activity can be relocated, and carried out at anytime and anywhere. In education, the use of mobile devices is penetrating classrooms among both students and teachers. An illustrative figure is that 85% of educational institutions allow both teachers and students to use their own devices on campus (Johnson, Adams Becker, Estrada & Freeman, 2015)¹⁶. (Moyano et al., 2016, 99-104).
- 5) **The sharing economy.** The sharing of goods, services and knowledge between peers is now consolidated and takes the form of business models such as Uber¹⁷ in the field of transport, Housers¹⁸ in real estate investment and Sharing Academy¹⁹ in the field of education (Moyano et al., 2016, 109).
- 6) **Democratisation of education.** Various types of low-cost and free training opportunities have proliferated over the last decade, such as MOOCs, open educational resources, social learning²⁰

¹⁶ According to a study by the Bradford Network (<http://www.bradfordnetworks.com/new-survey-finds-85-percent-of-educational-institutions-allow-byod-despite-security-concerns>).

¹⁷ <http://www.uber.com>

¹⁸ <http://www.housers.es>

¹⁹ <http://sharingacademy.com>

²⁰ Application of social networks and social media tools in formal and informal learning.

(Moyano et al., 2016, 110-111) and microlearning platforms, or short-format courses aimed at professional training such as Lesson Paths²¹, Pocket Academy²² and Alumne School²³.

- 7) **Infoxication.** The amount of data, information and content available on the web is much greater than users' capacity to process them. This has created the need to manage and select the information that is valuable and relevant in each case (Moyano et al., 2016, 93).
- 8) **The experience economy.** Individuals seek an experience beyond the product. The physical or digital object is no longer the focus of consumption. The experience that it provides is at the centre (Moyano et al., 2016, 114).
- 9) **From "just-in-case education" to "just-in-time education".** The rigidity and the length of current educational programmes make them unsuitable for providing skills for the labour market, with the flexibility and personalisation that this requires. Accordingly, it is possible to anticipate a transition from a model based on long degree programmes with a broad-based approach to the discipline, towards an education-as-a-service model, with specific short courses tailored to the skills required by the market and by the learners (Moyano et al., 2016, 121).
- 10) **Open micro-credentials²⁴.** The opportunity to create a globally transferable recognition system for training outside the formal systems is emerging. Some actors in the educational ecosystem, such as Pearson, Educational Testing Service and EDX are committed to adopting the Mozilla Open Badges standard²⁵ (Moyano et al., 2016, 123).

Table 4: Macrotrends and microtrends identified in the study

MACROTRENDS	MICROTRENDS
DIGITAL SOCIETY	• Digital divide
	• Infoxication
	• Improved teaching practices
	• Skills mismatch
	• Automation vs. Creativity
	• Data management in education
UBIQUITY	• Mobile learning
	• BYOD (bring your own device)
	• Blended learning
NETWORK SOCIETY	• Democratisation of education

²¹ <http://www.lessonpaths.com>

²² <http://www.pocketacademy.net>

²³ <http://alumn-e.com>

²⁴ Open micro-credentials are ecosystems of open digital badges that an individual can use to indicate skills acquired or knowledge learned, regardless of the learning environment where the training took place –in an educational institution, in the workplace or through self-study (Moyano et al., 2016, 123).

²⁵ <http://openbadges.org>

	• Social learning
INDIVIDUALISATION	• Adaptive learning
	• Game-based learning
	• Virtual reality (AR)
FAST-MOVING SOCIETY	• Generational misalignment
	• “Just-in-time” learning
	• Skills assessment
	• Open micro-credentials
	• Skills for real challenges

3.4 Future scenarios

The trends with the highest level of uncertainty regarding their consolidation in the medium term have been selected to identify the four future scenarios (as explained in section 2.3). In specific terms, this is the tendency towards the implementation of open micro-credentials as an open accreditation system in the education market, and the tendency for the skills gap between the demands of society and the labour market, and the real training of digital learners acquired in formal education systems (Moyano et al., 2016, 129-134). In the other trends identified, we believe that the level of uncertainty is not so high, and they are therefore vectors that are very likely to be part of any of the possible scenarios.

The intersection of the two trends selected, polarised between the highest and lowest probability of implementation, results in four quadrants –one for each of the four future scenarios that we describe. At the workshop in phase 3 of the study we performed a contextualised analysis based on the UOC’s institutional situation²⁶. However, in the context of this article, we merely present the scenarios resulting from the intersection of the trends (Figure 3), leaving the description open so that each reader or institution can perform their own analysis and interpretation based on the data provided in the study, using the questions raised (Figure 1), and do it according to their own point of view and context.

²⁶ See (Moyano et al., 2016, 135-160).

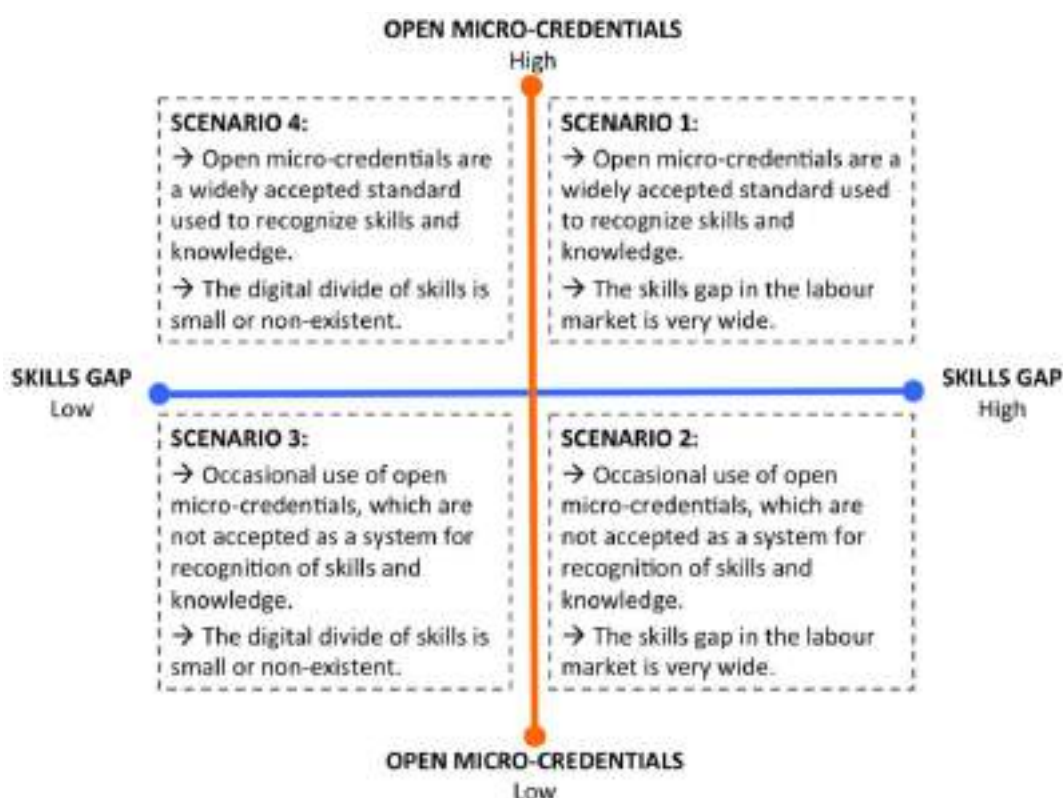


Figure 3: Future scenarios considered (Moyano et al., 2016, 134)²⁷

4. Conclusion

The increase in the demographic significance of Generation Y and Generation Z means that their characteristics –needs, habits, skills and values– will contribute to redefining the landscape of business, government and other sectors of society in the coming years. This will happen because these two generations will occupy the central space in both the consumer market and the group of professionals making up the labour supply. Universities will not be an exception. On the one hand, they will be affected by the transformation of the educational community (students, teachers, researchers, specialist technicians and management professionals), and on the other, they will have to face the challenge of responding to new approaches and needs in education. It is foreseeable that the demand for training from the labour market and society will undergo changes, not only in terms of curricular content (new skills and areas of knowledge), but also in terms of its structure and organisation. This means that the way students' skills are accessed, organised and accredited will be affected by the pace, consumption habits, ways of communication and socialisation, mechanisms and conventions of the digital society.

Education in general will therefore have to adapt to individuals' new uses of digital technology. Above all, this means its effects on the daily lives of people in various areas: communication, socialisation, accessing information and content, consuming goods and services, time management, productivity, personal

²⁷ English translation by the author.

organisation, etc. One of the effects of the digitisation of daily life is the ubiquity of human activity and the hybridisation of different areas, with the boundaries between them becoming increasingly blurred. The widespread use of mobile devices and cloud computing gives access to an unlimited number of applications and services that enable almost any kind of action to be performed anywhere and at any time, from communicating, accessing content and sharing information immediately to carrying out a bank transaction or purchasing a consumer good. In this new ubiquitous reality, training and learning must share their location, devices, applications, time and mental space with professional activity, social relationships, and leisure and entertainment.

Moreover, we are paradoxically facing a second digital divide caused not by access to technology, but arising from the command of digital competence. There is a minority group of digital learners with a strong command of this competence, making complex and extensive use of technology, and another majority group characterised by a basic command (see section 3.1). This phenomenon, which is not exclusive to any particular generation, is a factor aggravating another problem that education must face. This is the skills gap between the skills of individuals and the skills demanded by the professional world and the labour market, especially in the areas that are most closely related to technological knowledge and skills, and the command of increased digital competence.

The existence of this skills gap cast doubt on the ability of today's educational systems to provide training solutions for the real demands and needs for skills from the professional world and from digital learners in particular. More responsive educational agents are required to cope with this problem, with closer links to the various professional fields, as well as educational systems that allow agile, flexible and open types of training to be created, which adapt quickly to new demands and individual needs. One of the critical issues is accreditation, which –as seen above– could evolve towards systems of open micro-credentials showing the learning, competence and skills acquired throughout the learner's life in various contexts apart from formal education. In this regard, consideration must be given to whether the current structure, content, methodology, academic regulations and means of access to training programmes that universities offer are the most appropriate for providing a satisfactory response to the market for education in the digital society in the medium-term future.

Finally, returning to digital learners, everything appears to suggest that they will have a leading and increasingly active role in relation to their own learning. This means they will have to be able to make their own decisions about their training throughout their lives, and to master skills and learning strategies through an intensive use of ICTs that allows them to be efficient and autonomous in a totally digital environment. Given the existence of the second digital divide, these issues will emerge as an urgent need and it will be necessary to find appropriate strategies to respond to them.

Students' need for guidance on how to manage their learning and how to outline their educational –or perhaps we should say competence-based– path throughout their life, the speed of the changes in the demand for training from individuals and professional sectors in an increasingly fast-moving society, new conventions for access to goods and services in the digital economy and society, and ways of using technology in daily life in an ubiquitous reality are factors that are pushing universities to begin this process of reinvention.

One of the possible paths that universities could follow is perhaps to stop basing their range of courses on a rigid catalogue of products (a portfolio of qualifications) and instead to become genuine hubs which provide training services to accompany digital learners on their educational journey throughout their life. But there are many others to explore. It's worth trying.

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Changing the Gear: Adopting Inter-institutional Collaborative Course Development as the Policy for Distance Higher Education in Greece

Kalantzi R., Sideris D., Spyropoulou N., Androulakis G.

Hellenic Open University, Greece

Abstract

The Hellenic Open University (HOU), the unique Greek State University that exclusively provides distance education in both undergraduate and postgraduate level, has started to adopt a strategic framework which aims to enhance distance higher education in Greece and provide new courses in collaboration with other Higher Education Institutions (HEIs). This policy emerges from the growing social and academic needs to: a) provide courses in high demand academic fields, b) facilitate students' access to higher education, c) develop digital-based educational content, d) offer courses that take into account the current difficult economic situation, and e) reconstruct the HOU's academic landscape.

Towards this direction, the HOU initiated partnerships with universities, ministries and other social organizations in Greece, and formed a new dedicated Unit, the Digital Course Development Team (DCDT), based in Patras, the host city of HOU's headquarters. This Unit provides support to academic staff and Departments during the collaborative course development, and is responsible for all the necessary steps of module production, from design to delivery. The human resources and infrastructure of the HOU are exploited and reinforced, in order to create cutting-edge, widespread and competitive distance courses. This paper, using ethnographic, qualitative methods, describes the ongoing collaborative course development project. Initially, the collaboration with other HEIs is critically presented, alongside the creation of the DCDT. In addition, the procedures and processes of the project evolved are outlined. Finally, tentative but generalizable conclusions are proposed, including initial results, problems confronted by the decision makers and the Unit, and actions taken to address them.

Keywords: Collaborative course development, digital course development, distance teaching higher education, institutional policy, collaboration between universities

1. Introduction

This paper is about change and change management in a European distance teaching Higher Education Institution (HEI). The Hellenic Open University (HOU) has been, in many perspectives, a remote and isolated HEI in relation to other EADTU members; with most of the study programs practically unchanged since the early 2000s and organized in year-long modules, with a large part of the learning materials outdated and still in printed form, with very few permanent members of teaching staff and specialized employees, and with a drop of 85% in the figures of potential students in 10 years (from 2005 to 2015), the HOU was facing a sustainability issue.

The new Board of Directors appointed in September 2015 assumed the mission to revamp the Institution, and prepare a strategic plan for its academic development, focusing on the enhancement of the social dimension in its mission and objectives. To do so, the development of new study programs was considered as an essential step; the process and its first tentative results and conclusions are reported in this paper.

2. The new strategic framework

The Hellenic Open University has provided distance education in both undergraduate and postgraduate level for over 20 years, thus the achievements and impact on the Greek academic community are numerous. Some of the university's achievements are displayed in Figure 1.

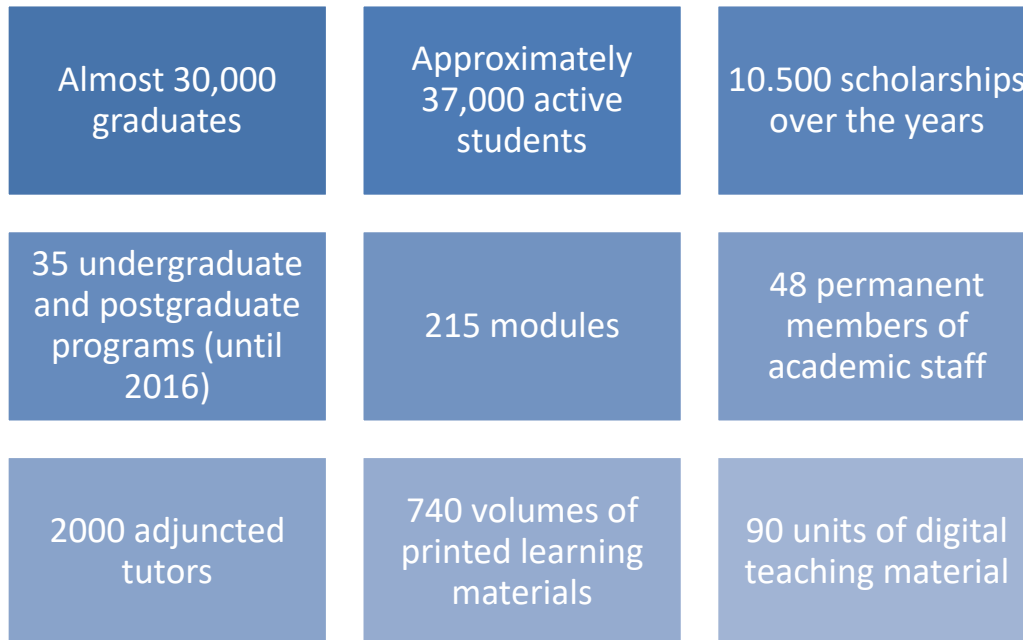


Figure 1: HOU achievements

Furthermore, HOU pioneered in the formation of internal Units associated with the development of the methodology of distance education (Educational Content, Methodology and Technology Laboratory), the standard and multiple assessment (Internal Evaluation Unit), and networking across Greece (HOU's Study Centers). However, despite the significant progress that has been made in the Greek academic landscape, the university experienced a limitation of its influence in recent years, manifested by a significant drop in the number of potential students. In the quest of the causes of this decline, it seemed that it was partly due to the increased competition from other HEIs, combined with the lack of digital infrastructure, the almost inexistent renewal of the educational material, and the inefficient administrative mechanism.

Under these circumstances, a new development policy emerged during the academic year 2015-16, associated with the growing social and academic needs. Primarily, with regard to social needs, the transition to a digital-based educational environment (Kampylis et al., 2015) is considered as a means to increase students' access to higher education (Zheng & Warschauer, 2015), and to take into account the current difficult economic situation by reducing the cost of studies (Yang et al, 2015). Subsequently, academic needs dictated the decision to provide courses in high demand academic fields (van Keeken et al., 2015), to strengthen collegiality with partnerships with other universities, ministries and other social organizations (Czerniewicz & Brown, 2009), and to reconstruct the HOU's academic landscape (Marginson & Van der Wende, 2009).

The overall objectives towards the above directions can be summarized as follows:

- Increase openness and students' access to HOU's programs
- Understand the needs of potential students and students, and evaluate the level of satisfaction of students and graduates
- Renew the academic landscape of the HOU, by improving the quality of the courses, and by developing new courses
- Strengthen the digital-based educational environment
- Adopt new ways to support the students, including digital mentoring
- Establish alternative forms of assessment (peer assessment, oral and group work, projects)
- Develop short learning programs
- Enhance international networking and mobility.

As a result, the development strategy includes the development of new, pilot courses. In the first stage of this process, six new postgraduate programs commenced on the 1st of October 2016. The new programs aim to promote academic innovation with the incorporation of:

- **More flexible academic system:** Differentiation in the pattern of modules with more flexible semester modules, and participation of academic tutors throughout the educational process and the development of the learning material.
- **New pedagogical and technical education solutions:** Adoption of up-to-date systems and learning tools that improve the educational environment based on a student-centered approach (Sharples et al., 2015).
- **Digital and interactive material:** Abandoning the conventional way of providing material exclusively through printed books by creating digital learning activities, hence improving students' interest and participation (Zheng & Warschauer, 2015).
- **New ways of student support:** Integration of synchronous communication between academic tutors and students, including mentoring, and new ways of communication and interaction.

3. Collaborative course development project

3.1 The collaboration of the HOU with other HEIs

As mentioned above, a new Unit involved in the development of the pilot courses is the Academic Supervision Team (AST) of every course, which consists of academic staff of the HOU and each partner University. This team consists of experienced academics, experts on the subject of each module, and is responsible for the design of the course and the choice and/or creation of appropriate educational material.

The ASTs and their mission were shaped after intensive meetings between the Scientific Coordinator and the academic staff of the relevant Departments of each HEI. The result of these meeting was the signing of cooperation protocols between the HOU and each partner University. These protocols describe the organization, the scope, the content, the subjects, the structure, the entry requirements and the learning outcomes of each course. Subsequently, ASTs collaborated, for several months, with the DCDT and in particular with the Scientific Advisors Team (SAT) and the Technology Enhanced Team (TET). The work of

ASTs was to determine the learning outcomes, the educational activities and the digital educational material to be used or to be developed. Finally, they defined the form of assessment, and organizational details such as the number of ECTS grades for every module, working week and task. The SAT provided feedback and the Scientific Coordinator gave the final approval.

During the development of the courses, several contacts and meetings were held between the parties involved, both in person and remotely. ASTs and DCDT were communicating on a daily basis through mails, phone calls and videoconferences. Initially a two-day common intensive workshop took place in Athens, with the participants being the ASTs, the Scientific Coordinator, DCDT and representatives of the library and of the legal department of HOU. During the presentation of the project, the stages and processes to be followed were analyzed, and crucial strategic issues were resolved. Finally, the need to train the ASTs both in open and distance learning and in the structure and procedures of HOU was met by the completion of a number of presentations and group activities.

In conclusion, the effective communication between ASTs and DCDT was significant for tracing the path for the development of every module and for resolving the several problems that arose during the project. The collaboration between HOU and HEIs was a very important factor and contributed decisively in the successful completion of the project and the creation of high quality digital educational material in line with the status of HOU and partner HEIs.

3.2 Digital Course Development Team

The need: The need to form a new unit arose from the evaluation of the HOU's academic operation, the academic debate that evolved from November 2015 (and is still evolving), the intensity of competition from other universities, and especially HOU's sustainability issues that have emerged from several different indications as described in the previous section. As the HOU provides distance education in both undergraduate and postgraduate level, it possesses internal Units relating to the development of the methodology of distance education such as the Educational Content, Methodology and Technology Laboratory (e-CoMet Lab), which has built a very distinctive profile in research for both adult distance education and technology enhanced learning. Therefore, drawing on the expertise and know-how of the human and infrastructural resources, the HOU formed a new Unit which operates since April 2016 in the framework of e-CoMet Lab, but with more specific objectives.

Aim: DCDT aims at a more efficient use of human resources and infrastructure available at the university, in order to achieve the best possible results in the creation of new digital, popular and competitive courses using the academic innovations as described above. The Scientific Coordinator of the project, who is responsible for completing the project, has the general supervision in all stages of implementation. These roles were assumed by the Vice-President for Academic and International Affairs of HOU, and co-author of the present paper. As already stated, each study program has an Academic Supervision Team, which is responsible for the design of the course and the educational material. This team consists of academic staff of the HOU or a partner University and works in close collaboration with DCDT.

Roles: The DCDT Unit consists of the following three teams:

- **Scientific Team**, which comprises young scholars of specific scientific domains (one specialist for each study program). This group of people is responsible for the communication with the Academic supervision team and participates in the academic content design. The team has been staffed by new external collaborators of the HOU with academic background and some years of teaching experience in adult education in the respective cognitive domains.

- **Technology Enhanced Learning Team**, which consists of people with experience in technology-enhanced learning and distance education. This team is responsible for creating guides and templates of the process (best practices for the design and development of educational material, instructional design templates based on international standards, design of learning management system, etc.). This team cooperates with the scientific team throughout the implementation process for the instructional design of the courses.
- **Digital Integration Team**, which consists of people with technical background and experience in the development of educational material. This team is responsible for the development of digital educational material and the new digital educational environment.

During the implementation process, DCDT worked closely with a number of different departments of the University, such as the Office of Teaching Material (which is responsible for legal advisors of educational materials copyrights), the department of education, the registrar's office, the technical department and the public relations department, which was responsible for the publication and promotion of the new courses to the media.

DCDT Training: To ensure the quality implementation of the programs, a series of seminars were organized including face to face and online training of the DCDT. The topics of the seminars focused on the aims of knowing each other and building team spirit, the creation of digital material for open and distance learning, adult education, IT applications in educational materials and methodologies, information systems, and so on... In addition, a series of contacts with other open universities in Europe was established, and educational visits were planned aiming (a) to explore the way of operation of other Open Universities, and (b) to create new collaborations and partnerships with other open and distance teaching universities. More specifically, members of the DCDT visited the Open University UK in Milton Keynes, where during their visit they discussed with all the relevant departments of the university about the design and development of new courses, acquiring new knowledge and ideas on how to improve the corresponding procedures.

- **New postgraduate programs**

Following the decisions and processes described above, for the academic year 2016-17, HOU offers the following six new postgraduate courses:

Creative Writing: This joint postgraduate program covers the teaching of literary (prose, poetry), theater, script writing, journalistic speech and digital storytelling, and leads to the acquisition, by certain educational practices, of academic, literary and authoring skills. One of the main purposes of this postgraduate course is to introduce students to the areas that make up the core of creative writing and creative reading, and to familiarize them with their realization processes, without being frustrated from any difficulties they encounter.

Educational Sciences: Special Education and Education of People with Speaking and Writing Problems: This joint postgraduate program offers specialized knowledge about the development of oral and written speech, the theoretical approaches related to the speech problems and the educational interventions that can be done in order to face the symptoms of disorders in oral and written speech for monolingual and bilingual/multilingual speakers.

Language Education for Refugees and Migrants: This program is the only one of the six new courses offered in English, the other five being offered in Greek. It is designed for teachers and graduates who wish

to complete or deepen their knowledge and skills of teaching various languages, as well as develop new resources they can later apply to specific contexts and levels. The modules will provide postgraduate students with a strong grounding in language teaching theory as well as appropriate classroom methodology, course design and an introduction to the key research tools. The course aims to provide specialized pedagogical knowledge to teachers in both levels of compulsory education and to graduates who plan to teach, as well as to teachers engaged with adult education in refugee or migrant contexts. It aims to train Greek and international students to pose and answer key questions in applied linguistics and second language acquisition in the world's numerous, diverse multilingual contexts.

Managing aging and chronic disease: This joint postgraduate course of University of Thessaly in collaboration with HOU offers specialization in health scientists. Graduates of higher education institutions from a broad scientific field will have the opportunity to specialize in the management of the elderly and people with chronic diseases, a sector which is particularly important as it is related to vulnerable groups of the population. The aim of the course is to offer the graduates the necessary knowledge about the modern developments in the provision of health care services, quality of life, and their practice in the management of aging and chronic disease and quality of life.

Modern Journalism Studies: The course targets graduates, scientists and professionals of journalism. At the same time, it addresses graduates of HEIs who already work or seek jobs in professional journalism. Its aim is to offer a comprehensive and critical understanding of the role and the practice of journalism in the modern world and to train them in professional skills and techniques required for effective use of digital media.

Sports studies: Sociology, History, and Anthropology: This postgraduate course offers specialized knowledge regarding social and cultural history, sociology, anthropology and cultural studies on sports through the connection between theoretical knowledge and research practice. Sports are a dynamic and under formulation research and teaching field for the social sciences in Greece. In this context, this new postgraduate course could give a new dynamics in the development of this scientific field and coordinate relevant forces and expertise.

4. Reflection and Lessons Learned

The process of launching six new postgraduate programs is on-going, but there are some initial conclusions that can be noted. The initial conclusions refer to the cooperation among the institutions, the way that the HOU has to manage collaborators with academic background in conventional universities, and the solutions that DCDT may offer in order to overcome the obstacles.

Organization of the collaboration - Establishing a timetable

In a joint program where two or more institutions cooperate, stakeholders spend a lot of time working together for all the necessary steps of modules production, from design to delivery. A hindrance could be the busy schedule of the individuals involved and the need to find a rigorous and commonly accepted schedule for communication. Aiming to an efficient cooperation, it is crucial to find a formula of communication and collaboration via scheduled meetings and teleconferences.

Towards this objective, the HOU organized a workshop in which the stakeholders of the six new postgraduate programs participated. The main purpose of the workshop was the acquaintance of the collaborators and the configuration of a commonly accepted timetable, whereby all steps of modules production could be monitored. The collaborators of each new postgraduate program discussed for several hours in this two-day event about the principles of each program, the modules' design, the schedule of tasks delivery and the schedule of team communication. However, the assessment of the workshop showed that the coexistence of academics from different domains may cause misunderstandings due to the incompatibility of some academic cultures. Nevertheless, face-to-face interaction and task-based work was considered as an extra incentive in the process of developing the new courses.

Collaborators with academic background in conventional university - Training seminars

A major challenge for the HOU is the fertile cooperation with members of the scientific community who have academic background in conventional universities. Some objective constraints emerge, such as the different educational framework between the HOU and conventional universities. The HOU exclusively provides distance education, using learning objects and techniques appropriately designed for this purpose. In addition, the HOU launches distance postgraduate programs with a strong cooperative profile, upon which students' digital communities will be built. The main goal is to give students the opportunity to share their ideas with their peers, in order to study learning objects from various points of view, and to broaden their critical perception. Conventional HEIs are not so familiar with this practice and simultaneously their academics tend not to incorporate digital collaborative activities in the instructional design of postgraduate programs.

The first challenge of the HOU was to illustrate the concept of distance education to the academic committees (ASTs) of each new postgraduate program, shedding light to the significant differences from the conventional higher education. Therefore, DCDT had a constant and intensive collaboration with academic committees, mainly in the first steps of modules' instructional design, in order to develop appropriate curricula and syllabi for distance education.

Another aspect of the same challenge emerged when new tutors and module coordinators took up their duties in the new modules. Tutors with experience in conventional education faced some difficulties with the use of tools, techniques and means of distance education, because they had to adjust their tutoring to different educational methods and tools.

Due to these obstacles, the HOU organized some seminars for tutors, aiming to provide the appropriate training and DCDT undertook the conduct of these seminars. The main goal of the training was to enable tutors to adapt their teaching to a new perspective of education. They received training on how to handle interactive learning activities where they have to give instant feedback to their students, to monitor and guide a community of students and to handle online means of communication.

Apart from the tutors, students need a corresponding guidance on how to use a series of online learning tools. To this direction, student handbooks and guides are included in the educational material of new graduate programs.

Students' Digital Literacy

Since the HOU has an experience on the provision of distance education, it has identified disparities in the level of students' digital literacy and thus aims to take into consideration this phenomenon in the development of the new postgraduate programs. This issue was extensively discussed during the visit of

DCDT at the Open University of UK. Members of DCDT met with members of departments who work on digital courses' development. In the section of instructional design, stakeholders discussed about the level of students' digital literacy and subsequently an issue that emerged was the level of students' digital literacy. The main obstacle is that students may have a completely different technological background and this may provoke disparities between them, when they are asked to elaborate an activity.

After this constructive discussion, DCDT decided to design learning activities that gradually increase the requirements of digital skills, in the structure of each postgraduate program. This endeavor aims to face some cases in which the students feel isolated from the rest of the students' community.

5. Conclusions and Future Work

HOU in collaboration with other HEIs changes the landscape in open and distant learning in Greece offering new courses in high demand academic fields and promoting academic innovation. In total, 1800 students were enrolled in the six new pilot courses. This policy emerged from several social and academic needs. DCDT was formed as part of this project. One of our first goals for the future is the development of courses in new scientific areas taking into account the needs of Greek society. The biggest challenge for the HOU and DCDT is to use the expertise of pilot courses in existing courses. This includes, among other things, reconstructing the modules and developing digital educational material. Along with the standardization of procedures, DCDT is interested in research activities such as organization of workshops and conferences, and transfer of expertise from other open universities as part of its continuous training.

During the first two semesters of the six new, pilot postgraduate programs' lifecycle, DCDT has planned to collect qualitative and quantitative data from the feedback of students, tutors and module coordinators about the quality of each postgraduate program, and about the level of satisfaction of the end users. The main goal is to come up with conclusions and decisions that they will improve the quality of students' experience, and construct a model of distance teaching courses transferable to other scientific fields and contexts.

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Needs and Challenges of e-Learning in the MENA Region

Pierre GEDEON

Notre Dame University-Louaize, Lebanon
pgedeon@ndu.edu.lb

Josiane GEDEON

University of Picardie Jules Verne, France
Josiane.gedeon@etud.u-picardie.fr

Mohamed SIDIR

University of Picardie Jules Verne, France
Sidir@u-picardie.fr

Abstract

In the past decade significant interest for e-learning as a new teaching and learning (T&L) methodology has been expressed throughout the MENA region. In 2014 the conference of Arab Higher Education (HE) ministers recommended exploring the positive impact of e-learning. This high expectation did not translate into practical application. Despite recent developments, the resistance to distance learning is still significant in the region. One example is Egypt currently considering stopping open HE.

Diverse HE systems operate throughout this region. However, common characteristics exist, including massification, proliferation of private HE Institutions (HEI), traditional teaching methodologies, under developed socio-economic tissue and, limited finance. In parallel, global technological development and increase in knowledge require new and adapted competencies.

In this context new T&L methodologies appeared as promising tools for different aspects among which reaching massive learner community, reinforcing student centred learning, supporting lifelong learning, and reducing the higher education T&L costs. Surprisingly, this new learning modality has not been adopted massively so far. Several reasons justify that: i) teacher-centred culture makes it difficult to move directly to this modality recognized to be massively centred on the learner, ii) limited resources are available to stimulate this change and, iii) present technological infrastructure needs to be developed in order to support a massive introduction of e-learning.

This paper presents strong arguments to the previous observations and suggests a three phases progressive approach to overcome the obstacles.

Keywords: e-learning, Blended learning, Digital learning, Smart learning, Higher Education, MENA

1. Introduction

The socio-economic development in the past several decades has shifted the labour market towards more offers for high-skilled job seekers, which required an increase in the demand for higher education. In addition, the crucial needs for research and innovation to serve the development in the knowledge-based economy shifted the role of the higher education institutions to become more central. This resulted in an increasing demand for higher education, a phenomenon often called 'massification'. The 'massification' in a sector is often very challenging. Several processes and reforms have been implemented to accompany this

‘massification’. We have witnessed in the last decades an increase in the autonomy of the institutions in parallel with more accountability. The teaching and learning approaches have also evolved with a major purpose of shifting towards active learning compared to the classical teaching approaches that have been frequently accused of inducing passive learning. Moreover, the fast pace of technological development has extended the formal learning from being a time limited process to become a lifelong learning. It is obvious that learning has always been lifelong, however, its formal aspect has changed recently to accompany this life time span.

The large development of new technologies, especially those related to knowledge access, presentation and communication, has sustained the interest in the application of those technologies to improve the learning experience. The digital devices and software in the classroom are present in a significant way. The idea quickly evolved towards distance learning in a clear and noble attempt to reach the maximum of learners on an equal basis. Using new technologies in the learning process has been referred to as e-learning. E-learning quickly faced a significant set of challenges; one can enumerate the need for ICT infrastructure, the maturity of the learners and the resistance of the instructors.

In the MENA region, the introduction of e-learning has been even more challenging. From one side, the demand for higher education is increasing dramatically which justifies the attempt of shifting towards more e-learning. From another side, the readiness to use this learning mode is not enough. Thus, several risks and opportunities are closely related to e-learning in this region.

This paper tackles the needs and challenges of e-learning in the MENA region. It starts with a quick overview of the e-learning as a new teaching and learning methodology. The section 3 presents the needs and challenges of e-learning in general before describing the state of play in the region in the next section. This whole framework motivates the proposal of a plan for the introduction of e-learning in the MENA region, which is presented in section 5. The paper ends with a conclusion and statement of perspective.

2. E-Learning as a New Teaching and Learning Methodology

2.1 The shift towards student centred learning

Recent developments in education have been marked by a clear shift towards student centred learning. This shift has been visible in the large adoption throughout the European Higher Education Area of the European Credit Transfer and Accumulation System which centres the quantitative learning award on the student’s efforts^{28,29}. Moreover, the learning outcomes (LO) are being extensively used in the description of the courses and programmes, and where this is the case, the teaching and assessment methodologies shall relate to those LOs³⁰. The LOs shall not be an additional or a replacement to existing tools like course description in the syllabus. Actually, the proper application of LOs requires a change in the mindset of the different participants in a learning process since they shift the learning from being teacher centred to become student centred.

²⁸ “ECTS Users’ Guide” http://ec.europa.eu/education/ects/users-guide/docs/ects-users-guide_en.pdf

²⁹ “Focus on Higher Education in Europe 2010, The Impact of the Bologna Process,” EACEA P9 Eurydice, ISBN 978-92-9201-086-7, Feb 2010

³⁰ “Trends 2015: Learning and Teaching in European Universities,” A. Sursock, EUA, ISBN 9789078997542, 2015

The shift towards student centred learning occurred as a natural evolution to improve the efficiency of the learning process by focusing on the learner in an attempt to assure she/he is being active. This evolution was accompanied with other evolutions that clearly impact the establishment of the knowledge-based society. The access to knowledge has been largely facilitated by the modern technologies. In this context the need to provide knowledge in a formal learning process becomes minimal allowing the process to concentrate on how the learner could assimilate, apply, analyse, synthesize and evaluate based on the available knowledge, as would suggest the Bloom's taxonomy³¹.

The pace of technological and knowledge development has also accelerated during the past decades. This also impacted the socio-economic development and the labour market whose demand for highly skilled professionals is constantly increasing. This results in an increased demand for higher education and explains to a large extent the HE 'massification' phenomenon. To respond to the needs created the number of higher education programmes and institutions increased.

In this dynamic and constantly evolving context where new technologies have big impact, the introduction of new technologies, i.e. "electronic-based technologies", in the learning process is unavoidable. This has been developing throughout the past years. E-learning has been used as a popular term to designate the introduction of new technologies, often internet-based, in the learning process.

2.2 E-Learning definitions

Besides e-learning several terms are used to designate learning and education methodologies related to the introduction of new technologies in the field of education. The origins of the term e-learning are not precisely identified, but it has most likely originated in the 1980's. Several authors explicitly define e-learning. We recall here the definitions reported in the TVETipedia Glossary³²:

- *Learning supported by Information and Communication Technology*³³ (ICT)
- *An umbrella term for providing computer instruction (courseware) on-line over the public internet, private distance learning networks or in house via an internet*³⁴
- *Term that have emerged to describe the application of information and communication technologies (ICTs) to enhance distance education, implement open learning policies, make learning activities more flexible and enable those learning activities to be distributed among many learning venues*³⁵
- *eLearning is an umbrella term that refers to the use of any digital device for teaching and learning, especially for delivery or accessing of content. Thus e-learning can take place without any reference to a network or connectivity. The digital device used by the learner to access materials need not be*

³¹ "Taxonomy of Educational Objectives, Handbook 1: Cognitive Domain," B.S. Bloom, 1956

³² <http://www.unevoc.unesco.org/go.php?q=TVETipedia+Glossary+A-Z&term=E-learning>

³³ CEDEFOP 2008, Europe

³⁴ TESDA 2010, Philippines

³⁵ "Common Wealth of Learning" COL 2003, Global

*connected to a digital network, either a local area network or to the Internet (or even to a cell phone network if a Tablet is used as a terminal or access device).*³⁶

This is just a small set of the existing definitions of e-learning. These definitions are broad but share common words. ICT, Internet, technology and networks seem to be common words in the definitions. They reflect the use of technology and networks in this type of teaching and learning (T&L). The word umbrella is often used in the definitions stressing the fact that e-learning term does not narrowly define a precise and well profiled T&L methodology. It rather refers to a broad set of T&L methodologies. Surprisingly the Commonwealth of Learning (COL) definition evolved between 2003 and 2015 to deny the need of using Internet and networks while speaking about e-learning, while the usage of digital devices and computers as new technologies remains necessary in any e-learning approach.

There have been several approaches to structure the large diversity of e-learning T&L approaches. One structure has been suggested in the work by Mayadas et al.³⁷. The authors suggest classifying e-learning into seven classes according to the usage of digital devices and networks in the course delivery, and into four classes when considering e-learning in the context of full programmes. The course's classes go from classroom presence where learning activities are organised around scheduled class meetings and make use of digital technologies and software, till full online course with a specific class reflecting the freedom of learners to choose the mode of instruction for each course. Several intermediate classes describe hybrid or blended modes of T&L. At the programme level the four classes of e-learning modes are:

1. *Classroom programme where all courses require some face-to-face sessions*
2. *Multi-format programme where a mix of classroom courses and other delivery courses classes exist*
3. *Blended programme where a significant percentage of the credits are achieved fully online*
4. *Online programme where all the credits are achieved online*

A second structure has been suggested by Downes, co-founder with Siemens of the connectivist theory of online learning. He describes his experience and research through six “series of ‘generations’ of technologies and approaches that have characterized the development of online learning over the years” (more than 20- year period) or as it is, for Downes, sometimes called e-learning³⁸. They are as follows:

1. **Online content:** ‘Generation zero’ characterized by systems as Plato, and represents the idea of placing learning content online. And it represents to a degree, the idea of programmed learning.
2. **Online interaction:** this generation consists of the network itself.
3. **Computer Games:** this generation takes place in the early 1990s and is essentially the application of computer games to online learning.
4. **New online content and/or online interaction:** this generation sees the development of content management system, and in learning the learning management system.

³⁶ COL 2015, Global

³⁷ “Definitions of e-Learning Courses and Programs,” F. Mayadas, G. Miller and J. Sener, April 2015, Online Learning Consortium, <http://onlinelearningconsortium.org/updated-e-learning-definitions-2/>

³⁸ Downes, S., *E-Learning Generations*. Retrieved from <http://halfanhour.blogspot.com/2012/02/e-learning-generations.html>.

5. **Web 2.0** with its core technology called social software: this generation is called in the field of online learning, e-learning 2.0 with the rise of social networks and the creation of content and services that can interact with those networks. E-learning 2.0 brings in the idea of interoperability.
6. **MOOC**: the sixth-generation e-learning, which Downes characterized by the Massive Open Online Course one.

A third well known structure in the United States is the segmentation used in the Sloan Foundation annual report³⁹ where Elaine and Seaman construct their model on a percentage allocation. The three segments are the following:

1. **Traditional course**: no online technology used.
2. **Web facilitated course**: from 1 to 29% of the content is delivered online.
3. **Blended or Hybrid**: from 30 to 79% of the content is delivered online.
4. **Online**: equal or more than 80% of the content is delivered online.

The same percentages are still used in the form to tracking the growth and development of online learning in the United States the *Online Report Card*⁴⁰. In Canada, Tony Bates is using the same methodology of the report to draw some comparisons with the Ontario.⁴¹

In Europe, the results of a mapping survey conducted in the last quarter of 2013 by the European University Association (EUA) on *"E-learning in European Higher Education Institutions"*⁴² defines e-learning as *"a generic expression for all learning involving the use of information and communication technologies (ICT) to support both learning and teaching. Its meaning, therefore, is normally synonymous with ICT-based learning"*. Where the report considers online learning as *"A form of educational delivery in which learning takes place primarily via the Internet. Online learning can serve those who are geographically distant and without access to traditional classroom education, so it includes 'distance learning'".* However, distance learners are not alone in benefiting from online learning, which is also commonly part of e-learning in mainly campus-based study programmes. *In such cases, it may be referred to as blended learning."*

Certainly, there is no holistic definition of e-learning. But, we adopt the inclusive definition of the concept published by the research team of the Open University of Catalonia: *"A form of teaching and learning - which may represent a part or the whole of the education model in which it is used - that makes use of electronic media and devices to facilitate access, promote evolution and improve the quality of education"*

³⁹ Allen, I., Seaman, J., *Grade Change: Tracking Online Education in the United States*, Babson Survey Research Group and Quahog Research Group, 2014 (Eleventh annual report). Retrieved from <http://www.onlinelearningsurvey.com/reports/gradechange.pdf>.

⁴⁰ Allen, I., Seaman, J., Poulin, R., Straut T., *Online Report Card: Tracking Online Education in the United States*, Babson Survey Research Group and Quahog Research Group, 2016. Retrieved from <http://onlinelearningsurvey.com/reports/onlinecard.pdf>.

⁴¹ Bates, T., 2014. Retrieved from <http://www.tonybates.ca/tag/seaman/>.

⁴² Gaebel, M., Kupriyanova, V., Morais, R., Colucci, E., *E-learning in European Higher Education Institutions: Results of a mapping survey conducted in October-December 2013*, EUA, 2014. Retrieved from http://erasmusplus-lebanon.org/sites/default/files/documents/e-learning_survey%20EU%20HE%202014.sflb_ashx.pdf

and training”⁴³. And for the question of percentages, we consider them below only to facilitate international benchmarking.

2.3 Comparison of different T&L approaches

The previous definitions clearly show a continuum in the usage of digital devices and networks in the delivery of courses and programmes. The majority, if not all classifications of e-learning definitions, also align them on an axis representing the degree of introduction of networks and digital devices in the delivery of courses and programmes. Two boundaries exist: the traditional face-to-face approach and the full online and distant learning where no face-to-face contact is supposed to take place. This does not directly suggest a correlation between the introduction of new technologies and networks and the progress or improvement in performance achieved through the learning process nor does it suggest a decrease in the costs of the learning process while going from traditional face-to-face towards the fully online delivery. Intuitive questions usually emerge at this stage regarding the comparative performances between online learning, traditional face-to-face learning web-facilitated learning and hybrid learning, which form the broader classes of learning. The measurement of performance of a learning process is not straightforward and its complexity increases drastically when placed in a comparative perspective as the one of interest here. Numerous attempts to perform this comparison have taken place in the past years. The analysis of the literature is not part of the scope of this paper. However, one can refer to the literature review conducted by Lack in 2013⁴⁴. It covers the studies conducted in a ten years period on the topic. The review revealed the lack of solid research that might lead to a decisive advantage in terms of performance of one learning method over the others. Actually, the sample sizes in the different studies covered by the review are relatively small and the findings change from one study to another. Unfortunately there is even less evidence when it comes to the comparison of the costs of each T&L approach. Moreover, it is extremely complex to conduct such comparison.

2.4 Potential perspectives of e-Learning

The absence of clear evidence showing a comparative advantage for one T&L mode does not eliminate the potentials related to the introduction of new technologies in the learning processes. Actually, new technologies are being used today even in the classical face-to-face classroom. Readings and references are often accessible online whether the course is offered online or in a face-to-face mode. Lectures slides and notes may also be available online, by email or on a specialized platform independently of the delivery mode. Moreover, supporting multimedia resources may be prepared in order to facilitate and improve the learning experience. Actually, the new technologies provide the learner with evidence, details and illustrations about different aspect of a course. Assignments may also be submitted online. New technologies are commonly used in today classroom independently of the delivery mode. That is why in some literature we find: **web-facilitated learning** (as it is mentioned before in the Babson surveys) or

⁴³ Sangrà, A., Vlachopoulos, D., Cabrera, N., Bravo, S., *Towards an inclusive definition of e-learning*, Barcelona, eLearn Center, UOC, 2011. Retrieved from http://openaccess.uoc.edu/webapps/o2/bitstream/10609/10562/6/inf_ed_ang.pdf.

⁴⁴ “Current Status of Research on Online Learning in Postsecondary Education,” K. A. Lack, ITHAKA, March 2013

enriched face-to-face (*‘Présentiel enrichi’*⁴⁵ in French based on the *‘Typologie Competice’*⁴⁶). These two concepts represent the first step of using technology in classroom (less than 29%) in the context of **technology-enhanced learning** (TEL)⁴⁷, **computer-assisted instruction** (CAI), **computer-aided learning** (CAL), one of the three first categories mentioned by Mayadas and al. and especially the **“web-enhanced course”** or **“web based learning”** as it is used in the US National Institutes of Health (NIH): *“Web based learning in an institution is often integrated with conventional, face to face teaching”*⁴⁸. NIH introduces the web *“as a learning tool to support formal programmes and as a means of delivering online learning programmes.”*⁴⁹

The new technologies allow for improving the interaction between the learners and the professor. Electronic mails are one example. Audience response systems or clickers are another example. Their potential for improving student learning has been reported by several educators⁵⁰. That’s why Competice considers for TEL or the Web-facilitated learning two sub-categories: the **enriched face-to-face** (*‘présentiel enrichi’* in French) and the **improved** one (*‘présentiel amélioré’* in French). The improved one is the kind of learning when the teacher uses mail before and after the course to communicate with his students.

Flipped classroom is another example of the successful application of technology in T&L. It inverts the traditional pattern of information acquisition in the class and problem solving at home, where students view at home the class lectures posted online and use the class time for application and problem solving. Higher performances have been reported with this T&L approach⁵¹. Based on the previous examples and arguments, one can conclude that e-learning in its wide sense offers potential perspectives to improve student learning. Flipped classroom is an example of blended learning. Using the definition of Mayadas and al. mentioned before, Flipped Classroom could occur in the fourth and fifth categories related to Blended (also called Hybrid) Classroom Course and Blended (also called Hybrid) Online Course.

3. e-Learning Opportunities and Challenges

As shown in the previous section the role of technology in higher education is becoming increasingly important. e-learning offers several opportunities that shall be discussed hereafter as well as the corresponding challenges.

⁴⁵ Retrieved from <http://alsic.revues.org/2691>

⁴⁶ Haeuw, F. Competice : management tool by competences for Higher Education ICT in Education projects, 2002. Retrieved from: <http://eduscol.education.fr/bd/competice/superieur/competice/index.php>

⁴⁷ Goodyear, P. and Retails, S. (Eds.), Technology-Enhanced Learning: Design Patterns and Pattern Languages, Sense Publishers, 2010.

⁴⁸ Ibidem.

⁴⁹ Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1125774/>.

⁵⁰ “Designing effective questions for classroom response system teaching,” I.D. Beatty, W.J. Gerace, W.J. Leonar and R.J. Dufresne, Am. Jurnal of Physics, Vol. 74, n. 1, pp. 31-39, 2006.

⁵¹ “San Jose State U. says replacing Live Lectures with Videos Increased Test Scores,” The Chronicle of Higher Education, Oct. 2012, <http://www.chronicle.com/blogs/wiredcampus/san-jose-state-u-says-replacing-live-lectures-with-videos-increased-test-scores/40470>

3.1 Flexibility

An important feature of e-learning is the flexibility that it offers to the learner who can follow a lecture upon his convenience. This has to be compared to the fixed timing imposed in the classical face-to-face mode. However, this flexibility assumes the responsibility of the learner and a minimum discipline and motivation. Thus, mature and responsible learners shall better profit from the flexibility. Several interviews mention that online students success rates are less than conventional students but the average of those who succeed are more higher⁵².

Flexibility extends to lifelong learning. Continuous education is a major field of application of e-learning due to the flexibility offered to the professionally active learners who are often responsible, mature and motivated by the course or programme they are following. Moreover, the flexibility in this particular case serves better the busy agenda of those learners.

3.2 Widening access

e-learning is often presented as a response to the increase in the demand for higher education. Widening access to higher education seems to be a major objective of e-learning. In a recent study by the European Universities Association⁵³ flexibility and widening access seem to be the major objectives for developing e-learning in the European Universities. In the following the most important objectives as expressed by the European universities are reproduced:

1. To provide a more flexible learning offer, leaving it to the student to decide whether they learn on or off campus (24%)
2. To increase the effectiveness of classroom time (20%)
3. To provide more learning opportunities to students who are not based on campus (18%)
4. To provide more learning opportunities for on campus students (13%)
5. To enhance internationalisation (9%)

Theoretically, online and open learning has a global outreach. However, the access to this mode of learning requires a reliable ICT infrastructure and some ICT skills. The low performance of some networks and the lack of skills in ICT may limit the outreach by e-learning. In addition, e-learning is often presented as a cheaper learning approach. However, there is no evidence about this especially when considering the cost of preparing the materials and the cost of access.

Besides the general interpretation of widening access by e-learning few particular cases exist. For example, a university from Lebanon offers a particular programme in theology online with a specific target covering Lebanese living abroad. Generally, cultural heritage courses and programmes can be offered online for immigrants living abroad as a particular e-learning application.

⁵² Recent (September 2016) interview with V.D. from Conservatoire National des Arts et Métiers (CNAM), Paris.

⁵³ "Trends 2015: Learning and Teaching in European Universities," A. Sursock, EUA, ISBN 9789078997542, 2015

3.3 Other challenges

Some issues are challenging the development of e-learning. In the following are enumerated some of the most important:

- Lack of common terminology: It has been mentioned in the previous section that multiple definitions exist for the same term and in particular for e-learning. The lack of a common terminology reflects the lack of a common understanding, which certainly does not promote the development of e-learning.
- Teachers' e-readiness: Beyond the lack of common terminology, e-readiness of teachers requires teachers training and preparation to the digital era.
- Technological infrastructure and cost: The development of online courses requires a technological infrastructure that might not be available in all higher education institutions.
- Quality: Specific quality standards, guidelines, procedures and evaluation processes need to be well defined to assure the quality of courses and programmes offered in the e-learning mode.
- Recognition: Recognition procedures and tools need to be developed especially for fully online courses and programmes. This usually requires new regulations.

These challenges are global but exist in particular in the MENA higher education systems.

4. State of Play of e-Learning in the Arabic MENA region

Bringing Arab education online is a new challenge for the Arab countries. The twenty-two Arab States do not share a common terminology, neither e-readiness nor answers for the integration of technology that enhances learning. In this section, we provide a summary of the current state of play of e-learning in the Arabic Middle-East and North Africa (MENA) region. We start by drawing the Arab States context before the summary related to the state of play of different e-learning categories' challenges.

4.1 The Arab States Population and Education

The Arab League regroups twenty-two States distributed between West Asia and Africa (especially the North Africa). Many different groupings of States exist to identify the countries of the Near and Middle East. In this paper, we use the following groups:

1. The Arabic Near East States are as follows:
 - Asia: Iraq, Jordan, Lebanon, Palestine and Syria. (Five states)
 - Africa: Egypt. (One state)
2. Countries of the Middle East: Arabic States of the Near East and countries of the Arabian Peninsula: Saudi Arabia, Bahrain, the UAE, Kuwait, Oman, Qatar and Yemen.
3. The other nine countries of the Arab League States fall into two categories:
 - States of Little Maghreb. They are Algeria, Morocco and Tunisia.
 - Other Arab States in Africa: Djibouti, Comoros, Libya, Mauritania, Somalia and Sudan.

According to the Central Intelligence Agency of the US (CIA) to 1 August 2016, Arab States population is 373,696,494 (61.9%). For the WorldBank: *"The Middle East and North Africa Region (MENA) has taken*

great strides in education. It has quadrupled the average level of schooling since 1960, halved illiteracy since 1980 and achieved almost complete gender parity for primary education”.⁵⁴

4.2 The Arab Higher Education Institutions

Higher education institutions in the states members of the Arab League are 971 according to the Webometrics⁵⁵ Spanish site. They are positioned between the 328th worldwide for the King Saud University in Saudi Arabia until the 26,299th place for the University Halabja in Iraqi Kurdistan. Only 155 institutions are among the five first thousand or 3% and 253 among the first ten thousand or 5% while the share of higher education institutions in the Arab world represented only 3.7% of those worldwide. We referred to Webometrics because it uses excellence and the presence of institutions on the Internet, two basic pillars used in our research.

The majority of higher education institutions in the Arab world is young.

- Prior to 1953 fourteen institutions existed in eight Arab States. The Middle East had 71% of them in Lebanon (4), Egypt (4), Iraq (1) and Syria (1). The other four were in Algeria, Morocco, Tunisia and Sudan.
- Between 1953 and 1973 eight Arab States created their higher education institutions. They are: Jordan, Palestine, Saudi Arabia, Kuwait, Qatar and Yemen in the Middle East. as well as Libya and Somalia in Africa.
- Between 1973 and 1993, six other States followed. They are: Bahrain, Oman and the UAE in the Middle East and Djibouti, Mauritania and the Comoros islands in other African Arab States.

The eight institutions before 1953, have become one hundred forty in 1993 and nearly a thousand today. This explains partly the actual problem of research observed and commented by Sultan Abu Orabi, President of the Association of Arab Universities (AARU). This big number Arab higher education institutions is accompanied by research problems but also by a lack of confidence for the majority of new private institutions and especially those most recent (since the late 1990s). For example we find the following in Bahrain: *“Graduates of private universities in Bahrain are not accepted by the labour market”*⁵⁶

4.3 Non-traditional and Conventional Education and Training

The conventional traditional training still dominates in the Arab States. The open and distance learning is in crisis. The figure below shoes the Arab States use of ICT in Teaching and Learning. Not only it is not commonly appreciated and recognized but the arrival of new private institutions and the almost lack of evaluation and quality assurance agencies have almost hindered the development of new learning methods despite several attempts more or less successful.

⁵⁴ Hoel,A., *Education in the Middle East and North Africa*, WorldBank,2014. Retrieved from <http://www.worldbank.org/en/region/mena/brief/education-in-mena>

⁵⁵ Webometrics, July 2016 Edition. Retrieved from <http://www.webometrics.info/en/aw>

⁵⁶ Retrieved from : <http://www.alaraby.co.uk/investigations/2015/6/14>, dated 14 June 2015

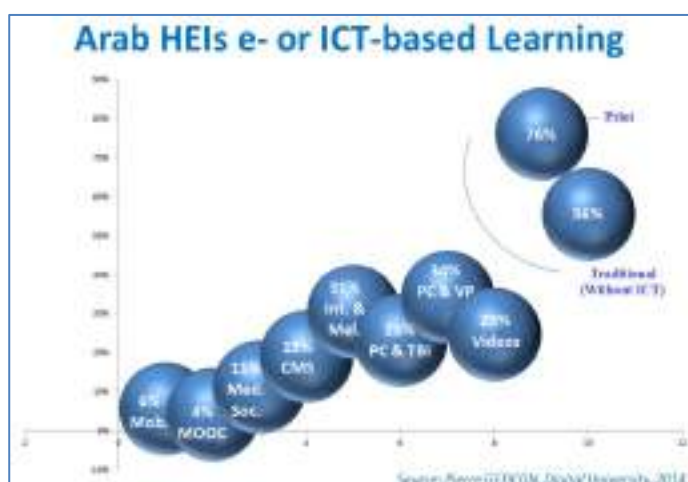


Figure 1. Technology mediated learning in the Arab World

The figure shows that 56% of the Arab Higher Education Institutions (HEIs) are still traditional in their T&L approaches. MOOCs are present in 4% of these HEIs, Mobile learning in 6%, Social Media in 11%, CMS in 19%, and the improved face-to-face in 31%. While interactive white boards (TBI) connected to PCs 34% and video enhancing T&L is used in 25%. These percentages are the results of a mapping survey conducted between January and June 2014 by Pierre Gedeon⁵⁷.

We discuss below some findings:

- **The concept of distance:** Undoubtedly, this concept means that the teacher and the student (s) are located in different places at a geographical or temporal level. The evolution of training by correspondence, to the training through radio and television has led institutions to use audio and video cassettes and then the Internet. "

In Saudi Arabia, the Ministry of Higher Education publishes on its website that it does not recognize a degree from distance. According to the decision number 1418 5 November 1997 *"equivalence is not granted to the diplomas for which the modality is one of the following: learning affiliation, learning by correspondence, distance learning, the learning by cassettes -audio or video-, learning through continuing education and learning through the international network of internet communication or through the mail."*⁵⁸ In Egypt, it is even more catastrophic. The Bar Association does not accept graduate students at the national level if they followed the distance courses⁵⁹. Even students who respected the condition fixed by the Conference of Arab Higher Education Ministers. In fact, they required a hybrid education with a minimum of 25% face-to-face. And we find the following: *"Affiliation (or enrolment) Certificates and Distance Education are not officially*

⁵⁷ Gedeon P., *The digital university and the evolution of training and learning via the Internet in the Arab States: the case of higher education institutions in the Middle East*, University Paris 8, 2014, p. 363.

⁵⁸ Retrieved from <https://www.mohe.gov.sa/ar/HelpAndSupport/Pages/FAQS.aspx>

⁵⁹ Retrieved from <http://www.youtube.com/watch?v=vbbgxBzjY5U>.

recognised”⁶⁰ in Qatar, “Higher Education Authorities will not recognize certain Educational Institutions”⁶¹ in Oman,

- **The concept of openness:** UNESCO considers open learning as “an umbrella term for any scheme of education or training that seeks systematically to remove barriers to learning, whether they are concerned with age, time, place or space. With open learning, individuals take responsibility for what they learn, how they learn, where they learn, how quickly they learn, who helps them and when they have their learning assessed.”⁶² The portal of the French Ministry of education underline this openness by the “freedom of access to educational resources made available to the learner, without any restriction and that takes into account the singularity of people in their individual and collective dimensions, and based on complementary and plural learning situations in terms of time, place, human and technological teaching mediations, and resources.”⁶³

Since the seventies the concept of openness is growing in the Arab States, despite the ups and downs he meets. In 1976, and after the launch in 1969 of the Open University (OU) in the UK, the Arab experts recommended the use of open education to reduce analphabetism and illiteracy and support training of adults. A recommendation that prepared the launch of open universities in the Arab States. Actually we have different kinds of open universities in the Arab world, the main two categories are the following : the national Open universities and the "Arab Open University".

The national open universities Al-Quds Open University⁶⁴ founded in 1985 in Palestine and the Open University of Libya⁶⁵ founded in 1987 exist well before the Arab Open University⁶⁶ (AOU) created in 2002. At a national level we have also the Open University of Sudan⁶⁷ founded in 2002, and different ‘open’ academic centres belong to traditional universities such as those in in Egypt and Saudi Arabia.

And academic centres that are geared toward "opening" belong to conventional traditional. But these centres undergo great pressure.

- Saudi Arabia is investing since 2010 in a more modern entity the "Saudi Electronic University"⁶⁸ (SEU)". Eventually, all open and distance learning would be integrated to SEU.

⁶⁰ Retrieved from <http://www.al-sharq.com/news/details/378932#.VinZ42fovIU>, dated 22 October 2015

⁶¹ Retrieved from <http://www.atheer.om/News/8819>, dated 14 July 2015

⁶² Retrieved from http://portal.unesco.org/education/en/ev.php-URL_ID=18650&URL_DO=DO_TOPIC&URL_SECTION=201.html

⁶³ Retrieved from <http://eduscol.education.fr/numerique/dossier/archives/eformation/notions-distance-mobilite/foad>

⁶⁴ Retrieved from <http://www.qou.edu/englishIndexPage.do>

⁶⁵ Retrieved from <http://www.libyaou.ly/index.php/ar/>

⁶⁶ Retrieved from <https://www.arabou.edu.kw/>

⁶⁷ Retrieved from <http://www.ous.edu.sd/en/>

⁶⁸ Retrieved from <https://www.seu.edu.sa/sites/ar/Pages/main.aspx>

- While in Egypt the "Open Education" is undergoing a redefinition. There are several problems for this kind of education. A decision was taken in late May 2016⁶⁹ to stop enrolment waiting the redefinition of this kind of training⁷⁰. Before the decision we can find in the media the following messages: "Open Education ... went out of the track!"⁷¹, "Former ministers: Open Education derailed ... and reform is a must"⁷²

We believe that Egyptian culture of "Open Education" is facing a problem in its definition of openness. In fact, the concept is deflected from its human and social vocation and is dependent of the grade or diploma acquired in a so-called open institution. This diploma orientation for an international human and social open movement seems to be at the origin of the problems encountered in Egypt nowadays. According to the UNESCO definition openness means also accessing without prerequisites and the actual brainstorming to redefine the open education diploma is going to orient its students to technical and vocational education while the order of engineers president is announcing that *"students having less than 82.1% in the secondary exam will not be accepted this year. The next year the order will require a compulsory test to accept graduated engineers from public or private faculties of engineering. And to protect the engineer and the profession graduates from Open Learning can't join the order of engineers"*⁷³.

- In addition we find that "Open Education" is banned in Bahrain⁷⁴.

The project of the Arab Open University (AOU) was launched on 5 October 2001. Originally it was a cooperation agreement⁷⁵ between UNESCO and AGFUND (The Arab Gulf Program for Development)⁷⁶. AOU currently has eight branches that were launched as follows: the headquarters in Kuwait, and two branches in Jordan and Lebanon were launched in 2002. Three branches in Saudi Arabia, Bahrain and Egypt launched in 2003. A seventh branch in the Sultanate of Oman launched in 2008, and an eighth launched in Sudan in 2014.

- **The concept of virtual, electronic, e-learning and smart universities rather than digital university:**

The arrival of the public internet in the 1990s has revitalized the market with e-commerce and other e-services. Some universities in the world have taken the wave of e-names and e-features

⁶⁹ Retrieved from <http://www.masralarabia.com/شباب-وجامعات/1087507-قرارات-هامة-للتعليم-المفتوح-تعرف-عليها/>, dated 01 June 2016

⁷⁰ Retrieved from <https://www.albawabhnews.com/2082418>, dated 25 August 2016

⁷¹ Retrieved from <http://www.ahram.org.eg/NewsQ/405484.aspx>, dated 12 June 2015

⁷² Retrieved from <http://www.almasryalyoum.com/news/details/763769>, dated 29 June 2015

⁷³ Retrieved from <http://gate.ahram.org.eg/News/1252050.aspx>, dated 29 September 2016.

⁷⁴ Retrieved from <http://www.al-fanarmedia.org/2015/03/distance-education-banned-in-bahrain/> dated 22 March 2015

⁷⁵ Retrieved from <http://www.unesco.org/bpi/fre/unescopresse/2001/01-102f.shtml>

⁷⁶ Retrieved from <http://agfund.org/about-us/>

and used the terms electronic university, e-university or virtual university. The early 21st century has been marked by the transformation to '**digital university**' and '**smart university**'.

In the Arab States we find the following universities:

- **Virtual:** The Virtual University of Tunis⁷⁷ (UVT for "Université Virtuelle de Tunis" in French) established by the decree of 28 January 2002⁷⁸ in Tunisia in the Maghreb (Webometrics 6,648th place). The second Arab virtual university is the Syrian Virtual University⁷⁹ (SVU) established by the decree of 8 May 2002⁸⁰ in Damascus in the Mashreq (Webometrics 10,455th place).
- **E-learning:** The "Egyptian E-learning University (EELU)"⁸¹ in Cairo, Egypt was established by a presidential decree in 2008⁸² knowing that the project started three years before, in September 2005.
- **Electronic:** The Saudi Electronic University⁸³ (SEU) in Saudi Arabia and established by a Royal decree in 9 August 2011⁸⁴.
- **Smart:** In the United Arab Emirates, the Hamdan Bin Mohammed electronic University was transformed in 2014 to Hamdan Bin Mohammed Smart University. (Webometrics 7,374th place).

The EELU educational model in Egypt combines between the advantages of both the traditional face-to-face education and the e-learning in a localised blended model. In the same time, SEU in Saudi Arabia aims to be a national representative and the home of experience in the field e-learning and distance education. It uses also the blended learning model. For example, the SEU electronic media bachelor is planned to have one third in face-to-face mode and two-thirds in online learning. While HBMeU (for Hamdan Bin Mohammed electronic University) the first e-University in the United Arab Emirates, launched in February 2009 in Dubai (Project established in 2002⁸⁵) becomes in February 2014 HBMSU (for Hamdan Bin Mohammed Smart University). In his speech at the graduation ceremony on 26 February 2014, the Prince of Dubai, Chairman of the Executive Council of Dubai and President of HBMeU Sheikh Hamdan Bin Mohammed Bin Rashed Al Maktoum announced the name change in harmony with the United Arab Emirates' strategy to become among the "*Top five first 'SMART' governments with the arrival of the year 2021.*"⁸⁶

EELU, SEU and HBMeU or HBMSU are committed to e-learning but as we may see it, HBMSU is committed to instigating a culture of quality, excellence and research through e-learning in the Arab world while the

⁷⁷ Retrieved from <http://www.uvt.rnu.tn/en/>

⁷⁸ Retrieved from <http://www.uvt.rnu.tn/en/the-university/official-texts>

⁷⁹ Retrieved from <https://www.svuonline.org/SVUIS/index.php>

⁸⁰ Retrieved from <https://www.svuonline.org/SVUIS/pages.php?id=9>

⁸¹ Retrieved from <http://www.eelu.edu.eg/>

⁸² Retrieved from <http://www.eelu.edu.eg/index.php/about/history>

⁸³ Retrieved from <https://www.seu.edu.sa/sites/en/Pages/main.aspx>

⁸⁴ Retrieved from <http://old.seu.edu.sa/en/index.php/news/view/81/>

⁸⁵ Retrieved from <http://www.hbmsu.ac.ae/about-us/overview>

⁸⁶ Retrieved from <http://www.hbmsu.ac.ae/news/13567>, consulté le 9 mars 2014.

other two universities are working to instigating a culture of quality but they are consolidating their educational positions before research. And all the three in addition to the UVT, SVU, AOU and some national Open Universities are bringing education online to the Arab countries at their own pace and means. Arab countries have some momentum. For example, A professor from Fayoum University proposed a future project to develop the Egyptian universities (e- and ICT-learning)⁸⁷. The Virtual University of Tunis has a MOOC in Eco tourism and is open to MIT and is working with its Resources 'MIT Open Course Ware' (OCW)⁸⁸. The University Cadi Ayyad in Morocco has also its own MOOCs and it hosted in Marrakech the first digital meeting in October 2015.⁸⁹ The Al-Quds Open University launched the Palestinian Center for Excellence in e-learning⁹⁰.

But also we find an obstacle at a credibility level of the institutions as per in the following: *"Higher Education Authority warns against Mock e-universities"*⁹¹ in the United Arab Emirates or in Iraq *"A member of the Iraqi parliament: There are Mock universities in Kurdistan that practice fraud and swindling"*⁹². The journalist of the daily newspaper Annahar entitled its article *"E-learning in Lebanon: Fear of traders and the chaotic delivery of certificates"*⁹³ after the Erasmus+ organised debate on e-learning in May 2015 in Lebanon. In addition to another kind of follow-up and governance problems as it is mentioned in the following Saudi Arabia reference: *"Students on distance Najran: our level declined ... The university respond: we do what we have to do!"*⁹⁴

5. A Progressive Approach for the Introduction of e-Learning

Based on the segmentation seen above of the different categories of mediated T&L strategies, we suggest the following categories and sub-categories:

1. Phase 0: Traditional (T&L without online mediation)
2. Phase 1: Progressive introduction of technology enhanced learning (TEL) based on the internet
 - Enriched face-to-face (usage of the internet inside the Class)
 - Improved face-to-face (usage of mail: before and after the class or usage of LMS)
3. Phase 2: Progressive introduction of Blended learning
 - Blended 1 (where the percentage of face-to-face is more than online)
 - Blended 2 (where the percentage of face-to-face is less or equal than online)
4. Phase 3: Progressive introduction of Online learning
 - Online (partially online because the exam is intra-muros or in presence)
 - Distance (totally online)

⁸⁷ Retrieved from <http://www.youm7.com/story/2015/3/20>, dated 20 March 2015.

⁸⁸ Retrieved from <http://mit.uvt.rnu.tn>

⁸⁹ Retrieved from <http://journane.ma/info/archives/18681>, dated 9 October 2015.

⁹⁰ Retrieved from <http://www.maannews.net/Content.aspx?id=782622>, dated 15 June 2015.

⁹¹ Retrieved from <http://www.araanews.ae/153086>, dated 16 August 2015.

⁹² Retrieved from <http://www.alsumaria.tv/news/139812>, dated 11 July 2015.

⁹³ Retrieved from <http://newspaper.annahar.com/article/245221>, dated 16 June 2015.

⁹⁴ Retrieved from <http://sabq.org/yfJgde>, dated 12 October 2015.

With these three categories or phases, we defined six sub-categories going from enriched face-to-face to totally online (or distant). For benchmarking, we suggest the following ratios:

- Phase 1: [Online: From 1% to 25%]
- Phase 2: Progressive introduction of Blended learning [Online: From 26% to 75%]
 - Blended 1 (more face-to-face) where [Online: from 26% to 50%]
 - Blended 2 (more online) where [Online: from 51% to 75%]
- Phase 3: Progressive introduction of Online learning
 - Online [Online: from 76% to 95%]
 - Distance [totally online]

Remark: with didn't use Seaman and al. percentages (30% and 80%) because the Arab Higher Education Ministers require 25% of minimum presence. In the same time Some international accreditation bodies require a new reaccreditation procedure if the institution goes beyond the percentage of 50%. For these reasons we used the scale of : 25%, 50%, 75% and 100%.

Based on the outcomes of our common experience in the project Tempus Towards the Lebanese Quality Assurance Agency (TLQAA)⁹⁵ on the design of an evaluation agency for quality assurance in higher education we suggest first of all to take time to experiment together this new kind of innovative T&L.

Based on the students' requirements of Credibility and Quality of any Distance Education and e-learning institution. We can refer to the "*Quality assurance in distance education and e-learning: Challenges and solutions from ASIA*"⁹⁶ where sixteen Distance Education providers and programs are shown and discussed. Based on the lack of infrastructure and teachers' e-readiness in the Arab region, and based on the surveys shown above and conducted for Europe by Gaebel and al., the US by Seaman and al. and in the Arab region by Gedeon, and based on the paper published by Gedeon and Khalil in Science Direct⁹⁷, we propose a progressive approach for the introduction of non-traditional Teaching and learning (Open, Online, Flexible,) in four steps and times as follows:

The first period (T1) covers years till 2020. In fact we started to communicate on it since end 2014. At a technological level a common experience with new technologies is very benefit to develop a common glossary and guarantee a common definition of terms. A learning level: it is important to rewrite programmes based on competencies or Competency- based education. At an educational level: Innovation for some institutions means integrating enriched face-to-face and improved or enhanced-face-to-fac. And

⁹⁵ Retrieved from <http://tlqaa.org>

⁹⁶ Jung I., Wong T.M., and Belawati T. (Eds.), *Quality assurance in distance education and e-learning: Challenges and solutions from Asia*, International Development Research Center, 2013.

⁹⁷ Gedeon, P., Khalil, L., Management of the Transition to e-Learning in Higher Education Based on Competence Quotient, *Procedia Computer Science*, Volume 65, 2015, Pages 324-332, ISSN 1877-0509, <http://dx.doi.org/10.1016/j.procs.2015.09.091>. Retrieved from <http://www.sciencedirect.com/science/article/pii/S187705091502921X>

for others means testing Blended 1 with more face-to-face than online. And at a legal level: allow for e-learning courses up to 50% of a program.

The second period (T2) covers five years from 2020 to 2025, and it will be characterized by the following main actions: Technological level: experiment together more new online environments and solutions; Learning level: finish rewriting programs based on competencies ; Educational level: innovate by integrating augmented learning ; Legal level: Prepare a law project related to the digital university.

The third period (T3) covers five years from 2025 to 2030. It will be characterized by the following : Technological level: experiment 100% virtual courses; Learning level: show the implementation of automatic assessments based on e-portfolios and competencies; Educational level: Most of the training is done through technological mediation. Prepare minds to test the integral distance; Legal level: prepare an addendum related to the totally Distance learning.

And the fourth period (T4) goes beyond 2030. It is characterized by the following:

Technological level: The Lebanese scientific community is ready to share SWOT analysis of the use of technology to enhance learning; Learning level: The majority of programs are written with LO and Competency-based Education; Educational level: Teachers are e-ready to use online and e-learning with their students; Legal level: prepare the recognition of competencies automatic assessments.

To succeed, all of these steps require the National Qualification Framework, Quality Assurance Agency, credibility of institutions and full transparency and integrity.

6. Conclusions

There is no doubt about the potentials offered by e-learning in responding to the challenges related to 'massification' of higher education and to lifelong learning. However, the adoption of e-learning is not without challenges. In this paper, we have presented e-learning and some major related challenges. The paper also covered the situation in the MENA region from the perspective of the application of e-learning. A state of play has been drawn showing the needs and challenges related to the usage of e-learning.

Based on the needs and challenges a plan is suggested for a successful introduction of e-learning. This plan is progressive and in four steps. Each step has a specific target regarding the percentage of online learning adopted. We believe that this progressive approach is the best process to be followed that guarantees a rational and concerted adoption of e-learning.

Future work shall consist in a study of the possible reactions of the stakeholders to this plan. Working groups sessions and interviews shall be organised. The reactions of the stakeholders shall be collected and analysed which will permit a refinement of the suggested approach.

Customised education in 2016

Christien Bok

SURFnet, The Netherlands

Christien.Bok@surfnet.nl

Abstract

What is "flexible and personalized education" anyway?

The current state in Dutch Higher Education

An analysis of strategic plans of 40 institutions of higher education in the Netherlands shows an overlap in ambition: a search for more flexible and personalized education. But what does that look like, customized education? And how would or should that prepare students for a career in a rapidly changing world? SURF, the collaborative ICT organisation for Dutch education and research, spoke to a large group of innovators that try to translate concepts of flexible and personalized education to classroom practices. We spoke to people who are changing the way they offer their courses, and explore, in the classroom, what works and what does not. We also spoke with visionaries who think about what we need to change to prepare students for the future. We asked them what they see as flexible and personalized education, why it is needed, what we have to change and offer to enable it, what organisational boundaries we encounter, what already is happening, and what their vision of the future is. We had them meet up and share their visions and inspire each other. We included international publications about the subject in the discussion. We looked where vision and practice seemed to connect and where it collided. During EADTU Christien Bok, program manager of SURF Technology Enhanced Education, will present the current state of flexible and personalized education in Dutch higher education, and how ICT can contribute to shape

Keywords: flexible and personalized education, innovation in higher education, vision and practice

1. Introduction

A large number of universities, technical colleges and university medical centres in the Netherlands harbour the ambition of offering personal and flexible education. Placing the student at the core of their teaching seems a better option than placing the curriculum at the core. Not every institution is at the same stage in achieving this ambition. In practice, it seems that it is not yet very clear what exactly personal education is, and when it provides an improvement in quality.

The terms personal and flexible are defined and interpreted in diverse ways by different institutions. In this white paper, SURF is setting out to define and describe the topic of "flexible and personal education". We also refer to this as "customised education". The goal of this is to provide the higher education sector with a grasp of the different options and the issues they bring with them. We will examine questions like: Why is customised education needed? What might customised education look like, and what do institutions need to take into consideration when setting it up? The white paper is intended for educational developers, policymakers and lecturers who are involved in shaping customised education.

In preparing this white paper, we have carried out a large number of interviews and held discussions with representatives from Dutch technical colleges, universities and student associations. We have gratefully

made use of their insights and practical examples. The different examples allow institutions to learn from each other and show the full bandwidth of the subject. The title of this white paper is *Customised education in 2016*, because in the discussions we held, we were far from covering all the points of interest on the agenda, and because new experiments, developments and research in the next few years will undoubtedly rapidly provide new insights.

Based on our discussions we distinguish between five educational dimensions for customised education that could be helpful in developing your own vision. The crux here is that institutions and programmes define, based on their own vision on education, which dimensions they want to emphasise to a greater or lesser extent when implementing customised education. Customised education looks different not only for each student, but also for each university, college and lecturer.

Education means working with people. ICT can never replace people, but it offers lecturers options to allow them to implement customised education. Digital assessment makes it possible to hold exams more flexibly, and offers the opportunity of testing learning targets that cannot be tested in a written exam. Analyses of tests give lecturers insight into the quality of the tests and test items, which improves the reliability of the tests and the ability of the lecturer to set tests. The use of study data provides insight into personal progress with study, meaning the students can work in a more targeted way on their weak points. Students are also asking via their representatives⁹⁸ for more digitalisation of teaching. SURF helps institutions by providing ICT services that enable innovation in education and customised education. Over the next few years, we will be intensifying our research, in collaboration with the institutions, into customised education and the ICT services that are required for this.

2. Why customised education?

The knowledge economy is placing greater and greater demands on people. Mid-level jobs are disappearing, and the need for higher education is growing. A one-size-fits-all approach cannot deliver this. Education must make space for more people with different backgrounds, talents and needs. This in turn requires differentiation.

Jobs are mutating or disappearing at a rapid rate. Lifelong learning is necessary. To remain accessible and attractive to people at each stage of their (professional) lives, education must take account of differences in goals and circumstances.

In this chapter we examine the importance of customised education from the perspective of the student, the lecturer, the job market and the educational establishment.

2.1 The student

Young people have greater choice in every area of their lives than they did in the past. Smartphones and tablets have become an extension of themselves; boundaries between learning, living and working are blurring. They also expect freedom of choice in education, and want to be able to use ICT applications. Beside this, the student population continues to become more diverse; students with a variety of

⁹⁸ ISO, LSVb (spring 2016), Measures to make education more flexible. Paper on creating flexibility in higher education from ISP and LSVb

backgrounds, levels of knowledge and different learning needs benefit from a freedom of choice. Students also need the flexibility to be able to combine work and life with an education.

Different talents, backgrounds, prior knowledge

Einstein supposedly once said of the education system: "Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing it is stupid." Students have different talents, backgrounds and prior knowledge. An education will not always connect with or take into account some very specific combinations of talents, knowledge, skills and interests on the part of students.

Speeding up and slowing down

Whereas in the past students could study for as long as they wanted, currently students are tied to a fixed number of study years. But for many students, their time as a student is also an important time in their development. Students want to travel or do management work or volunteer work. Registration per academic year can be restrictive.

Studying at multiple institutions

More and more students also want to take subjects outside their own course of study or institution. A minor or optional subject in another faculty or educational establishment provides a broader perspective of the subject. Of course with the advent of MOOCs, SPOCs⁹⁹ and other online courses and teaching materials, students can choose from a vast selection, including from other institutions.

2.2 The lecturer

Teachers have – just like students – different abilities and preferences. Just as students have different learning styles, they have different teaching skills. In the classroom, a lecturer who likes conventional teaching, and who prefers to use their contact hours this way, is better than someone who wants to experiment with innovative forms of education.

When students have a lot more freedom of choice in how they complete their studies, then lecturers assume a new role. They supervise the learning and selection process as coaches or mentors of the students, provide context and content, and sometimes also act as online moderators. This new role demands different teaching methods and different abilities. Above all, lecturers are professionals who are expert in their subjects, and must remain so. By creating teams made up of lecturers, ICT support staff and experts in education, each team member can contribute what they are good at. Some lecturers are pioneers and contribute innovation, while other lecturers contribute mainly their domain content.

Teachers also have a heavy workload to deal with, even without any added innovative strategies. In addition, especially in universities, lecturers are judged more on their research results than on their teaching abilities. To stimulate educational innovation and to motivate university lecturers better, there is a need for an educational career path, with an appropriate HR policy. That also needs to be aligned with the new role of lecturers as coaches and mentors.

⁹⁹ MOOC: Massive Open Online Course, SPOC: Small Private Online Course

2.3 The job market

Careers, jobs and tasks are changing ever faster. Thanks to technological advances such as digitalisation and increased use of robots, some professions and careers are disappearing and new ones are being created. The content of careers is also changing. To resolve complex problems such as the environment, ageing populations and rising health costs, creative and adaptable knowledge workers are needed who can work together across disciplines. Companies and organisations are probably looking more for flexible and adaptable employees than for domain experts. They need highly educated employees who are able to deal with change, and who know how to identify and fill in gaps in their knowledge. Higher education needs to prepare students for this and to teach them how to handle it.

Up-to-date knowledge

Employers expect graduates to enter the job market with up-to-date knowledge. That requires the institutions to keep their curricula constantly up-to-date, and to continue to keep up with new developments. They also need to teach their students that personal development does not stop when you get your certificate. They need to ensure that students are able to prepare themselves for the following stages in their career and are able to manage their own learning process.

Skills as well as knowledge

As well as factual expertise, employers are increasingly looking for soft skills such as creativity, critical thinking, problem solving ability, communication and working in a team. Leadership, self-awareness and providing feedback are also becoming more and more important. Within the current curricula these skills often receive little attention, and students have less time to acquire these skills alongside their studies, due to the shorter time spent studying. More attention should be given to this in courses of study.

2.4 Educational institutions

Institutions are faced with the challenge of making education more effective while at the same time maintaining the quality of education. Rising student numbers, less funding per student, low yields and high drop-out rates are forcing institutions to make teaching more efficient and more effective. Institutions need to shape their teaching to fit the demands of students and the job market.

Study switchers and drop-outs

A substantial proportion of first-year students change their subject or drop out. More freedom of choice within the curriculum offers students the option of changing direction during their education. Matching, information and insight into the professional world also remain crucial.

Part-time education

In 2014 the advisory committee on flexible higher education for employees noted that "results in the Netherlands in the area of lifelong learning [lag behind] the ambitions, while the urgency of this keeps on growing. In this area, the Netherlands is trailing well behind its own ambitions as a knowledge economy."¹⁰⁰ With truly flexible education programmes and more opportunity for students to follow their own path at their own speed, taking their individual circumstances into account, the distinction between full-time, part-

¹⁰⁰ Flexible higher education for adults Consultative report dated 12 March 2014

time and work-study education should disappear.

3. What is customised education?

Customised education always means *personal* and *flexible* education. Personal education is not based on a fixed educational programme, but is aligned to the wishes and preferences of the student. Personalised education enables students to define their own learning paths. Flexible education offers students freedom of choice. If students are able to pursue their education when and where they want, more flexibility becomes possible and more freedom of choice can be provided. That makes learning at your own speed and on your own schedule easier.

Customised education can take a number of different forms, which can always be defined in five dimensions from the student's perspective. The selected mix of dimensions, along with the breadth of each dimension, leads to customised education for each institution. Two dimensions relate to *what* the students learn, three to *how* they learn:

What the students learn:

- freedom of choice of content
- fitting with their background

How the students learn:

- in their own time and place and at their own speed
- at their own level
- in their own way

In this chapter we briefly describe these five dimensions.

3.1 Freedom of choice of content

Freedom of choice of content enables students to match their education to their own ambitions, interests, talents and abilities. It also enables them to pursue parts of their education at a number of different institutions. By creating unique combinations, they can differentiate themselves in the job market.

Freedom of choice can apply at a number of levels. For example, lecturers can offer their students freedom of choice within a course. Within a course of study, students can be given the choice of taking or not taking specific courses, often with room for elective courses and activities. And finally, students can choose the educational institutions where they want to pursue their education.

3.2 Fitting with the background

By taking account of the (prior) knowledge, skills and experience of each student, institutions can do justice to each individual. Particularly for students with work experience who want to develop themselves further, that can be very attractive.

Universities and programmes can offer students exemptions and adapted programmes, based on their experience and prior knowledge. Programmes can also continuously adapt their content, presentation and feedback to the level of the students. Learning analytics offer ways to customise this adaptation. By analysing students' learning data, students and lecturers can gain insight into learning results and learning behaviour, enabling tailored support for students.

3.3 Own time, place and speed

Institutions can offer students the opportunity to study in their own time and at their own place and speed. In this way institutions accommodate individual circumstances in the lives of their students. That makes it easier for students to combine their education with work, family, care, etc. The availability of online courses makes it possible to take courses at other institutions, including abroad.

Learning at their own speed allows students to speed up or slow down. If they have learned all the material in three weeks, then they can sit the exam after three weeks. If instead they need twenty weeks, that is not a problem. In this way, institutions can adapt to the specific talents of exceptional students. Adaptive teaching makes learning at the student's own speed possible.

3.4 At their own level

Presently most education is offered at a single level. However, this sort of education may be too difficult for some students and too easy for others. By stretching excellent students further, they are kept motivated. In addition, they can differentiate themselves for potential employers. Students who have problems with specific parts of a course should, where possible within the scope of their final qualification, be able to take some subjects at a lower level.

3.5 In their own way

Students can work more successfully if they have the opportunity to learn in the way that suits them best. Some prefer lectures or seminars on the campus, while others would rather learn at home with a book or use tutorial videos or games. Some students have a preference for problem-based learning, others really dislike it. Freedom of choice to learn in various ways enables students to choose from among the learning methods, learning materials and support that suits them best. Furthermore, the teaching methods always help to guide the approach and the way in which education is provided. This determines the degree of freedom of choice.

4. What is already happening?

In the Netherlands, there is already plenty of experimentation going on with customised education. Some forms of customisation, such as freedom of choice at the master's level or development of online education, are already the norm in many institutions. Institutions are also carrying out pilots to better define the boundaries of customised education. A number of examples of how institutions have made choices to implement one or more dimensions of customised education to a greater or lesser degree are described below.

4.1 Freedom of choice

At many educational institutions students can take a minor subject elsewhere, sometimes also outside their own subject area. University colleges and liberal arts and sciences colleges offer a bachelor's programme with a lot of room for elective content. That also applies for many master's courses. At the University of Utrecht, all bachelor students can define a quarter of their curriculum themselves.¹⁰¹

¹⁰¹ <http://www.uu.nl/bachelors/veel-keuzeruimte>

Individual definition of a full course of study also occurs, but on a small scale. An example is the contract education programme at the Erasmus Academy. Part-time students here can select their own courses, and on the basis of these, create their own master's degree. Another example is the bachelor's in ICT from Fontys, where students can choose from seven study paths after the first year.

4.2 Background

Various educational institutions take account of prior knowledge, experience or skills. Higher vocational training institutions participating in pilot projects with work-study or part-time education assess case by case whether students should follow a standard course of study or qualify for a customised course of study because they have already achieved specific learning goals.

The part-time course of study in Management, Economics and Law at HZ University of Applied Sciences, started in September 2016 with education based on learning outcomes. Students can bring in projects from their job and qualify for study points if they demonstrate that they have already achieved certain learning outcomes. At the Windesheim University of Applied Sciences, part-time students in educational programmes (secondary and primary lecturer training) are eligible for exemptions based on previously acquired knowledge and skills.

The Utrecht University of Applied Sciences offers testing independent of the manner of learning: students can sit a test once they have mastered the course material, without being required to attend the classes for the course. At the Amsterdam University of Applied Sciences, study time can be reduced on the basis of skills acquired previously.

4.3 Time, place and speed

Windesheim University of Applied Sciences offers part-time students in educational programmes (secondary and primary lecturer training) the option of distance learning to develop theoretical knowledge. This is, however, done at a defined speed, with a tight study timetable and hard deadlines.

Despite the broad availability of MOOCs, their penetration into regular education is still very limited. Students who want to be credited or get an exemption for a successfully completed MOOC sometimes find it is a lengthy struggle. An exception to this is the programme "Wageningen X", in which Wageningen University is working towards integrating online and offline study options, including MOOCs. There are now two fully recognised master's courses available: Nutritional Epidemiology & Public Health and Plant Breeding. Starting with the 2016-2017 academic year, students at Wageningen University will be able to collect study points for MOOCs from their own university. These courses can be taken completely online, and students sit the exam at the university.

In part-time courses the students can postpone their courses. Speeding up is also possible, for example in the medical faculty of the University of Leiden. Students can use the freedom of choice in their transition year, after their basic medical training, to begin courses that fit with their specialisation. The result of this can be that students complete their specialisation six months earlier.

4.4 Level

Many institutions offer honours programmes for students who want to and can do more. These programmes have to some extent been developed as part of the Sirius Programme¹⁰², which since 2008 has enabled universities to challenge students who are performing well to dig deeper.

In the honours programme at HZ University of Applied Sciences, the students add an extra 420 hours to their studies in one academic year. The Utrecht University of Applied Sciences offers honours courses in all subjects, with both broader and deeper content. Around 6% of students sign up for this.

At the Hague University of Applied Sciences (at the TU Delft campus), students in scientific subjects can choose between the university variant or the TU Delft variant. In the latter case, they can move directly from their bachelor's studies into a master's programme at TU Delft, without any transition programme.

Other institutions, like the University of Leiden and Maastricht University, offer online refresher courses for students, for example to improve their maths skills so that they can keep up with the bachelor's course of their choice.

The University of Amsterdam allows psychology students to do a formative test each week, with the help of the SPSS statistics programme. Through the test results, the students receive targeted feedback about their weak spots. "This way, it is almost impossible not to pass the course," says one of the students.

5. Scenarios for the future

An institution that wants to implement customised education not only has a choice of different dimensions, such as freedom of choice in content or freedom of time and place. For each dimension, an institution can choose the bandwidth that fits with its motivation for creating education that is more customised. In this chapter, we explore what the selection of the maximum variant might look like. As to the question of whether the maximum variant is desirable for improving the quality of education: we examine this in more detail in Chapter 6.

5.1 Freedom of choice

Full freedom of choice within an institution could mean that the institution no longer offers any programmes, but rather courses from which students construct their own educational programme. Full freedom of choice in education by all institutions could mean that students no longer register with a specific institution, but only for one or more educational components. That requires unbundling teaching, testing and services. Students can then pursue their education both at home and abroad, face-to-face, blended or online.

Independent accreditation bodies decide when a student has earned a degree. That is then by definition no longer a diploma from an individual educational establishment. The diploma will state for each component which institution provided the course(s). In this context, the development of micro-credentials becomes

¹⁰² <https://www.siriusprogramma.nl/instellingen>

important. Micro-credentials, for example with the aid of digital badges, are a form of recognition of skills that students can earn and can use to prove their growing abilities.

5.2 Background

If we want to adapt education fully to reflect the prior knowledge and experience of students, the ultimate consequence is that all diplomas are detached from any fixed curriculum. The link between study points and nominal study hours is cut; instead, education is defined in terms of learning outcomes. The outcomes state what a student knows and is able to do on completion of a learning process, without defining a specific teaching path. Students can take exams at any time, whether or not they have followed a teaching unit.

At the start of their studies, students can take a test to rate them against the final level to be reached of the course to be followed. Based on the result, the student can choose where to acquire the missing knowledge: at an institution or in the work environment. Exams can be taken at any time, and as often as the student wants. Students pay separately for attending the courses and taking the exams.

5.3 Time, place and speed

Full freedom of time, place and speed in education implies that the full curriculum is also offered online. Students then no longer have an obligation to attend, but instead an obligation to deliver results. Students have (online) study support available 24/7. Students can make appointments with lecturers for times that suit them both. Students have the teaching materials available online. And they can take a test wherever it suits them: at home, at the institution or at a regional test centre.

Studying at your own speed means that there is no longer any nominal study duration. Students can take two years to get a bachelor's degree, or they can take six. Registering for a course means signing a contract with an institution that helps the student reach the end goal, at their own speed.

5.4 Own level and own way

For good matching to the level of the students, it is necessary to define a clear baseline for all courses at the middle vocational, upper vocational and university levels. Students can then take any course at any level they want. Their diploma will show the highest level they achieved. For all courses, educational establishments will organise extra challenges for the students who ask for them. Those can be honours courses, but also customised approaches per course. A student does not need to achieve a specific diploma level; a combination is also possible.

Studying in your own way implies that, for each course, students are able to choose from different methods of teaching, different kinds of teaching materials, and different forms of support.

6. Issues

Customised education is not a goal in its own right; it can equip students better for their future. To define the bandwidth of each dimension of customised education that best suits an institution, the institution needs to make choices. The scenarios in Chapter 5 are extensive. To determine whether an institution wants to opt for an extensive variant or a less extensive variant for each of the different dimensions, questions need to be asked about the desirability and feasibility of the outlined options, and about the necessary (legal) framework. In this chapter we examine a number of issues.

6.1 Legal framework

The Dutch *Wet op het hoger onderwijs* (WHS) [Higher Education Act] places limits on the freedom of choice. This act enshrines the principle that a formal education needs to be consistent and coherent. All study units must combine to achieve the final objectives of the course of study. In addition, the WHS states that the core of the curriculum must be provided by the institution that issues the diploma. This restricts the freedom to combine educational components from different institutions.

Students in higher education are given an "explicit right" to continue with their best subjects at a higher level. For example, students at a vocational school with a talent for English can take this subject at a more academic level. This was stated by Secretary of State Sander Dekker in a letter to the Second Chamber. Dekker: "Not every child fits exactly into one of the slots of the different types of school. At present, it is too often your worst subject that decides how good you are allowed to be in your best subject. This is demotivating for students and a waste of talent." In higher education this is not yet the case.

The Dutch Social Economic Council (SER) states that a clearly discernible difference is necessary between higher vocational education and academic education. This is necessary both for the recognition of courses of study and for the link between education and the job market. However, the Council believes that this difference should not be allowed to create a barrier to collaboration, coordination and transfer between vocational and academic education.

Any experiments that represent an exception to the statutory requirements normally require a General Administrative Measure arising from a political decision process. This generally hampers the launch of innovations..

6.2 Sense and nonsense of freedom of choice

Freedom of choice in creating the curriculum raises a number of questions. What is the quality of a self-constructed curriculum? How do you guarantee its coherence, and how do you define the objectives? Institutions generally opt for a limited form of freedom of choice. In doing so, they seek a balance between the degree of freedom of choice that students can cope with, a coherent curriculum and fixed objectives.

Structured freedom

Not everybody wants freedom of choice. A fixed programme can also be a valid form of customised education. However, freedom of choice also demands structure – for example, a structure that provides room and support to students who do not yet really know what they want, as well as students who know exactly what they want, within the scope of their wishes and circumstances. How much freedom a student can handle depends on the person concerned and their age. Generally speaking, 17 and 18 year olds need more direction and guidance than a 22 year old. Research by the Amsterdam University of Applied Sciences shows that students mainly need guidance and structure in their first 18 months. After that, they want more space, but without being completely left to their own devices.

Guaranteeing professional skills

Legal professions such as judge or lawyer, or controlled professions such as doctor or registered psychologist, require certain defined levels of knowledge in order to ensure the ability to practise. In these courses of study it is not easy to offer freedom of choice for the content of the curriculum. It would, however, be possible to take some courses at another institution.

Examinations

If diplomas are completely detached from the educational curriculum, the question arises whether an educational institution is the most suitable party to set the exams. The exams could then probably be better set by independent examination boards. However, the question is whether testing and setting exams are indissolubly bound to teaching.

6.3 Other points for discussion

Preserving the educational community

Teaching is more than knowledge transfer. The interaction between students and lecturers is a crucial part of education. Studying at an institution means being part of an educational community. If students are able to study totally in their own time and at their own place, this interaction is at risk. There are, of course, ever more options for online interaction between students and lecturers, but education is a relationship, and face-to-face interaction remains important for the discussion of crucial matters and sharing of (complex) knowledge.

Different speeds without detachment

The big question with speed differentiation is how the institution can organise the teaching. This includes interactions with fellow students and monitoring tasks and assignments. Teachability is also a contentious issue. In addition, there is the question of whether the lack of a deadline will kill motivation to complete a course.

The freedom associated with different speeds is not always a benefit. International research has shown that a high level of choice of speed leads to dropouts. Some students specifically need a strict framework. For these reasons, the Erasmus University Rotterdam offers more structure than previously in the part-time Law course of study: every Friday afternoon there is a lecture. For this reason, the Open University and Windesheim University of Applied Sciences have restored more structure in part-time courses of study. Working with fixed groups led to a spectacular rise in the number of completed diplomas at the Open University. The National Student Survey also shows that it has a positive effect on student satisfaction.

Do differentiated levels leads to dumbing down?

The question is whether equivalent courses can actually be organised at three levels (middle vocational, higher vocational and university) for all courses. This demands a lot of mutual coordination, which may come at the cost of the quality of education. The value of a differentiated diploma is questionable if crucial elements are achieved at a lower level. Another question is whether the job market can assess the value of a scaled down diploma when several different levels are involved.

Is it feasible?

Customised education demands choices: choices of the dimensions where an institution provides customised learning, and choices as to how far it should go. When assessing potential changes to education, the following criteria may be useful:

- Does the change lead to the desired change (students who are better prepared for the job market and better equipped for lifelong learning)?
- Is the change feasible in terms of studying?
- Is the change feasible in terms of teaching?

- Is the change feasible in terms of organisation?
- Is the change affordable?

The redesign of education costs time and therefore money. Experiments require a long-term effort and investments that do not always deliver the expected results. Differentiated education, which therefore many also be smaller scale, is also likely to be more expensive, with no additional funding to cover it. The WHW has stipulated that educational institutions may not ask students for additional contributions over and above their fees. The only exceptions are the University Colleges. If they have been designated as small-scale and intensive educational institutions by the NVAO, then they can ask for higher fees.

In the Ministry's experiments with voucher financing, the effects of other forms of financing are being studied, such as payment per module. Another experiment is that of the University of Amsterdam/Amsterdam University of Applied Sciences. These institutions are carrying out a pilot in the 2016-2017 academic year with one thousand students who are not paying annual fees, but instead are paying per course.¹⁰³ This can be financially beneficial for part-time students and for full-time students who also have to work a lot alongside their studies. The question is, of course, how financing affects the educational institutions.

7. Supporting customised education with ICT

In this chapter we offer a number of examples of how ICT can play a role in shaping customised education. The question of how ICT can enable customised education was addressed by the authors of the SURFnet trend report. We summarise their answers below.

7.1 Virtual reality

Using virtual reality you can construct the entire learning environment for a student. By using simulations in VR, students are less tied to time and place, and can experience important events, exotic locations or future work environments without leaving the teaching location or the college lecture hall. Students can decide how, where and when they use it as part of their own learning process, provided that the education/institution offers high quality content. A student can therefore influence their own learning process. Although a virtual environment can be experienced jointly with others, a virtual reality experience is essentially individual. It offers options to adjust the environment to the person, both in terms of level and of the way in which information is presented. Content can therefore be personalised.

7.2 Serious gaming

Serious gaming adds value particularly in learning situations where it is important to experience for yourself the effects of your actions. But it can also contribute to changing attitudes and reflection. Games can also be used to good effect for skill training. The use of (virtual) games/simulations for skill training offers logistical benefits: students can practice in situations that would cost a great deal of time and money in the "real" world. Serious gaming, just like other forms of e-learning, can be used individually, where and when you want. The game elements here are a bonus that motivates students to achieve their goals. Another possibility is to differentiate within the game using roles. This means students can be assigned a role within a team that suits them, or indeed a role that does not suit them so well, so that they can practice it.

¹⁰³ <http://www.folia.nl/actueel/98236/uva-en-hva-proeftuin-voor-collegegeld-betalen-per-studiepun>

7.3 The virtual classroom

It is often difficult to bring students, lecturers and (online) sources together, while direct interaction is indeed important. A virtual classroom can offer a solution. In a virtual classroom, students from different countries can follow the same lesson together, and learn about each other's cultures. The power of a virtual classroom lies in its direct interaction and the group dynamic it generates. In a virtual classroom, students work in groups. Learning to collaborate is one of the skills required for the 21st century. Here students learn that other people have other cultures and a different way of solving problems and thinking. This helps to create your own range of learning and problem-solving strategies.

7.4 Internet of things

The IoT offers wholly new and cost-effective methods of data collection. These methods can be applied to collecting data about students to support both the student and the lecturer. On campus, sensors and smart devices can be used to organise educational logistics. Managing the occupancy of teaching rooms is one example. Using data about the attendance, activities and study needs of students, you can create dynamic learning hot-spots that stimulate interaction between students. The IoT can enrich student analytics in many ways. An Internet of Everything can offer a learning experience that is much more authentic and personal than is currently possible. Reflection is based on both real data and on data enriched by the environment, and is embedded in an authentic learning environment with physical interaction options.

7.5 Digital testing and learning analytics

Each student leaves a digital trace from the moment they seek out the website of the educational institution until the time they are registered as an alumnus. Link all the systems together and you gain insight into students' learning behaviour, the quality and effectiveness of the teaching. Learning analytics allows targeted feedback to students and lecturers about the progress of studies, and provides insight into how the material is being mastered. Learning analytics can also provide insight into the quality of the (online) teaching materials which can then be improved as a result. By analysing the test data from formative testing, students and lecturers rapidly receive insights into which parts of the subject matter the student has absorbed. In addition, the lecturers can see which exercises and sections of their teaching could be improved. Digital testing combined with learning analytics make it possible to integrate exercises in the student's learning and development process. Students get feedback on their development, success and any stumbling blocks. And the lecturer can also form a view: he/she sees not only the results, but also the students' efforts. Based on this, he/she can offer them customised work during a seminar or a personal meeting.

7.6 Adaptive learning environment

Based on current information about the learning process and their progress, a student may choose a further learning activity and the correct learning content for a learning path. There is a constant action and reaction, supervision, assistance and reflection back and forth between the student, the lecturer, supervisor and workplace. Every interaction generates data (analytics) that form the basis for a student profile. In an adaptive learning environment it is possible to give just-in-time information. Based on the data analysis we can provide digital learning content (for example digital tests) just-in-time for a student. We can also construct non-linear learning paths. We can render material adaptive by chopping up (large) blocks of teaching material into small chunks. This way we can vary the learning path in order to match the

level, speed, interest and other characteristics of the student. Digital teaching resources can be flexible in their form, content and methodology.

7.7 Digital badges and micro-credentials

Badges make it possible to assign a discrete value to smaller teaching units. This increases the flexibility of the education that can be provided: students have more freedom of choice in constructing their curriculum. Students can go looking for educational units, for which they can earn badges, that suit their own background and learning path. Especially professionals who want to continue with lifelong learning, often do not want to follow a complete degree course, but just specific parts of it. They then want to be able to provide proof that they have completed this additional training. Badges can help in recognising previously acquired skills. For employers, badges make it more transparent what education someone has completed: they make unusual skills more visible. And badges can enable clearer differentiation between formal and informal education.

7.8 The student as owner of his online identity

A good and reliable online identity is an absolute precondition for customised education. An educational identity for each student offers access to worldwide educational options without complicated and time-consuming registration procedures and difficult transfers and re-registrations. A student may specialise by taking extra subjects and additional courses at other educational institutions and simply combine study at Tokyo University with an intensive online refresher course at Munich University. A reliable identity is also important for collecting micro-credentials. Certificates and badges awarded can be linked to a single identity: that makes it simpler for a student to prove that he/she has successfully completed a course.

8 Conclusion

Education is due for some drastic changes in order to be better able to meet the ever-changing demands of the job market and to offer students more customised services. Institutions are moving in this direction, and revising their teaching in some wide-ranging innovative programs. But there is still much to be uncovered about the way in which education can more closely meet the demands from the job market and from students.

Where we want and need to get to with education is a difficult but important question. Insights will emerge as we work on it, and will not follow a straight line. In this paper, we have described five dimensions of customised education, we have reflected on the extreme consequences of customised education and we have asked some questions about its desirability. We also drew an outline of the way in which ICT can play a role in achieving customised education. With this, we hope we have made a contribution to the discussion of innovation in education.

We invite educational institutions to continue to share their experiences in innovation in education and to refine their own vision of education. SURFnet wants to provide an environment for using the technological options that are necessary to achieve these ambitions.

Empowering universities for excellence in higher education, improving the quality of higher education

Innovative forms of Quality Assurance for Innovative Programmes

Stamenka Uvalić-Trumbić¹, Sir John Daniel²

¹Formerly Chief of Section, Reform, Innovation and Quality in Higher Education, UNESCO; ²Formerly Vice-Chancellor, UK Open University

Web-Based Learning Performance-Centred To Develop Professional Competencies In Program Evaluation

Catalina Martínez-Mediano

*Research Methods and Diagnosis in Education, Universidad Nacional de Educación a Distancia,
Spain*

Empowering lecturers to facilitate high quality education through the use of learning technologies

Inger-Marie F. Christensen, Christopher Kjær, Stine Piilgaard Porner Nielsen

University of Southern Denmark, Denmark

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Technical University of Cluj-Napoca, Romania

Exploratory Teaching Space: Stimulating Innovation in Teaching

Colette Knight, Thomas Dondorf, Vera Eckers, Heribert Nacken

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Tampere University of Applied Sciences, Finland

Digital teacher training. A tool for excellence in Higher Education.

Lourdes Pérez Sánchez, Rubén Gómez Palomo, Ana María Martín Cuadrado

Universitario de Educación a Distancia

Reflections on the inaugural Empower Online Learning Leadership Academy (EOLLA)

Tom Farrelly¹, Ana García-Serrano², Ruth Schaldach³, Jeroen Thys⁴

¹*Institute of Technology, Tralee, Ireland;* ²*ETSI Informática – UNED, Spain;* ³*Hamburg University of Technology, Germany;* ⁴*UC Leuven-Limburg, Belgium*

E-students' readiness to adjust to online learning technology

Di Mele Luciano, Cosi Gianluigi, Paciello Marinella

Università Telematica Internazionale Uninettuno, Italy

Quality & Faculty Satisfaction in Higher Education Online

Danila Scarozza, Marco De Marco, Alberto Romolini

Università Telematica Internazionale Uninettuno, Italy

Semantic technologies can help in learner-centred (re)design of study programmes

Achilles Kameas

Hellenic Open University, Greece

Library's Knowledge Resources for students and teaching staff
in digital universities from EADTU

Gema Santos-Hermosa¹, Paul Bacsich², Christos Rodosthenous³, Evagelia Lappa⁴, Marlies Bitter-Rijpkema⁵, Fred Truyen⁶

Open University of Catalonia, Spain¹; SERO Consulting, UK²; Open University of Cyprus, Nicosia, Cyprus³; Hellenic Open University, Greece⁴; Open Universiteit, The Netherlands⁵; KU Leuven, Belgium⁶

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Stamenka Uvalić-Trumbić

Formerly Chief of Section, Reform, Innovation and Quality in Higher Education, UNESCO

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Abstract

Institutions are being urged to innovate in the provision of higher education, notably through online delivery, while some governments are encouraging the emergence of new providers. Quality assurance systems have been slow to catch up, so this burst of innovation is being restrained by having to satisfy QA criteria designed for an earlier era.

We report on three initiatives that address this challenge. First, the US Council for Higher Education Accreditation, through its International Quality Group (CHEA/CIQG), has designed and pilot tested a 'Quality Platform'. This was expressly conceived for innovative higher education provision - variously described as 'non-institutional' or 'post-traditional'.

Although quality higher education is quality higher education in whatever form it takes, designing a QA system for innovative provision means focussing on the most essential criteria. For the Quality Platform these centre on the articulation and achievement of student learning outcomes. We describe the pilot implementation of the Quality Platform at the DeTao Masters Academy in China, an organisation conducting high-level training outside China's conventional higher education system.

The other two initiatives are guides of more general applicability written in the form of Frequently Asked Questions. One, A Guide to Quality in Online Learning , addresses the use of online technology in regular credit programmes. The other, A Guide to Quality in Post-Traditional Online Higher Education , addresses the challenge of QA for more informal approaches such as MOOCs and OERs.

After some comments about combatting corruption in higher education, which is becoming an increasing concern for quality assurance systems we end by citing the Seven International Principles of Quality developed by CHEA/CIQG.

1. Introduction

The various ways in which higher education is innovating in its quest to reach larger numbers of learners and promote equity pose challenges not only to HEIs' established ways of operating, but also to the systems, both external and internal, that assure the quality of their provision.

Quality assurance systems, which once focussed mainly on inputs to HEIs and later evolved to include reviews of their internal processes for teaching, are now concentrating on the basics, which are the students' learning outcomes. No matter what the students' earlier academic backgrounds, no matter what methods were used in the teaching/learning process, the vital question is, 'what can the students do now that they could not do before they took this course'?

Even that approach, however, does not capture the full scope of the innovation that is taking place. While all teaching has a purpose and aims to give new skills and knowledge to students, some innovative approaches do not verify what students have acquired in any formal way. Open Educational Resources (OERs) enrich the universe of accessible knowledge in remarkable ways, yet they do not carry external assessment. Similarly most MOOCs (Massive Open Online Courses) include informal tests and quizzes but most students do not seek any formal certification of what they have learned. Yet those who produce OERs and MOOCs would like to be able to assure the public that their offerings have been developed in a serious and systematic way and represent the state of the art in the subjects they purport to teach.

All this means that quality assurance needs to find new ways to adapt to innovative providers and programmes of higher education. This paper reports on four developments that relate to this need.

2. A Quality Platform for Innovative Providers: Focus on Learning Outcomes

The first project is a Quality Platform developed in 2013 by the Council for Higher Education Accreditation/International Quality Group (CHEA/CIQG) as a form of external review of the quality of alternative/innovative providers of higher education that are not part of the traditional higher education systems or quality assurance frameworks (CHEA, 2015).

The Quality Platform was designed in 2013 as a tool to measure learning outcomes from MOOCs and other alternative providers. It reviews these providers for their performance and quality and it can be used both nationally and internationally. The Platform is designed as a response to an emerging new sector of higher education, offerings from private companies and other organizations, often online, now available alongside the provision of traditional colleges and universities. The primary intent of the Quality Platform is to assure and improve quality as this sector develops and serves more and more students. It is an outcomes-based review using standards established by the Platform, a self-review by the provider and peer (expert) review. If successful, the provider is designated as a “Quality Platform Provider” by CHEA/CIQG for a three-year period.

The Quality Platform is based on four simple standards, summarized as follows:

1. Learning outcomes are articulated and achieved.

The provider organizes its work, determines the content of offerings and sets expectations of rigor based on anticipated and actual results for students who enroll: information about gain in skills, competencies or other attributes resulting from a learning experience.

2. Learning outcomes meet postsecondary expectations

The provider demonstrates that the articulated and achieved student learning outcomes are consistent with expectations of student learning at degree-granting colleges and universities.

3. Curricula provide opportunities for successful transfer of credit

For the provider’s offerings intended to be used for credit or credentialing at a college or university, the provider: 1) Builds opportunity for student progression beyond its offerings as part of its curriculum

development; 2) Organizes offerings into a coherent learning experience that can be sustained across multiple providers of higher education.

4. Transparency is maintained and comparability is established:

The provider develops and provides reliable, easily accessible and readily understandable information to the public, at least annually, about its performance: 1) An aggregate description of the student learning outcomes that are achieved; 2) The results of comparisons of performance among similar types of non-institutional providers; 3) An aggregate description of the uses of the offerings to students, for example, advancing toward an educational goal, employment.

The self-review by the provider is based on a template providing evidence that each of the four standards have been met. This is the basis for an external review and a site-visit by a team of experts. The acceptance of the report by CHEA/CIQG is the basis for the award of the Quality Platform Provider Certificate.

Colleges and universities could use the Quality Platform designation as an indicator of quality when considering the award of credit or recognition. Quality assurance agencies could refer the Quality Platform in reviews of these providers that they might conduct.

The Quality Platform was pilot-tested in 2015 with the DeTao Masters Academy in Shanghai, China. DeTao is a private company set up in 2012 with the aim of developing innovative educational programmes, which go beyond conventional educational approaches and are not part of the traditional higher education system in China. The programmes are designed and implemented with the guidance of teaching staff, most of whom are from outside China (designated as “Masters” by DeTao) with distinguished academic or industry backgrounds in a wide variety of disciplines. DeTao works in partnership with the Shanghai Institute of Visual Arts (SIVA) by providing Advanced Classes to a selected number of students. Since DeTao Advanced Classes do not lead to a degree but can be thought of as an enriched major to programmes offered by SIVA, they are not covered by traditional QA frameworks in China nor are they part of the traditional higher education system.

DeTao applied to undergo the Quality Platform review in April 2015 and conducted a self-evaluation from June to September 2015, based on the standards of the Quality Platform. An expert team held a site visit in November 2015 and produced a report with recommendations to CHEA. After reviewing the report in December 2015, CHEA awarded DeTao Masters Academy, a Quality Platform provider certificate at a ceremony during the CHEA Annual Conference on 26 January 2016 (CHEA, 2016).

The Quality Platform process had proved to be very beneficial for the DeTao Masters Academy in a number of ways. First, conducting the Self-Review helped DeTao to develop a common framework for its Advanced Classes based on learning outcomes. Second, it introduced the concept of learning outcomes as a new approach in China that may well have an impact on future developments in student evaluation.

On the basis of this experience, the CHEA/CIQG Quality Platform is now being piloted by the US Department of Education (USDE) as part of a new experimental programme, Equip (the Educational Quality through Innovative Partnerships), designed to counterbalance the “inflexible and unaffordable options” of traditional higher education for those who need it most, working adults and other non-traditional students.

CHEA will also be the evaluator for a partnership between the Dallas County Community College System and the company StraighterLine that provides low-cost courses across several disciplines. Together they will offer two associate-degree programmes aimed at students who have already earned some college credits (Blumenstyk, 2016).

3. A Guide to Quality in Online Learning

The 13th Babson Report on online learning in the US (Babson, 2016) concludes that distance education now mainstream because more than one-quarter of higher education students are now taking a course online. In addition, one of the positive consequences of MOOCs - and the fact that elite universities around the world engage in them - is that the perception of the quality of online learning is changing.

In view of the above, assuring the quality of online learning is a continuous challenge. This inspired our second development, the publication of “A Guide to Quality in Online Learning” (Butcher et al. 2013). This Guide distils extensive experience and research into an easily readable format through 16 Frequently Asked Questions (FAQs). FAQ 3: What constitutes quality in online learning? summarises key aspects of quality in the online experience under the headings of: institutional support (vision, planning & infrastructure); course development; teaching and learning (instruction); course structure; student support; faculty support; technology; evaluation; student assessment and examination security.

One of the concrete examples cited is the Quality Matters Programme (<https://www.qualitymatters.org>) in the USA, which has established national benchmarks for online courses. Central to the QM is the concept of alignment, which is evident when learning objectives, measures and assessment, educational materials, interaction and engagement of learners, and course technology ensure the achievement of learning objectives.

A strength of this Guide is that it provides other numerous examples from around the world: benchmarks of the Australasian Council on Open Distance and e-Learning (ACODE), guidelines to improve the quality of online offerings by the Asian Association of Open Universities (AAOU) and useful approaches for staff development in support of online learning such as those by the University of South Africa (UNISA). A useful Annotated Reading List on Benchmarks further reinforces this Guide to Quality in Online Learning.

4. A Guide to Quality in Post-Traditional Online Higher Education

Reactions from around the world to the 2013 Guide to Quality in Online Learning were very positive. However, since it appeared at a time of intense press coverage of massive open online courses (MOOCs), the editors were asked to commission another document to explore quality issues in less formal types of online learning than those covered by the 2013 Guide. In 2013-14 alternative, innovative or ‘post-traditional’ approaches to higher education continued to multiply. These included wider, more open and more equitable access to higher learning and a growing diversification of teaching and learning methods and content, such as MOOCs, OER, Open Badges, Experiential Learning, etc. This led to the 2014 Guide to Quality in Post-Traditional Higher Education. (Butcher et al, 2014)

The Guide looks at what is meant by post-traditional higher education and reviews the main manifestations of ‘openness’ in higher education before addressing the issue of assuring quality. We shall use the quality assurance of MOOCs and OER as examples.

4.1. QA and MOOCs

The quality assurance of MOOCs is a very topical question in developing countries. Since learners are everywhere, countries want to know which MOOCs would be of greatest value for them. But, because MOOCs do not offer credit and do not lead to qualifications, traditional quality assurance frameworks do not include them in their reviews.

A MOOC is a Massive Open Online Course and Open Educational Resources were the long fuse that detonated the MOOCs explosion. The fuse was lit when MIT started putting its professors' lecture notes on the Web in the late 1990s. Meanwhile, the University of Manitoba, Canada, first used the term MOOC for a course called Connectivism and Connective Knowledge in 2008. Two thousand members of the public took the course free online.

But MOOCs really made news in 2012 when elite American universities like Harvard, Stanford and MIT offered MOOCs based on a very different educational philosophy and pedagogy. Since then there has been a stampede to join the MOOCs craze and MOOCs are no longer just a North-American phenomenon. A range of MOOC providers has appeared around the world and MOOCs are now offered in many languages. European Multiple MOOC Aggregator (EMMA) and FutureLearn are just some examples of European providers.

How do MOOCs – and online learning generally – challenge traditional practices of internal and external quality assurance and accreditation? There is bad news and good news.

The bad news is that since most MOOCs are shorter than normal courses and do not carry credit, most universities have only skimpy academic procedures for giving approval to offer them. Moreover, since they essentially by-pass internal QA processes, external QA systems have also taken little interest in them – at least so far. The good news, of course, is these relaxed approval processes give institutions a chance to test innovations without having to submit them for approval to conservative academic governance bodies and engage in the standard intra-institutional bargaining needed to get new initiatives going.

Institutions offering MOOCs – and sometimes also those offering traditional online learning – often partner with external enterprises (both for-profit and not-for-profit) to help them. MOOCs require IT systems that can cope with very large number of learners and those offering traditional programmes online may need help with setting up distance learning systems.

A recent publication by UNESCO and COL (2016), *Making Sense of MOOCs: A Guide for Policy-Makers in Developing Countries* addresses the issue of QA and MOOCs. It recommends including them in existing QA frameworks, especially those designed for ODL. Some European tools such as e-Excellence and OpenupEd are put forward as possible models. However, it is clear that this remains a challenge.

Fresh approaches to quality assurance are needed for the emerging innovations that we call 'post-traditional' higher education. These would address innovations such as MOOCs, OERs Open Badges, and the assessment of experiential and prior learning.

4.2. Quality and OER

The issue of assuring quality of OER is even a greater challenge. The 2014 Guide begins by quoting Wiley (2013), to the effect that the open licence does not necessarily guarantee that an OER will be 'fit for

purpose'. The decentralised nature of OER creation remains a major challenge. Key issues are how to make the process more transparent and how quality can be maintained over time. The openness and flexibility of use, modification and re-use of OER further exacerbate this challenge.

Recent research (OECD, 2015) demonstrates that different institutions and networks have tried to address the quality assurance of OER. A key requirement seems to be the development of relationships of trust between the producers and the users of OER. Another solution, used by the UK Open University, is to release "beta content" and revise the OER after feedback. Others argue that creating collaborative communities to improve quality and relevance of OER is an efficient way of assuring quality through peer review. The need to adapt learning materials to specific educational contexts is also proposed as a quality requirement.

Aligning OER with common learning standards used in educational systems is another approach used by institutions. One example is the Dutch repository of educational materials, Wikiwijs, which is aligned to learning outcome plans. Another example from the US is the Common Core State Standards, which refer to the expected outcomes in mathematics and English, used, among others, by the Khan Academy's repository for educational resources. A project at the University of Leicester uses fixed quality criteria for OER as does, more comprehensively, the Tidewater Community College in Virginia. The College's policy is based on the requirement that academic staff cannot develop or teach an OER-based course unless they have undergone training and learning outcomes have been specified. Furthermore, any changes of up to 10% of the content of an accredited course require a new quality assurance review.

Despite the practices noted above, concerns about quality remain a barrier to using OER. There is an urgent need to rethink quality assurance mechanisms so as to make them more open and to apply standards for ensuring that what is learnt using OER is recognised in formal education.

5. Quality and Corruption

Finally, we offer some comments on corruption in academic processes. Historically the risk of corrupt practices has not been a significant focus of either external or internal quality assurance. However, alarmed by the increasing frequency of press reports on corrupt practices in higher education, the International Quality Group of the US Council for Higher Education Accreditation (CHEA/CIQG) joined forces with UNESCO to convene an international expert group to review this threat in March 2016. Its Advisory Statement noted that: 'dishonest practices are undermining the quality and credibility of higher education around the world' (CHEA/UNESCO, 2016).

It is somewhat ironic to discuss corruption in this forum about open, distance and online learning because times have changed greatly in recent decades. Historically, conventional campus institutions used to accuse correspondence education, the older form of distance learning, of dubious ethical practices in areas such as fees policy and the verification of student identity. Today, however, the CHEA/UNESCO Advisory Statement on corruption makes little mention of distance learning. There are several reasons for this.

First, bribery and favouritism in admissions processes are a notable form of corruption in campus institutions. Many distance-learning programmes, both formal and informal, do not have selective admissions criteria, which eliminates this problem.

Second, all higher education institutions (HEIs) are now using online technologies, especially in student assessment. To the extent that ODL institutions 'got there first' they have a longer history of addressing the threats of dishonest practice that online technology makes possible. The guides to quality in online higher education, both traditional and post-traditional, which we cited earlier, address these threats in all aspects of the teaching and learning process.

We strongly suggest that ODL institutions check their operating practices against the matrix of effective preventive actions in the CHEA/UNESCO Advisory Statement, but well-run ODL institutions should not need to be defensive about the issue of corruption.

6. Conclusion: Quality rests with the Provider

In conclusion, promoting equity by opening up higher education has posed challenges to quality assurance and even to the definition of quality in higher education. However, certain fundamental principles underpin all forms of higher education, no matter what the curricula or delivery mode. Seven International Quality Principles were articulated in 2015 by CHEA/CIQG as follows (CHEA/CIQG, 2015):

1. Quality and higher education providers: Assuring and achieving quality in higher education is the primary responsibility of higher education providers and their staff.
2. Quality and students: The education provided to students must always be of high quality whatever the learning outcomes pursued.
3. Quality and society: The quality of higher education provision is judged by how well it meets the needs of society, engenders public confidence and sustains public trust.
4. Quality and government: Governments have a role in encouraging and supporting quality higher education.
5. Quality and accountability: It is the responsibility of higher education providers and quality assurance and accreditation bodies to sustain a strong commitment to accountability and provide regular evidence of quality.
6. Quality and the role of quality assurance and accreditation bodies: Quality assurance and accreditation bodies, working with higher education providers and their leadership, staff and students, are responsible for the implementation of processes, tools, benchmarks and measures of learning outcomes that help to create a shared understanding of quality.
7. Quality and change: Quality higher education needs to be flexible, creative and innovative; developing and evolving to meet students' needs, to justify the needs of society and to maintain diversity.

Two principles particularly resonate with the topic of our paper. First, principle 1 states that "assuring and achieving quality in higher education is the primary responsibility of higher education providers and their staff". This applies both to face-to face and online provision of higher education. Quality assurance will have to adapt and become more flexible and creative – as stated in principle 7 - to keep abreast with the dynamic diversification of higher education provision as it opens up in multiple ways and promotes equitable access to greater number of learners.

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Web-Based Learning Performance-Centred To Develop Professional Competencies In Program Evaluation

Catalina Martínez-Mediano

Research Methods and Diagnosis in Education I (MIDE I) Universidad Nacional de Educación a Distancia (UNED) Madrid. Spain

Email: cmarme@edu.uned.es

Abstract

Students in higher education usually acquire considerable knowledge and many separate skills, but they rarely learn how to integrate them into performance of complex tasks. For this reason, our purpose in this project is 'Design procedures to develop students' professional and key competencies for lifelong learning in one course technology mediated'. Based in a mixed methods research approach we have analysed the students and teacher behaviours in the course, the achievement in the subject and the course evaluations by the students by survey and by the Institution's Quality Assurance System. The results based in three cohorts show improvement in student's participation in the virtual course, in achievement, and in satisfaction with the innovation. Our purpose to develop competencies for professional and lifelong learning, online, included in the curriculum academic, based on an instructional design which attends personal needs, collaborative learning and formative feedback, has been fulfilled.

Keywords: Web-based learning, Performance-centred learning, Professional competencies, Lifelong learning competencies, Quality evaluation.

1. Introduction

Internet represents a medium through which universities may deliver grades, masters and doctorates courses for students and people who need to actualise their studies and training to improve in their profession and in their lives, without any restriction of time, geographical situation or topics area. The success of this learning modality rests on their instructional designs, learners need and motivation and teachers involvement.

Students in Higher Education usually acquire considerable knowledge and many separate skills, but they rarely learn how to integrate them into performance of complex tasks. Students should learn professional competences where complex tasks could be performed as integrated units, as well as key competencies for lifelong learning to be updated for their personal and professional development (Janssen-Noordman et al. 2006, p. 447). For this reason they have to receive training for application of research skills, develop and evaluate project, take decision and find solutions to problems that they should prove.

To address these questions, our instructional design pay special priority to educational practices, placing the higher-level of the Bloom taxonomy objectives to get our goals, awaking in students' higher expectation on learning requiring adequate teacher support and feedback, as well as peers collaboration.

2. Use this headline for titles

According with the outcomes recognizes by the EU for HE:

To have developed those learning skills that are necessary for them to identify their own training need to continue to undertake further study with a high autonomy degree. (QFEHEA, 2009).

Professors should be involved in the professional and LLL competencies development to reduce the gap between young people's training and job Demands. And, with this purpose, our instruccional design is focussed in developing professional and lifelong learning competencies embedded in the academic curriculum, on line.

2.1 Professional competences and Lifelong learning competences

A *professional competence* is defined as meaningful whole tasks that are performed in professional practice, and requires integration of knowledge, skills and attitudes. *It says is competent* who possesses the ability to do something efficiently and to meet complex demands in a particular context, through knowledge, cognitive skills, practical skills, as well as social and behaviour components such as attitudes, emotions, values and motivations. (Gonczi, 2003). Competency emphasizes a stronger relation between practical and theoretical knowledge, and the contribution of personal and social qualities to task performance (Brockmann et al. 2008, in Fastre et al. 2014, p. 972).

Lifelong learning (LLL) is regarded as an important strategy to improve human development, with a growing interest related to employability, as well as an important learning output of the Educational Systems in Europe and the entire world. (Moos and Gray, 2013). LLL competencies in today's knowledge society require specific key competencies, such as knowing what one has to learn, knowing what one does not know, and knowing where to find relevant information. Because of the increasing amount and the changing nature of knowledge, the need to keep up with change is even more critical today, (Martinez-Mediano & Lord, 2012).

Prepare students as professional requires preparing them for Lifelong learning.

2.2 The instructional course design in a Virtual Learning Environment

Design educational programs have the challenge to create learning environments that helps students construct well-functioning networks of packages that comprise integrated knowledge, skills and attitudes. Educational designers should strive to preserve the coherence of whole learning task and the whole practice, and students should be asked to perform meaningful whole tasks inside a whole practice.

The idea behind performing a practical tasks, as similar as possible those performed in real professional environments, help students to integrate knowledge, skills and attitudes necessary for the effective task performance, and allow transfer what they have learned into real work situations.

Performance and competency-based education not only aims to train students in solving tasks effectively, in addition to training in conceptual and procedural content, but aims to contribute to develop them autonomous learning ability to analyse and select relevant information, in each case, to experience their own solutions and show their results to the public.

Practices enable students to engage in active learning experiences, understand the new material in much more meaningful ways and incorporate these new ideas into their own knowledge framework. Interactions student-student-teacher provide opportunities for prompt formative feedback throughout the learning process, enhancing motivation and satisfaction with the learning experience.

In our Instructional Design:

- The sequences go from the simple to the complex,
- Use examples, and
- Encourage and facilitate students to find the information needed to complete the practice.

The instructional design supports the implementation of learning tasks designed to simulate real work situations, is related to the paradigm of online performance-based learning, with educational support, embedded in the leaning curricula. (Kommers, Stoyanov, Mileva & Martinez Mediano, 2008, Stoyanov, Kommers, Bastiaens, & Martinez Mediano, 2008).

The instructional design assumes that a learning environment for complex tasks should always include the following five components:

1. Proposal of the Practice.
2. Information Procedures to guide the practice step-by-step, theory-based.
3. Examples of Practices.
4. Collaboration and formative-feedback.
5. Presentation of the final task.

The use of formative and summative evaluation, emphasizing the informative and formative feedback, provided by teachers and peer, related to the theoretical topic, in each correspondent forum, adapting instruction to the previous level of student learning with flexibility, by providing the conceptual framework for interpreting the issues help to get the outcome desired in the course, supported by the entire instructional design.

This technology-mediated learning experience occurs in a degree course in Pedagogy Grade, offered in the fourth years of the degree, in the subject of Program Evaluation, at the National University of Distance Education (UNED) in Spain. This is developed in the virtual course of the subject, which constitutes a Virtual & Personal Learning Environment offered by the UNED by means of the aLF Platform, which facilitates an enriched learning environment through collaboration and formative feedback through Forums.

The concept of 'Personal Learning Environment' comes from the development of Web 2.0, which allows integrate learning resources, relationships and personal experiences for the construction of learning through interaction and collaboration between people. This new website as a platform for participation and

exchange, focusing on the user and the services that are offered, along with the concept of summative collaboration between services and users, has made possible the participation and enrichment of all, what power the capacity for learning in university courses, as the smallest part can enrich another, be shared and

enriched by another.

The design of the practice emphasizes its authenticity and is in line with the program content; It goes from simple to complex; Use examples showing embodiments of the tasks and the elements included in the actual practices; It encourages and facilitates students to find the information needed to complete the practice; It provides collaboration and formative feedback on key issues in the forums practices and evaluates the work by heading system that guides their implementation.

In the Virtual & Personal Learning Environment, there is a Forum of Theory for each topic in the syllabus.

- The teacher introduces questions to drive learning and generate debate and collaboration, promoting deep learning, centred in theory understanding and its relation with every part of the global practice.

In the Forum to guide the Practical work:

- Students are encouraged to present their proposal to evaluate a real educational program recommending s/he's familiar with it.

All receive formative feedback individually, open to all students, grouping the answers when it is possible.

The design of the course, the script to do the work, and the examination test by essay evaluation, in which the contents of theory and the own work done by the student, well structured and oriented in the virtual course are evaluated, benefits all students enrolled in the course. To a few for their direct involvement in the debates, to others because promote reflection based in the reading and silent participation. To those presented in the ordinary call and those who do in September and used in the summer to see the discussions in the virtual course as personal learning environment.

The Virtual & Personal Learning Environment Network, is key to personal and professional development of students, taking advantage of the wealth of network communication, to reflect on key theoretical issues and their relationship with practice, show examples, share experiences, consult multiple learning resources and update information. The online learning Instructional Design has the challenge of creating learning environments that help students build networks that allow them to integrate knowledge, skills and attitudes of collaboration, respect, commitment and responsibility.

3. Research methodology

Innovation based in Science learning should be tested in order to check if the innovation gets students learning more effective, efficacy, satisfactory, and enjoyable. According with the idea of benefice student's education, teacher need receive feedback from their students.

3.1 The innovation

The innovation is based in one "Instructional design, performance centred, in a Virtual & Personal Learning Environment Network', guided by teacher, enhancing collaborative learning and formative feedback"

3.2 The research objective

The main objective in this part of the project is 'evaluate the design, implementation, and results, to test if

it has success in getting the intended goals, gather arguments to improve the course, and make recommendations’.

3.3 The design

The research design belong to the evaluative research, that uses mixed methods approach. We analyse three students cohort from the following courses:

- 2013-2014: Course first time in the Grade. Enrolled: 120.
- 2014-2015: Innovation was implemented. Enrolled: 279.
- 2015-2016: Innovation was improved. Enrolled: 324.

We use survey techniques to collect information form the course users, the students, and also compare the students’ final mark obtained in the year we applied the instructional design with special development to guide the practice, and teacher presence providing formative feedback, with the obtained a year before, students achievement and information collected by the Institutional Quality Assurance System on the subject.

The indicators and procedures followed to measure the success of the innovation are the following:

- Teacher and students behaviour in the Forum (Platform statistics).
- Achievement: Comparison between students’ final mark in the base-year, the year we applied the innovation, and the following year to check if the innovation is consolidated and sustainable (2013-2014, 2014-2015, 2015-2016. (ANOVA).
- Course evaluation by students the course which the innovation was applied, 2014-205 (Survey).
- Subject or course evaluation the three academic years, 2013-2014, and 2015-2016, by the UNED Internal Quality Assurance System (IQAS).

4. The results

4.1 Teacher and students’ behaviour in the Forum

The data in participation in the virtual course are in table 1.

Table 1. Key questions, students’ participation and teacher feedback in Forum

Forum	2013-2014 (120)			2014-2015 (279)			2015-2016 (323)		
	KQ	SP	TF	KQ	SP	TF	KQ	SP	TF
1. General questions	23	56	29	36	112	38	15	62	16
2. The practical work	6	10	8	40	102	40	57	141	79
Total participation in Forum 2	24			182 (x7.5)			277 (x11)		
The theory on the syllabus:									
3. Concepts and Functions of P.E.	15	69	32	6	160	14	9	121	15
4. Evaluative Theories of Scriven	4	18	13	8	112	12	5	31	3
5. The CIPP Model of Stufflebeam	3	9	7	5	86	14	11	56	15
6. The Educational P.E. of Pérez Juste	3	9	10	4	96	19	8	36	21
7. Procedures to realizes P.E.	8	24	18	4	86	8	7	21	11
8. The Program Evaluation Standards	3	13	4	5	75	9	5	22	8
9. Techniques and Instrument to P.E.	2	3	4	3	8	4	2	6	5
Total	42	145	88	35	623	80	47	293	68
Total participation Theory forum 3-9	403			1106 (x3)			788 (x2)		

KQ = Key Questions; SP = Students Participation; TF = Teacher Feedback. P.E.= Program Evaluation.

Font: Statistics from the Virtual course.

The students' enrolled has been increasing since the first course, in 232 % and 270% respectively. Key Questions, Students' Participation and Teacher Feedback also are higher in the year that innovation was implemented. In the course 2015-2016 the Innovation was maintained. It is remarkable the increase of the key issues in the forum on the practical work on the course that innovation was introduced, 2014-15, which was increased in the course 2015-2016, as well as student participation and feedback Teacher. Forum is an excellent learning resource for students participating and also for the silent and invisible ones.

4.2 The students' achievement

About the student's achievement, their results in the three years could see in table 2.

Table 2. Descriptive. Achievement. Final mark passed (mean, range 1-10, pass from 5)

	2013-14 (enrolled 120)				2014-15 (279)				2015-16(324)	
	June		September		June		September		June	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Presented	70	58.33	36	56.25	155	55.55	61	39.95	207	63.89
Pass	46	62.16	24	66.67	124	80.52	47	77.05	165	81.16
Mean	5.84		6.11		6.99		6.56		6.99	

Freq: Frequency. Font: Statistic from Institution Students Qualification application.

From the information in the table 2, is remarkable the following results:

- Students enrolled have been considerably incremented.
- Percentage of presented in June 2015-2016 is higher than in the previous course (+8.34).
- Percentage of pass at the first is higher in 2014-2015 and 2015-2016.
- Comparing the final students' marks in June among the three courses, ANOVA results gives statistically significant differences to favour of the courses 2014-2015 y 2015-2016 against the course 2013-2014 ($F=8,509$, $p=0,001$ and $p=0,000$ respectively).

The results confirm the objective pretended by the Instructional Design, performance centred, guides by theory question and on the practical work, enhancing collaboration and formative evaluation and feedback, in the forum, in a Virtual & Personal Learning environment, in the aLF platform in UNED.

4.3 Students satisfaction on the course, 2013-14

The evaluation of the course, in which the innovation was implemented (2014-2015), is integrated by 29 items, Likert scaled, from 1 to 5. The sample invited to answer the survey was all the students enrolled 279, in 2014-15. The sample participant was of 35. The results are showed in table 3.

Table 3. The five blocks in the Course Evaluation Questionnaire.

The five blocks in the Questionnaire (1-5 Likert)	Items	Mean	St. Dv.
The virtual course design	6	4.60	0.12
The questions for learning, in forum	6	4.65	0.04
The competencies for lifelong learning	4	4.47	0.13
Prepare student to performance practice	7	4.80	0.07

Develop generic competencies related to LLL	6	4.56	0.18
Total	29	4.63	0.109

N= 35. Course 2014-2015. (Reliability by Cronbach Alpha: 0.95).

Font: Questionnaire elaborated by the teacher.

The Mean in the questionnaire was 4.63, about 5. The best evaluated in the course was the practical work, the forum structure, and the professor presence. To summarize the students evaluation on the course, signed the following:

- The high agreement degree with the items presented in the questionnaire shows a good conformance and satisfaction with the innovation.
- The part best evaluated was the refereed to the practical work.
- The forum orientation was also well evaluated.
- Competencies for lifelong learning have been also well evaluated.

4.4 Information from the Institution's Quality Assurance System

The course is evaluated every year by the Institution's Quality Assurance System by mans of a questionnaire, which report the following information (Table 4):

Table 4. Questionnaire from the Institution's Quality Assurance System Questionnaire.

Evaluation Questionnaire on the course. ITEMS	%
The previous knowledge in the subject	100
The student Learning Guide	96.43
The learning material impressed	96.43
The complementary learning material in the virtual course (VC)	100
The activities in the VC	100
The structure of the VC	100
The teachers team (TT) behaviour in the VC	100
The students involvement in the VC and its importance to prepare the subject	92.59
The information facilitated by the TT on the final evaluation	96.43
The continue assessment in the virtual course	92.59
The final exam	92.86
Personal satisfaction with the learning material	96.30
Personal satisfaction with the TT	100
Personal satisfaction with the evaluation system.	92.86
Personal satisfaction with the learned in the subject matter	100
N= 28. Mean in %	97.6

The answers' results, with a participation of 28 students, show a higher valuation on the course objectives and its development trough the Questionnaire from Institution's Quality Assurance System.

We show the graph of the course in 2015-2016, and its relationship to the average of the course grade, the maximum and the minimum (Figure 1):

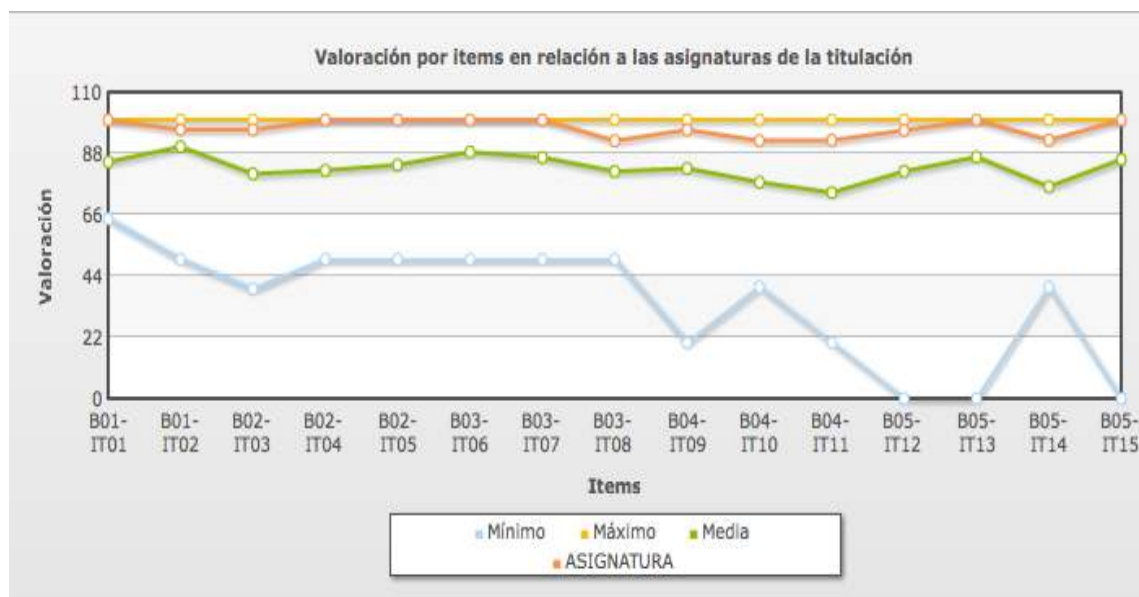


Figure 1. Evaluation of the Subject. Course 2015-2016. N= 28. Mark: 97.6 in %. Font: <https://app.uned.es/evacal/questgen.aspx?cu=2016&tecp=6302&ca=63024059&ten=1&en=4>

We show below the bar charts that relate the average, minimum and maximum, those of the subject through the SGIC of the University in the three years we are studying in the Grade, which allows comparing the evolution of the evaluation of the subject, in the year that innovation was introduced, the previous one and the following were the innovation was maintained and improved, showing its sustainability during the time (Figure 2).

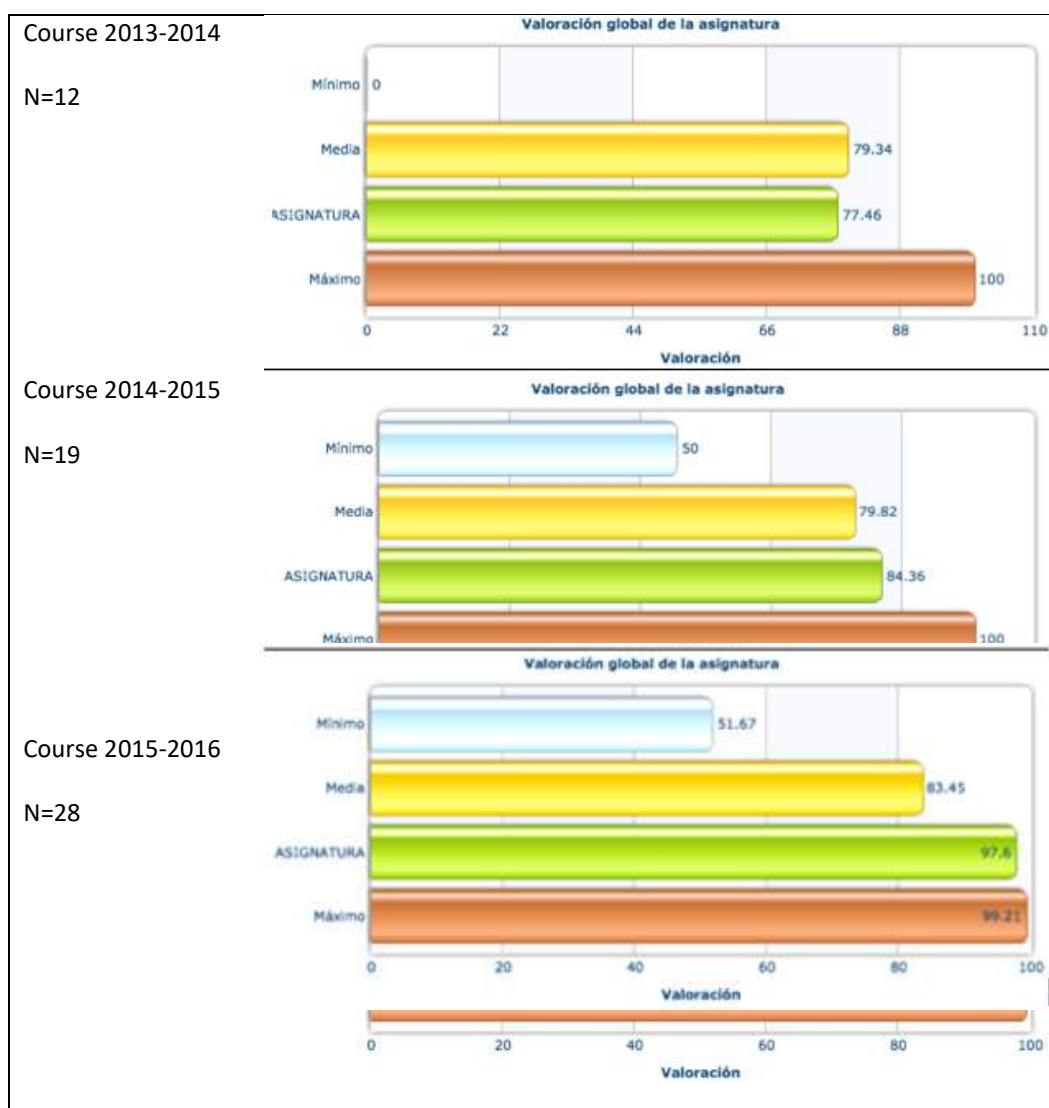


Figure 2. Evaluation of the subject (green colour) and the Grade in Pedagogy (Brown colour). Font: SGIC of UNED. <https://app.uned.es/evacal/questgen.aspx?cu=2016&tecp=6302&ca=63024059&ten=1&en=4>

The evaluation of the subject through the System of Internal Quality Assurance of UNED, in percentage scores, on a maximum of 100%, shows a very positive increase on the first or basic course, 2013-2014, with a students participation of N=14, 77.46%; in the course which innovation was first time introduces, 2014-2015, the answers in the questionnaire was N = 19, with 84.36 % score, and year were the innovation was maintained to consolidate it, the course 2015-16, with a higher participation, N = 28, and score: 97.6% shows an excellent evaluation and its sustainability over time.

To guide the learning and the practical work in the virtual learning environment network is key to obtain students good learning results.

5. Conclusions

The results obtained in this research on one innovation based in an “Instructional design, performance centred, in a Virtual & Personal Learning Environment”, guided by the teacher, enhancing collaborative learning and formative feedback”, have demonstrated that in the course has been incremented:

- The Participation in the forum on the practical work and in the forum of theory, in both courses, the first applied the innovation, 2014-2015, and in the next one, 2015-2016.
- The Presented on the first call (+8.34 %).
- The Passed at the first, in 2014-2015 (+18.36 %) and 2015-2016 (+19 %).
- The Achievement (ANOVA gives statistically significant differences in 2014-2015 y 2015-2016 against the course 2013-2014).
- The Satisfaction with the innovation, practices centred, professional and LLL competencies, theory guided by teacher, enhancing collaborative and formative feedback (Survey, 2014-15, M=4.63, over 5, N= 35) in a Virtual & Personal Learning Environment.
- The Satisfaction with the course (2015-2016, N= 28, 97,6 %, in the IQAS).

According with the results obtained in this research, we could conclude that our purpose to develop competencies for professional and lifelong learning, online, included in the curriculum academic, based on an instructional design, guiding theoretical learning and practices, which attends personal needs, collaborative learning and formative feedback, has been fulfilled.

- To be competent is to about being able to learn to adapt and respond to new situations i.e. to continue to learn throughout one's life.
- Learning by internet has a huge potential, but it couldn't be seen independently of an adequate instructional design and the formative feedback on the learning progress.
- The evaluation of the innovation, with purposes of continues improvement on students, teachers and course design, has demonstrated its contribution to the improvement of educational quality.
- We recommend the use of this instructional design in the UNED.
- Also we recommend it to other Online and Distance Higher Education.

Empowering Personal Learning Environments, using the aLF Platform in UNED, based on an instructional design to prepare students on professional competencies, which uses the positive benefits of networked learning, through guided learning, collaborative learning, formative assessment and formative feedback is a good way to improve the education and training of our students, the quality of our teaching, the teacher professional development in accordance with the developments of the web, updating and enrichment programs study and the satisfaction with their Educational Institution.

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Empowering lecturers to facilitate high quality education through the use of learning technologies

Inger-Marie F. Christensen

Centre for Teaching and Learning, University of Southern Denmark, Denmark
imc@sdu.dk

Christopher Kjær

Centre for Teaching and Learning, University of Southern Denmark, Denmark
ckjaer@sdu.dk

Stine Piilgaard Porner Nielsen

Department of Law, University of Southern Denmark, Denmark
sppn@sam.sdu.dk

Abstract

In 2014, the Department of Law at the University of Southern Denmark (SDU) decided to transform some of the courses related to the graduate program *Cultural Sociology – Law, Power and Social Justice* into distance learning. The vision was to reach out to new target groups of students and establish partnerships with other universities across time and space.

This abstract outlines the process of empowering lecturers and students, the online learning activities that were designed and the results and evaluation.

In 2014, three lecturers participated in faculty development facilitated by the Centre for Teaching and Learning (CTL) at SDU. The course offered insight into e-learning pedagogy and into the functions and features of Adobe Connect that constituted the live, virtual learning environment and Blackboard that made up the asynchronous, virtual learning environment, thereby empowering the lecturers to use these two systems as platforms for teaching and learning. The faculty development took place online to enable lecturers to practice their online skills.

The course that was designed and carried out with students consisted of both synchronous activities; online lectures, discussions and group work in Adobe Connect, and asynchronous activities; wikis and written feedback in Blackboard. This approach promoted the modernization of the learning environment and enabled different forms of interaction which, documented by students' course evaluations and exam results, resulted in a high degree of active participation that enhanced the learning experience.

Keywords: Empowerment, learning technologies, high quality in education, modernization

1. Introduction

Learning technologies are being implemented in higher education (HE) at a rapidly increasing speed which opens up new possibilities for teaching and learning but also puts the traditional teacher and student roles under pressure. The question is how to help both teachers and students to navigate in this new learning

landscape. How does one design staff development for academics that can not only motivate and engage teachers but that will also lead to their competent implementation of digital technology?

In general, it is a challenge to design staff development for HE teachers. Often teachers are not compensated for the time they spend on staff development and therefore they have difficulties finding time for this activity in a usually very busy schedule. Furthermore, some experience a very unevenly distributed workload, where busy periods of teaching take turns with periods without teaching in which research tasks must be prioritized. However, many teachers see a need for developing their digital competencies since they, to an increasing extent, are expected to be able to teach geographically distributed classes of students or to carry out blended or distance learning.

Therefore, the specific challenge is how to design staff development activities that clearly signal what is in it for the teacher with respects to his/her own practice. The hypothesis is that successful staff development should be based on the integration of work tasks and learning, be exemplary and act as a role model and enable teachers to learn through knowledge in practice. This will motivate and engage teachers to set aside the time necessary.

The second specific challenge is how to engage students in online learning and how to optimise their learning outcome. The hypothesis is that students must not only be supported in mastering the technical aspects before an online course starts to be able to focus on and engage in the teaching and learning activities, they must also become comfortable with the different learning environments that are used and with their fellow students and the teacher. In addition, students' learning online must be carefully scaffolded to secure progression and active, in-depth learning.

The purpose of this paper is to account for the staff development activities that were designed for three teachers at the Department of Law at SDU when they were developing a series of distance learning courses. Furthermore, the actual design of one of these distance learning courses will be explained and the teachers' and students' evaluations of the staff development activities and the distance learning course respectively will be analysed and discussed. The paper will end by listing recommendations for empowering teachers and students and for designing online courses that promote students' active learning and enhances their learning outcome.

2. The process of empowering lecturers

2.1 Staff development – the design

The staff development activities were designed by two e-learning consultants from the CTL on request from one of the teachers at the Department of Law. It was decided that the department should offer distance learning courses, and the teachers who were to teach these courses asked for staff development both with regards to the technical possibilities as well as pedagogy and design.

An initial meeting was held face-2-face to determine the needs of the 3 teachers. Subsequently, online sessions were carried out in Adobe Connect, where the two e-learning consultants did short presentations and gave examples of distance teaching and learning focusing both on pedagogic and technical aspects. Each session also included hands-on exercises for the teachers to give them the possibility to set up and try

out the different tools and functions. As the big finale of the Adobe Connect activities, each teacher was asked to create an Adobe Connect meeting room, invite the other teachers and the e-learning consultants and plan and carry out a teaching and learning session. Each live session ended with a debriefing in which the participating teachers could reflect on their experiences and learning. In a parallel track of the staff development, short face-2-face sessions were held on the e-learning platform Blackboard that was to form the asynchronous learning platform of the distance learning courses that was being designed. These were consultancy sessions in which the teachers and the e-learning consultant responsible identified the learning goals of the actual distance learning course being developed, discussed learning processes, formulated specific learning activities and decided on tools to be used.

Below is an account of the pedagogical principles that make up the foundation of the staff development activities.

2.2 The hands-on approach, embedding learning in activity

The authors of this article have designed and carried out staff development for HE teachers for 8 years and know from experience that many teachers lack both knowledge on and experience with online teaching, e-learning platforms and tools. This makes them insecure and uncomfortable with respects to designing and carrying out online learning with their students. Staff development that aims to give teachers the knowledge, skills and competences to design and carry out online learning must therefore address these challenges. The staff development that was designed for the three teachers at the Department of Law attempted to do this by drawing on the concept of “knowledge in practice” (Dohn og Kjær, 2009; Dohn, 2013) which is made up of:

“three interdependent, but analytically distinguishable, aspects: linguistically expressible knowledge (‘know that’), practical knowledge (‘know how/skill’), and personal experience (‘know of’).”

(Dohn og Kjær, 2009:147)

Knowledge in practice dismisses the idea that knowledge is something a person has and that can be transferred unchanged from one context to another (Dohn, 2013). Instead, focus is on context and action – the knowledge in practice that can only be achieved through application. Therefore, the staff development that takes place in a more traditional manner as presentations, lectures and dialogue is missing an important aspect, namely practical skills training. If the training of practical skills is added to staff development, this will give the learners the possibility to acquire a readiness to act in future situations in which the same e-learning platform and/or tool is used.

In the staff development activities, the three participating teachers experienced being online students via Adobe Connect and acquired experiences with the system from this perspective. With the purpose of supporting the teachers in becoming ready to design and carry out online learning themselves, the staff development activities also included the following elements that were to give the teachers the possibility to obtain knowledge in practice from a teacher perspective and support the creation of re-situation experiences which could help them realise the acquired knowledge in their own practice (Dohn, 2013).

Knowledge on online learning, pedagogy, platforms and tools via resources, presentations made by the two e-learning consultants and dialogue (know that).

Practical knowledge by trying out and training relevant skills on the platforms to be used for the distance learning courses being developed (know how).

Personal experience via reflections/debriefings on the experiences connected to the trying out and training of relevant skills (know of).

The practical skills that were seen as necessary in this context were e.g.

- Taking on the role as live, online teacher

- Creating and setting up meeting rooms in a web conference system

- Designing learning activities

- Producing educational videos

- Setting up e-learning tools

- Moderating asynchronous, online learning activities

The staff development of the teachers from the Department of Law resembled cognitive apprenticeship. Cognitive apprenticeship methods “try to enculturate students into authentic practices through activity and social interaction in a way similar to that evident – and evidently successful – in craft apprenticeship” (Brown et al., 1989:37). Focus was very much on embedding learning in meaningful activity to motivate and engage the teachers and to enable their future implementation of digital technology in their own teaching. “Learning methods that are embedded in authentic situations are not merely useful; they are essential” (Brown et al., 1989:37).

2.3 Combining learning and work tasks, motivation and meaningfulness

With the purpose of improving the teachers' motivation to engage in challenging learning activities, the staff development programme draws on research from the field of adult education (Illeris, 2004). The Danish educational- and learning researcher Knud Illeris states that one of the most important aspects when designing and carrying out staff development is that teachers find it so meaningful that they develop both their practice and understanding.

“The generally most decisive factor for significant learning in adults is the requirement for motivation rooted in direct interest, something they feel like doing and are committed to, or a realized necessity, something they have understood and accepted to be beneficial to learn in relation to something they want to achieve.”

(Illeris, 2000 quoted from Illeris, 2004:162)

Therefore, key learning activities are deliberately designed to be open, not fixed, so that the teachers have optimal conditions for applying knowledge from the course to develop their own practice. To accommodate this aspect the learning activities were designed with inspiration from Illeris' (2004) instructional principles of participant direction and problem orientation.

The instructional principle of participant direction highlights “... that the participants themselves have the possibility for and are maintained as directing their learning to the highest possible degree within the given framework” (Illeris, 2004:173). In this case, the framework consists of three HE teachers following tailor made staff development activities where the activities are designed to support the teachers' intentions to

develop and implement distance learning courses. Tasks were based on the idea that the teachers should develop aspects of their distance learning courses in order to complete the tasks of the staff development programme. The fact that teachers can use their own courses as a point of departure when working with tasks makes the development activities more problem oriented which was the intention as the instructional principle of problem orientation states that

“[it] is first and foremost when one works with finding out where the important problems lie, when one tries to formulate problems with precision and to develop patterns of understanding and proposals for solutions that the full learning challenge is established.”
(Illeris, 2004:177)

The last half of the quote is related to the teachers' challenges when they develop patterns of understanding and proposals for solutions as part of the mentioned tasks which at the same time are related to their challenge of developing a new distance learning course. So for the participants, problem orientation lies in the challenges that appear in the development process.

Using the instructional principles participant direction and problem orientation also gives teachers optimal conditions for integrating work and learning. In order to strengthen and maintain the teachers' motivation during the staff development, the design of activities were also inspired by the research field work-based learning (Boud, Solomon and Symes, 2001). Here, a key point is that the learning activities followed by the participant in the staff development programme

“[d]erive from the needs of the workplace and the learner rather than being controlled or framed by the disciplinary or professional curriculum: work is the curriculum.”
(Boud and Solomon, 2001:5)

Although theories, concepts and e-learning tools were presented as part of the staff development activities, it was still the teachers' challenges which were the point of departure for the learning activities as mentioned above. In this way theory, concepts and e-learning tools became resources for the teachers following the staff development activities. This close integration was also supposed to reduce the teachers' time spent on extra tasks by securing that the staff development tasks were actual and authentic work tasks. By engaging in the staff development activities, the teachers actually completed tasks which should be done anyway. In addition, and as an added value, the teachers received valuable feedback, engaged in joint reflection and obtained a quality check on their “homework”.

2.4 Virtual classroom management

Being a live, online teacher and managing a virtual classroom can initially be a bit of a challenge. Especially if you have not built up sufficient knowledge in practice of the many aspects and functionalities that are in play in the virtual classroom. As stated by McKinnie (2008):

“You won't have the time to ‘page flip’ and look for what you need in an online class. If you confuse your learners with too much topic-jumping, recovery from confusion in an online environment will be exponentially more challenging”.
(Ibid, 2008)

One of the most important issues regarding management of the virtual classroom has to do with how well you are prepared, how well you have structured the time and the balance between e.g. teacher presentations and student interaction in the classroom. It is important to decide how much time to use for presenting topics and when to engage your students. A general rule of thumb is to include some kind of interaction every 3-5 minutes. With respects to preparation McKinnie (2008) highlights that best practice involves a carefully prepared agenda that is made visible in the virtual classroom. In addition that you run through your material and exercises at least 30 minutes before you start your live session. Besides this you need to understand and be able to use the different tools in the virtual classroom in a way that makes the students comfortable. This is a practical skill that takes time to learn but which is fundamental for managing the virtual classroom.

In her book "The synchronous trainer's survival guide" Hofmann (2004) states what is required to become a successful online teacher. "Ground Rules" are particularly important. These are a set of rules which indicate how students are expected to act in the classroom. Ground rules include closing the mail window on your computer, switching off your phone, participating and being prepared to be called on by name, raising your hand to ask questions and sending a chat to the teacher if you leave. In summary, virtual classes should always be relevant, organized, clear, and to the point. The goal should be to take the virtual class beyond just a lecture style environment. This requires the live, online teacher to be able to multi-task; therefore staff development is required to secure success.

In the learning experience and evaluation section below, it is discussed to which degree the staff development activities helped transform the teachers into live, online teachers.

3. Empowering students

Students may be very present online, updating their status and connecting with friends, sharing and watching images and videos on social media. However, they may never have experienced learning online before and will be insecure and uncomfortable when first visiting new and unfamiliar virtual learning environments. Technical, logistical as well as pedagogical support is therefore needed to engage students in distance learning (Chen et al., 2015, Johnson et al., 2016).

To help students get ready to learn online and to enhance their learning outcome, the distance learning courses that were developed were based on Salmon's 5-stage model and e-tivity concept. These are founded in social constructivism and the belief that knowledge is constructed by the learner with and through others (Salmon, 2013). Salmon's 5-stage model stresses the importance of a gradual progression in learning activities – so-called e-tivities – in order to create a dynamic and efficient virtual learning environment that supports collaborative learning (Salmon, 2011). The model consists of the following five stages: 1 Access and motivation, 2 Online socialisation, 3 Information exchange, 4 Knowledge construction and 5 Development. E-tivities are "frameworks for enabling active and participative online learning by individuals and groups" (Salmon, 2013:5). Tables 1-4 below are examples of specific e-tivities used at the Department of Law.

In the initial stages of the 5-stage model, the focus is on activities that secure the students' access to e-learning platforms and tools and that create a sense of community that makes learners comfortable with the idea of being present and learning online. Once this has been achieved, more demanding, collaborative

learning activities can be introduced that require students to jointly build their knowledge, discuss their perhaps differing understandings and negotiate meaning.

With Salmon's 5-stage model and e-tivity concept as the point of departure, the distance learning courses at the Department of Law were designed as structured learning paths with clear instructions, interaction in the shape of feedback activities, progression and frequent deadlines; all with the purpose of creating an inspiring, dynamic learning environment that was to support interaction, reflection and motivate students to engage actively and complete the course. Students' active participation was especially important, since the underlying principle of education at the SDU is active teaching and learning.

Below is a description of one of the distance learning courses that was developed. The description illustrates how the 5-stage model and e-tivity concept were employed in the course design and how the course was run.

Law, Power and Professions was the first of the online courses developed that was carried out on the graduate programme Cultural Sociology – Law, Power and Social Justice. The course was carried out in autumn 2014 with 11 students and was a compulsory course at the graduate programme (7.5 ECTS) and an elective for law students (10 ECTS) at SDU in Odense, Denmark. It was the very first time that both the teacher and the students were to use Adobe Connect as a virtual classroom which meant that both the teacher and students had to learn how to navigate the system and use its various tools and functions. Likewise with Blackboard that was to function as a platform for information, course material and asynchronous learning activities using primarily the wiki tool.

Before study start, students received an introductory letter that, among other things, contained three e-tivities that covered stages 1 *Access and motivation* and 2 *Online socialisation* of the 5-stage model, see tables 1, 2 and 3 below. These e-tivities carried detailed instructions that were to help students get access to Adobe Connect and Blackboard, become familiar with the basic functions and tools and socialise online. Focus was, in particular, on familiarising students with the breakout room function in Adobe Connect, since they were to use breakout rooms for group work during lessons, and with the wiki tool in Blackboard that was central to the asynchronous learning activities.

During the first lesson in Adobe Connect, the teacher followed up on any problems students had encountered when using the wiki tool. Furthermore, the ground rules were explained to the students to secure an effective learning environment in Adobe Connect. This concerned the use of emoticons, setting up the microphone, using the webcam, using the chat etc. The purpose was to establish common ground and make sure that students had the possibility to ask questions, pose comments, signal understanding and so forth. Another important element in the first lesson was the presentation of a document that gave students an overview of the course and its individual components. It displayed the time and place of the synchronous and asynchronous activities, the seminars and the group work.

The course consisted of 2 hours' online teaching per week in which presentations, breakout rooms and dialogue were regular components. The students were often presented with a theoretical framework which they were to discuss in breakout rooms in small groups, using the note pod function to record their points and conclusions which were presented to the rest of the class later on. Twice during the course, the students were divided into groups and asked to do case work. They received case material and an e-tivity

covering stages 3 *Information exchange* and 4 *Knowledge construction*, see table 4 below, which described the procedure for the case work and stated the deadlines. The case work entailed the tasks of formulating answers to questions posed by the teacher on a wiki page, giving feedback to another group's wiki page and presenting their work to the rest of the class. The purpose of the case work was to help students prepare for the exam which is a case and questions based on the theoretical framework of the subject.

Right before the exam, the students were reminded how the different components of the course could help them review for the exam. The wiki pages prepared by the different groups, e.g. constituted a joint knowledge base, especially because the teacher had commented on each wiki pages, thus securing the quality of the contents.

In the learning experience and evaluation section below, it is discussed to which degree the course design contributed to enhance students' learning outcomes and empowered students to engage actively online.

4. Learning experiences and evaluation

In order to evaluate the course and gain knowledge on the teachers and the students' learning experiences, semi-structured interviews were carried out in September 2016. 5 students as well as the teacher from the first online course were interviewed. One of the other teachers who had participated in the staff development and who was now running her second online course was also interviewed. The results are presented and discussed below.

4.1 Teachers' learning experiences and evaluation

One of the main purposes of this article is to investigate whether the staff development activities that were carried out at the Department of Law motivated and engaged teachers in the acquisition of knowledge and skills to subsequently run a distance learning course. Interviews with two teachers performed after they had carried out online courses with students indicate that the staff development had a positive impact. Asked to what extent the staff development made them ready to teach students online, the teachers responded:

Teacher 1: "It got me ready. I was excited not nervous, the subject was new, and there were enough challenges. But not technically or e-learning wise. I felt well-prepared in those areas."

Teacher 2: "It was in a way quality assurance of my course materials and activities. I had faith in my own ability and my course material. There was a good flow. If I had not participated in the staff development, I wouldn't have known what to do."

The quotes indicate that the teachers felt ready to run a distance learning course. Regarding the concept of quality assurance it should be understood as the teacher's perception that the activities and materials developed during the staff development could subsequently be used in the teacher's own course with students. In this way the staff development became a quality assurance process where feedback and joint reflection on the staff development activities made the teachers feel well-prepared and confident to teach.

Another important point was the teacher's possibility to use authentic work-tasks when completing the staff development activities. This enabled one teacher to "Try things. It certainly gave me greater security."

(Teacher 2). The other teacher stated that "It's luxury that we could do it that way. That you yourself have been trained in using these media or systems, so it has indeed again been a huge advantage ..." (Teacher 1). Again, a key point is that the teachers had tried things out and developed course material that subsequently could be used directly in their own course.

A particularly important aspect of the staff development was the teachers' opportunities to train practical skills and achieve personal experiences with the role as an online teacher. The interviews clearly show how important the teachers thought this was.

Teacher 2: "When I think back, I have rarely looked in my notes from the staff development because it has been the practical exercises that have made me ready."

Teacher 1: "... if we had had no training, we had not been able to do it. These are not skills that we could develop ourselves. It was important that we tried it, that we made e-tivities."

In addition it should be emphasized that the training of practical skills was conducted in a way so that the teachers both experienced being students learning online, but also had time to practice the role as live, online teachers. The importance of getting personal experience with this role is highlighted in this quote:

Teacher 1: "When my colleagues ask me how I do group work in Adobe Connect and I explain that I set up breakout rooms etc., they think it's crazy. I thought it was very mysterious but also very fun the first time I did it. If you have not tried it before, you would think it's crazy and hard to understand."

Having accumulated personal experience seems to give the teachers more energy to focus on the academic content and the implementation of appropriate online learning activities. So, to develop successful staff development for teachers new to distance learning, it is a good idea to let the teachers train in and experience the virtual learning environment for themselves.

4.2 Students' learning experiences and evaluation

Most students reported being nervous and insecure about taking an online course, as these quotations from the interviews with students show:

Student 1: "I was nervous in the beginning. It is definitely different from learning in class".

Student 2: "At first I was a bit critical perhaps. How was it possible? I hadn't tried it before. Having taken an online course, I think it works like ordinary teaching if you have a good and structured teacher. In the beginning when using the webcam, I thought it was a bit odd. Now it's a natural thing for me to do."

Student 3: "I had a very good experience. It was my first time doing an online course. I was worried about how it was going to be because I'm hard at hearing. Thought there would be complications. But there were not a lot of problems with it."

Student 4: "Before we started, I was thinking that 2 hours are a very long time, but this was not the case in practice."

These quotations give evidence that many students are beginners when it comes to learning online and that they need to be supported to secure a good learning outcome.

Only one student indicated that she participated in the online course in the same manner as she would a face-2-face lesson:

Student 5: "I was very active. I was able to get my points across even though you don't have the physical room where you can use your body language. I participated like I would in the physical room, but I felt that other students participated less than they would have face-2-face. They lacked the personal aspect."

A couple of students mentioned that it caused some anxiety or awkwardness to have to talk into a microphone and appear on webcam. They were also intimidated by the fact that everybody could see when then used the raise your hand icon indicating that they wanted to ask a question. They both preferred the breakout rooms where they felt safer and more comfortable and made use of the microphone and webcam throughout the group work. "There is room for mistake because only two other people are listening" (Student 3). Students also indicated that they felt more comfortable saying something in the main room after having talked to their fellow students in the breakout rooms. The group work in the breakout rooms were appreciated by all students who thought it worked well, gave a sense of presence and made the live sessions dynamic. The note pod was seen as a good way to keep a record of discussions.

Most students stated that the online course was the course that had given them the best learning outcome on the graduate programme. Only one student thought she would have learnt more, had it been a campus based course.

The introductory e-tivities in Adobe Connect were labelled easy by the students. They worked well and made the students confident using the system and its tools. One student, who was hard at hearing, was especially happy about the ground rules presented. To her it was quite important to secure a good sound and avoid interruptions and confusion. One student felt that the second introductory e-tivity which took place in Adobe Connect and was led by IT service was too long. The technical part of getting students ready to learn online via Adobe Connect was left to IT service. This meant more qualified and quicker help for students. However, students were not willing to spend much time on technology online. The interviews with students indicate that students do not see time spent with IT service as meaningful which points to the necessity for teachers to be able to undertake basic support of students. Furthermore, one student mentioned that not everybody showed up for the introductory e-tivity in Adobe Connect. It was not mandatory because it was placed before the actual study start date. The students who did not participate, however, would disturb the lessons by forgetting to turn off their microphones or by clicking through the slides in the PowerPoint uploaded by the teacher not realising that everybody else was affected by this.

With respects to the introductory wiki activity, it was seen as a good and meaningful way to get to know the other students. It also provided a good introduction to and initial training in using the wiki tool. One student emphasised the asynchronous and interactive aspect which she thought was a good addition to the lessons in Adobe Connect which she felt were progressing more slowly than face-2-face teaching. One student thought that the wiki tool was rather out of date and would have preferred to use another tool. One point that was raised was that the same introductory exercises were used for the subsequent online

courses that the students took. Some students chose not to engage because they knew how to access Adobe Connect and use its different functions. Most students felt that it was meaningless to repeat the wiki exercise which stresses the importance of varying introductory activities.

Students also pointed to the importance of allowing more time for socialisation online, both initially during the introductory exercises, but also during lessons and when using breakout rooms in Adobe Connect. One student suggested to present teachers with different types of icebreaker exercises that could be used. The evaluations point to the need to help students overcome the awkwardness and anxiety connected with learning online for the first time and to support the creation of a safe and comfortable virtual learning environment.

A couple of students valued the feedback part of the casework in wikis. They stated that they paid more attention to the writings of fellow students when they had to give feedback and this enhanced their learning outcome. Another student said that she was very thorough when giving other students feedback because she wanted thorough feedback herself. One student thought the feedback task was ok, but was somewhat insecure and preferred to be guided by the teacher. This student, however, states that now she knows more about the subject and feels more comfortable giving feedback. A couple of students said that because of a busy schedule they could not always find the time to give feedback as a group, but would delegate the work to a group member.

All students claim that the success of the online course is entirely due to the teacher who they see as well-structured, well-versed in the tools and functions of Adobe Connect, well-prepared, good at explaining and signposting the activities in the live sessions, managing the time and speaking clearly. But also a teacher that puts demands on students and provides them with useful and meaningful tasks. Furthermore, one student explains how the teacher would always find a way to turn a “crazy” answer or comment from a student into something useful thus creating a comfortable learning environment. Students emphasise the importance of finding a good balance between the teacher’s presentations, dialogue and group work. One student recommends not starting a live session with breakout rooms. The teacher needs to start out with a presentation to help students get ready to interact and learn.

The e-tivity concept was highly praised by some students who stated that it was easy to get an overview of the tasks and that it was an advantage to have all the information needed including the learning outcomes of a task on one page only. One student said that the e-tivities “looked like an instruction for how to use a computer, but it was ok” (Student 1). Some students stressed that the teaching and learning activities of the online course helped them prepare for and do well at the exam. Both the wiki in Blackboard and the note pods in Adobe Connect contained the essential points of the subject and thus gave students a quick overview of the essential elements and helped them focus their preparation for the exam. A student mentioned that the casework in the wiki worked especially well because the teacher would give each group different questions relating to the same subject. This put each group under an obligation to do their best to provide good answers. The teacher’s feedback raised the value of the wiki as preparation for the exam.

It should also be noted that students point to one important aspect of a successful course which is not linked to pedagogy or technology. It is the importance of a dedicated and enthusiastic teacher who is him/herself highly interested in the subject.

5. Conclusions and recommendations

Basing staff development on the design principles - training of practical skills, adult and work based learning and classroom management - has proven surprisingly efficient. It can be concluded that the possibility to train practical skills and obtain personal experiences is essential to success and that the application of participant direction and problem orientation via adult and work based learning motivates and engages teachers. Furthermore, the integration of work tasks and learning activities in fact becomes a quality assurance process that helps raise the quality of the course materials and activities produced by the teachers.

In addition, staff development should be designed so that participants get to experience both the role of online student as well as the role of online teacher. Having tried the role of online student focuses the teacher's attention on the challenges of learning online and creates an understanding with respects to what students are experiencing and how they can best be supported. Practicing the role of live, online teacher and performing authentic tasks make teachers feel confident. They know they can master the technical aspects; they have tried it before and have a certain routine. Thus they can focus on the subject and on being attentive and present in the virtual classroom. Being a small group seems ideal in staff development since teachers can discuss and reflect on their experiences.

Students' evaluations clearly show that the teachers were confident with regards to the technical aspects and that they were able to carry out good teaching online. Teaching and learning was in focus, not technology. Students experienced well-structured live sessions in which activities were clearly signposted. They achieved a good learning outcome and did well at the exam. It can thus be concluded that the staff development enabled the teachers to plan and carry out high quality online teaching.

The introductory e-tivities helped students get ready to learn online and gave them enough confidence to use the two virtual learning platforms. However, some students experienced awkwardness and anxiety in the main virtual classroom where everybody was present. And some would have liked more time to socialize. Therefore, the recommendation is to spend more time on stage 2 of the 5-stage model - Online socialisation - in the virtual classroom. This could be in the form of icebreaker exercises that help students overcome the fear of being present and having to engage live, online.

The evaluations from both students and teachers point to the need for both parties to obtain a basic knowledge of and become familiar with not only platforms and tools but also live, online presence and interaction –engaging in online learning. The live, online environment – using webcam and microphone - seems to be especially intimidating for some. This is most likely connected to the class being small with only 11 students. There was no place to hide. One way to overcome this challenge would be to integrate platforms and tools more widespread in courses and services for both students and teachers to build up confidence and routine.

On the point of class size, it would be interesting to investigate how both the staff development and the online course design work with larger classes. It would probably be less intimidating for students, but

would students still get a good learning outcome and would teachers be able to perform virtual classroom management of the same high standard as in this case?

6. Tables

Table 1. Introduction e-tivity 1, stage 1 *Access and motivation* of the 5-stage model

<i>Law, Power and Professions and Law in Practice and Legal Consciousness</i>	
Numbering & pacing	E-tivity 1 out of 2
Title	Getting ready for live sessions in Adobe Connect
Purpose	To ensure that your computer (PC or Mac), USB headset and webcam are ready for your participation in live sessions via the web conference system Adobe Connect
Brief summary of overall task	The overall task of this first e-tivity is for you to test your internet connection, computer, USB headset and webcam in Adobe Connect, so you know that you are able to participate successfully in the online lectures.
Spark	Adobe Connect will be our virtual classroom. The system will also be used for group work between live sessions. Adobe Connect is one of the best and most professional web conference systems available on the market right now and is also significantly better than Skype. SDU students have free access to Adobe Connect and you will learn more about the system in the next live session. You can learn more about Adobe Connect here • https://www.youtube.com/watch?v=IE_FK298lcg • https://www.youtube.com/watch?v=sYboUYua818
Preparation tasks	Your first task is to ensure that you have the following available: 1. A computer with the following requirements: link 2. A webcam - internal (or external - HD quality is recommended) 3. A headset with USB connection (not iPhone headset) for your computer 4. A fast wired internet connection (wireless is often not fast enough) 1 M/bit for download and 512 for upload Your second task is to ensure that your webcam and headset work properly in the Adobe Connect meeting room. 1. Use Mozilla Firefox or Internet Explorer for Connect meetings 2. Run the test and install the Adobe Connect 9 “add-in” from Firefox or Explorer, the test can be found here 3. Log into this meeting room https://c.deic.dk/sdutestroom/ with your SDU username and password and run the Audio Setup Wizard. A guide for setting up you microphone and webcam can be found here
E-Moderator Interventions	If you need help please contact SFEO User Service
Schedule & time	Make sure that you have the necessary equipment ready for the introduction course August 26 th at 20:00-21:00. Deadline: August 25 th
Next	Online introduction to Adobe Connect on 26 th of August 20-21:00

Table 2. Introduction e-tivity 2, stage 2 *Online socialisation* of the 5-stage model

<i>Law, Power and Professions and Law in Practice and Legal Consciousness</i>	
Numbering & pacing	E-tivity 2 out of 2
Title	Introduction to Adobe Connect 9.2
Purpose	• Become familiar with the features and functions of the live, online web conference system Adobe Connect 9.2 • Carry out basic tasks with relevant tools: setting up meeting rooms for group work and sending invitations to group members • Socialize with fellow participants
Brief summary of overall task	In this e-tivity you will get an important introduction to the following elements: • Sound and camera, manage meeting rooms, how to collaborate in an existing meeting room • <u>Solve this task in a Breakout room:</u> ○ In the Breakout room you will find a link to the course description ○ Read the course description ○ In the Breakout room you also find a so-called Note Pod ○ In the Note Pod you write down your names ○ Discuss the course description and note down: One expectation that you have towards the course, one expectation that you have towards the lecturer and one expectation that you have towards your own participation. In addition this e-tivity will reveal if your technical setup works properly
Spark	When you have participated in this introductory course you will be familiar with the main tools that we will use throughout the course. Moreover, the task that you solve in Breakout rooms will be used as a starting point for discussing the course Law, Power and Professions, its purpose and main aim.
E-Moderator Interventions	SFEO will be in charge of this e-tivity and you will be able to reach them on: SFEO User Service
Schedule & time	This e-tivity will take place on August 26 th 20:00-21:00 in Adobe Connect. You will receive a link to the virtual meeting room in due time via Blackboard and email.
Next	We will meet online in our virtual classroom for the first lecture at either September 2 nd 11:45 or September 7 th 9:45, depending on which course you are enrolled in. This gives us time to check all technicalities before the lecture starts.

Table 3. Introduction e-tivity 3, stage 1 and 2 of the 5-stage model

<i>Law, Power and Professions and Law in Practice and Legal Consciousness</i>	
Numbering & pacing	E-tivity: Asynchronous activity
Title	Learning to use the wiki tool in Blackboard
Purpose	To ensure that you are confident in the use of wikis
Brief summary of overall task	The overall task of this e-tivity is to give you an opportunity of getting to know the tool wiki on SDU's e-learning platform, Blackboard
Spark	Adobe Connect will be our virtual classroom for this course. But throughout the course we will also be using wikis for the asynchronous activities.
Preparation tasks	Watch this introduction to wikis before you start the task: http://ondemand.blackboard.com/r91/movies/bb91_student_creating_editing_wiki_page.htm
Brief summary of the overall task	This task will show you how to use the wiki tool; create a wiki, write in it and comment on a wiki. Go to the course website on Blackboard Go to Tools and select wikis. Here you will find a wiki named Presentations of students and lecturer 1. Create a wiki page on Blackboard with your full name 2. Write a short description of yourself: - Where are you from? - What is your academic background? - Why did you choose this course/this master programme? 3. Read and comment on one of your fellow students' wiki pages
E-Moderator Interventions	If you need help please contact SFEO User Service
Schedule & time	This e-tivity is to be completed no later than September 1 st

Table 4. Case work e-tivity, stages 3 *Information exchange* & 4 *Knowledge construction* of the 5-stage model

Law, Power and Professions	
Title	Case based group work. Theme: Law and development
Purpose	Practice working with cases and theories which will be tested in the written exam
Brief summary of overall task	You are to work in groups on the case and the formulated questions using the wiki tool. Furthermore, you are to comment on another group's work and incorporate the comments you receive in your own work. On 21 st of October you are to present your work during the lecture by the use of a power point presentation.
Preparation	Identify your group - see the Blackboard/Course Materials. Create a meeting room in Adobe Connect and a wiki page on Blackboard for your group work.
Tasks	You are to work with the following article which is your case: <i>The Danish Courts – an Organisation in Development</i> (2007) in Scandinavian Studies in Law, vol. 51, p. 581-590. Stockholm, Sweden. Your tasks are to: 1. Write a summary of the article 2. Account for the role of courts, according to the article 3. Relate the role of the courts to Weber and Bourdieu's theory on the role of the legal profession and the legal system 4. Prepare a presentation of your group work for the lecture on 21st October Remember to use references in your work!
E-Moderator Interventions	If you need help please contact SFEO User Service
Schedule & time	12th October: Deadline for uploading your work on the wikis 12th-15th: The opponent groups give feedback using the Comment function 15th-17th: The groups implement the feedback from the opponent group The group work is to be completed and emailed to xx no later than 10:00 Oct. 18th
Next	We follow up on the group work in the lecture 21 st of October

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Course evaluation by the students: a way to improve teaching quality

Valérie Follonier

Distance University, Switzerland
Valerie.Follonier@unidistance.ch

Nicole Ruffieux

Distance University, Switzerland
Nicole.Ruffieux@fernuni.ch

Henrike Hamelmann

Distance University, Switzerland
Henrike.Hamelmann@fernuni.ch

Jean-Michel Jullien

Distance University, Switzerland
Jean-Michel.Jullien@unidistance.ch

Abstract

Distance Learning University Switzerland (UniDistance) has established a standard course evaluation by the students to improve the quality of instruction. Therefore, we have developed a process and two new software tools, which ensure the confidentiality of the results and support all the stakeholders with their tasks.

The process includes to put focus on different questions each semester to improve the different areas of learning. The first tool allows the institution to create the survey and to assign it to all the students of the tool proposes specific features for the teaching teams, the dean, the directorate and EDUDL+ (Educational development unit distance learning).

The teaching team can see the results of the questions in the form of histograms or word cloud. Within the tool, they write a comment about their course results, which will then be reviewed by their dean. The dean can see which module has received a positive evaluation, in particular regarding the focus questions and which module needs special attention and improvement in specific areas. The deans write a general report about the situation of their faculty and the possible improvements for the directorate and their students.

Based on different screenshots of our software tool, we will demonstrate our process: the different stakeholders, their projects and the focus questions. Moreover, we will discuss the impact of this evaluation for the improvement of the teaching quality at UniDistance.

Keywords: Course evaluation, quality in education, tools

1. Introduction

The Distance Learning University, Switzerland¹⁰⁴ (UniDistance) established in 1992 offers a number of university degrees in French and German language for its over 1.500 students. The teaching concept follows a blended learning approach where students are generally involved in online- and self-survey activities. They get together with their professor and fellow students for five on-site teaching sessions per semester. Each module is taught by a teaching team which consists of a professor and an assistant. In general, they come from traditional universities with little or no experience in distance education.

The Educational Development Unit in Distance Learning (EDUDL+) conducts the on-boarding and training of new teaching staff and ensures the quality of teaching. An important aspect of the quality strategy at UniDistance is the students' point of view. The course evaluation by the students aims at receiving a formative feedback for each course at the end of each semester and identifying possible areas of improvement. The evaluation questionnaire contains 31 questions clustered into 8 categories. A number of focus areas are selected each semester on which the quality improvement is focused during the selected time period. The evaluation results in these areas create the basis for personal development of the teaching staff.

To ascertain the process two new tools have been evolved and they have been used since two semesters. A web-based platform exists where all results are easily accessible and can easily be reviewed by the teaching staff as well as the dean of each faculty and EDUDL+.

2. The Evaluation Process at UniDistance

The goal of the evaluation is to improve the teaching quality in our institution. The evaluation play an crucial role in our quality process. Our evaluation should be clearly seen as a formative evaluation, which assesses the learning experience of the students. By means of the results of the evaluation, the teaching team is able to see their strengths and their weaknesses and have the possibility to improve their teaching.

There are several stakeholders with specific tasks throughout the evaluation process (figure 1):

1. The *students* have to fill out the survey.
2. The *teaching teams* have to read their results and to write a feedback to the dean of their faculty.
3. The *deans* have to read the feedbacks of the teaching teams, explore the results of their faculty and to write a general report to the faculty.
4. The *faculty managers* have to explore the results in their faculty and support their dean.
5. The *board* has to know the state of the institution
6. *EDUDL+* has to manage all the processes and support the stakeholders.

All these stakeholders and their functions are important to ensure the improvement of the quality of teaching at the institution.

¹⁰⁴ www.unidistance.ch



Figure 1: Evaluation's process

Another important part of the process are the questions of the survey. Each semester the board decides which topics are the important ones and where there should be an improvement. EDUDL+ choses the relevant questions and provide them with a possible alert if they are agreed only to a small degree. The chosen questions are called the focus questions. There are several rules which cause an alert .The alerts point to the teaching team that there is a problem, which they should pursue an in a next step initiate changes. Special attention is given to the focus questions, but nevertheless, attention is given to the other questions too.

The focus questions can be seen as a tool for the development of the teaching team's skills. We suppose that a new teacher in our institution is a beginner in distance teaching. With the aid of the evaluation and the support of the pedagogical consultants they can become experts after a few semesters. Figure 2 shows the expected development of expertise.

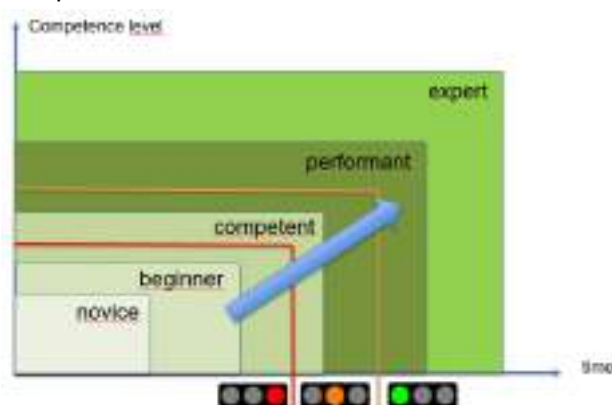


Figure 2: Skills development

The warning lights on figure 2 are calculated on the basis of the number of alerts. The board defines each semester the number of alerts for a red light, an orange light or a green light. For each module this information is given to the deans.

3. First and second evaluation: our first observations

Two evaluations have taken place so far: one in the autumn semester 2015 and one in the spring semester 2016.

The rate of participation in the first evaluation was 45% and 47% for the second. The acceptance of the evaluation for the teaching teams and the deans could be increased for the second evaluation. They were reluctant to this standardized evaluation first, but they slowly join in the process.

With the first evaluation we have gained very good experience, so that we were able to modify the tools and the process with the aim to improve the usage for all the stakeholders. These improvements resulted, among other things, to a much better feedback to the second evaluation.

4. The tools: Creation and Distribution of the surveys; Communicating the results

For the evaluation of the teaching, we use two different tools: one to create, distribute and fill the surveys and another to communicate the results to the stakeholder in question.

4.1 Creating the survey and assigning modules (ERP)

UniDistance uses an ERP system to manage the institution. New features have been developed in ERP for the evaluation of the teaching. The survey is created in ERP by EDUDL+. The individual questionnaires in a next step are attributed to the enrolled students of each module. The students receive an email and fill out the survey in ERP. The students receive a maximum of two reminders.

4.2 Evaluation platform

The second tool proposes a specific view for each stakeholder.

There are two different views for the results. The first one presents the results of the closed questions (multiple choice) by histograms. The second view represents a word cloud for the open questions. This word cloud gives a quick overview of the most important ideas, comments and suggestions of the students. It is also possible to export the text form of the answers to these open questions.



Figure 3: Word cloud

These views are available for the teaching teams, the deans and EDUDL+. The teaching teams have another view in terms they can write and submit their feedback.

There is a global view (figure 4) of the state of each module of the faculty for the dean.



Figure 4: Dean's view

The deans can quickly see the modules of their faculty, the number of students, the number of alerts, the warning lights and the feedback of the teaching teams. The deans can look at the results in detail by clicking on the corresponding module. The deans have an additional view to write and submit their report. On this view

EDUDL+ has several additional views to see the results, manage the platform, the users, etc.

Finally, the board has a global view to see the state of the institution and of each faculty.

5. Conclusion

The design and implementation of this new evaluation process and two new software tools has been an important step towards assuring a high standard of teaching quality at UniDistance.

The evaluation project is only in its start phase. It's important and necessary to improve the tools. The first evaluation has given a lot of information about the needs of the stakeholder. The tools and process have been changed, transformed and enhanced for the second evaluation. We received a good feedback from the teaching teams and the rate of participation of the stakeholders has been higher than in the first evaluation. The second evaluation has given even more detailed and useful information to adjust the process in future.

There are two principal difficulties in this process. The first one is the implementation of this new tool. We have encountered a lot of technical difficulties. The tools are still not perfect and they have to be improved to satisfy the needs of all the stakeholders and to enhance the acceptance of the process. The second one is the acceptance of the evaluation of the teaching teams. It is very important to explain to the teaching teams the goal of the evaluation. They have to be convinced that this evaluation is a formative assessment and does not serve as a control tool. This new process requires time to convince all the stakeholder. But we are convinced that we will move forward the following semesters.

Pilot Structured Mentorship Program for Higher Education Young Teacher Training and Lifelong e-Learning in Romania

A. Vlaicu, S.N. Meza, B. Orza

Technical University of Cluj-Napoca, ROMANIA;

Aurel.Vlaicu@com.utcluj.ro, Serban.Meza@com.utcluj.ro, Bogdan.Orza@com.utcluj.ro

Abstract

The presence of educational resources online with the culmination of OERs, MOOCs in the last years has greatly and deeply transformed the higher education landscape in terms of teaching and learning expectations, demands and interactions. However, although the perceived quality of the learning experience is associated more and more with the format of the given educational resource (gadget & internet friendly, graphically amazing, etc.) it is largely accepted that this quality is also influenced by the teacher itself. Likewise, irrespective of the technology available, in the yearly institutional evaluations there are key people who continuously distinguish themselves as being responsible for the added value in the perceived quality. The paper addresses the challenge of capitalizing on the know-how of these key-experienced-teachers in the form of a pilot structured mentorship program addressed to young professionals taking on a teaching carrier in higher education. The pilot was implemented in the context of the DidaTec project - a major initiative in Romania, with national coverage, aimed at higher education teacher training, and impacted 10 of the major universities across the country.

Keywords: national and institutional pedagogical policies, improved quality of higher education teacher training, lifelong blended e-learning.

Introduction

The perceived quality of the learning experience in higher education is associated more and more with the format and “friendly-ness” of the given educational resources: available anytime, anywhere and at a low cost (using the internet & a plethora of gadgets), graphically amazing and entertaining if possible, etc. This is directly visible in terms of the transformations that are culminating in the last years with the advent of OERs, (Mouromtsev D, 2016), MOOCs, (McClure, 2016), and serious games, (Allison C, 2016). However the teaching and learning expectations, demands and interactions are, it is still largely accepted that the teacher itself plays an important role in promoting quality, (van Lankveld T, 2016). Likewise, training teachers or creating an institutional framework that will foster the right climate for a young professional to become an outstanding higher education teacher is paramount, (Davenport WH, 2016). Generic programs that enlist a lot of candidates and provide a general approach to teaching tend to be constraint by their inherent universality and lack the specificity characteristic to a given field. For instance, in engineering, there is a specific culture that is characteristic to most engineers and this is achieved thanks to a similar, up to a point, means of educating / instructing / teaching such a person. And this leads to certain expectations from an engineering university professor that are different from those performing in the area of literature or law, for example. As an institution of higher education, getting a young professional and being able to make him/her reach / surpass the level of teaching competencies that well establish professor have is critical and cannot be left unaddressed.

1. Higher Education Young Teacher Training

This paper details a mentorship program dedicated to young university teachers that aims to provide a solution to the identified situation regarding the lack of institutional involvement in counselling and guidance of the later in the beginning of their carrier. Mentorship is a recognised training method based on a one-to-one relationship between a mentor, the owner of knowledge, competence and vast experience and the mentee, the recipient and less experienced partner. It is a known practice of training that received a lot of attention in the last decades especially in the business sector, with large companies implementing such programs. In education, it was seen mostly as a resource in training undergraduate personnel or integrate under-represented staff members, (Ehrich LC, 2004). However, there are few endeavours that deal with this practice at higher education level teacher training as it was considered that this was implicitly present in the PhD student – scientific supervisor relationship. With the challenges and changes occurring lately in the university life economics and the PhD being more oriented to scientific research, the teaching / knowledge sharing ability of a candidate tends to be neglected, (Gould, 2015). It is for this reason that a structured mentorship program supported institutionally was considered in order to develop those key competences in young academics of Romanian universities under what was termed the “DidaTec” initiative, (Project DidaTec, 2012).

2. The “DIDATEC” Project

“DidaTec” is an initiative that spurred from the project with the same acronym that was co-funded (structured funds) by the European Union implemented in Romania between 2010 and 2014. The project aimed at improving and developing additional competencies for higher education teachers active in the science and engineering areas. It encompassed 10 of the top universities in the country and reached directly more than 1000 higher education teachers. The key stated objectives were the lifelong training for IT&C instruments and platforms integration in the teacher – student relationship. This was devised into one comprehensive training program, one mentorship program for young higher education teachers having their first time job placement at the university, (Romanca M, 2013), and one online platform for managing teaching activities. The current paper describes in detail the structured mentorship program, stressing on the approach taken, on the structure and planning of activities and the reactions and conclusions received from the participants and stake holders.

3. Implementation of a Structured Mentorship Program for Higher Education Young Teachers

The aim of the implemented mentorship program for university teachers in the first years of their carrier was two-fold, namely:

- To integrate the young teachers in the socio-professional life and activity of the departments, faculty and university
- To contribute to the professional and personal development of young teachers in all aspects related to their work and educational service: develop skill and competences regarding knowledge sharing; communication and relationship management; the use of modern tools in education; carrier management; planning, organizing and evaluating a learning experience; creating educational curriculum and resources satisfying the latest requirements and needs.

3.1. The Approach

The approach taken for reaching the desired aim was that of a formal strategical program, in which all the involved parties commonly agree upon, support and follow what was called “*The Mentorship Plan*”. This is nothing less than a set of personalised objectives, topics and activities that the mentee, under the guidance of the mentor, decides that are required to be improved in the first years of their professional carrier. Being a structured program, the university decides upon a super set of topics and activities that form the pool of choices. Other topics and activities may be added at the suggestion of the mentee or the mentor. Also, in order to emphasize and encourage the use of IT&C both at the younger generation (the mentees) and the senior one (the mentors) the management of the mentorship relationship required the use of an on-line dedicated platform.

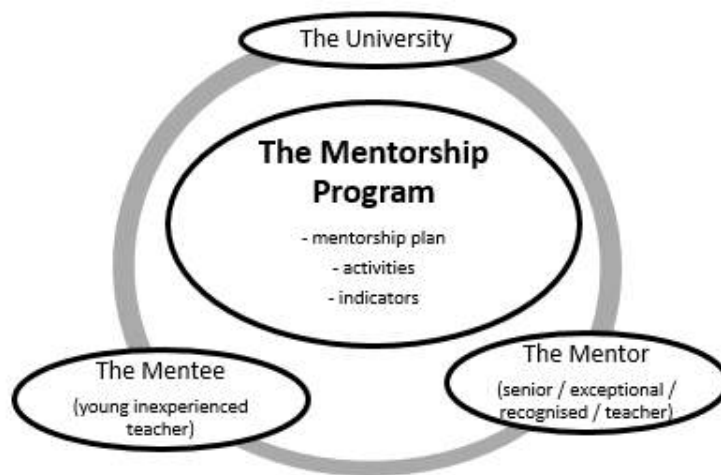


Figure 1 Stakeholders in the Mentorship Program

The stakeholders of the mentorship program are depicted in Fig.1. The “*University*” is used as a generic term to represent both the institution and the interests of the participants to the educational services that are provided.

3.2. The Structured Format of the Mentorship Program

The mentorship program was structured into a series of 16 one-to-one sessions / meetings between the mentor and the mentee. Each session was intended to follow a given agenda, in which a series of topics should be covered. The following figure illustrates the five components present and the allocated share.

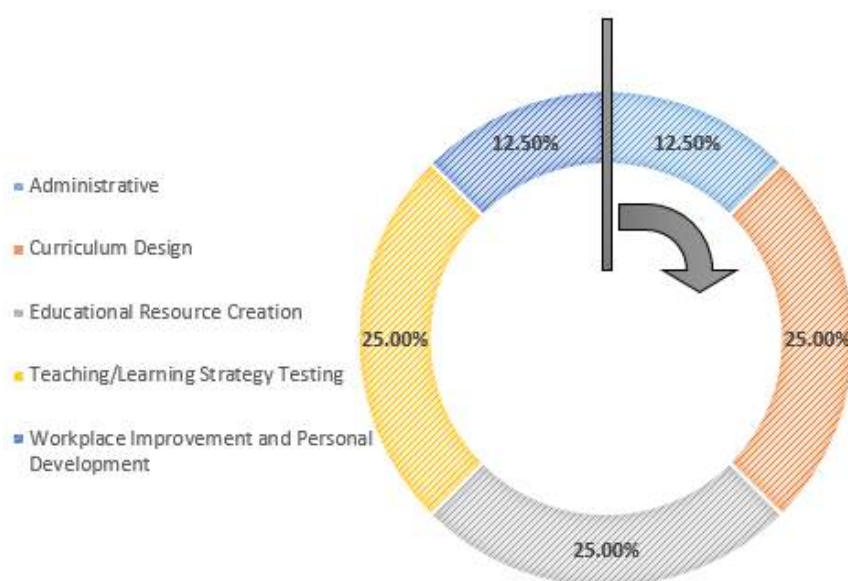


Figure 2 Structure Components of the Mentorship Program

The Administrative component is dedicated to the socio-professional integration of the young teachers at their new workplace – the university. It is intended to cover at most 2 sessions in which the mentor and mentee would take on and discuss about the administrative component of the academic life, starting from aspects present in the internal university regulations and Charta, to specific procedures governing daily activity, getting access to resources, etc. Table 1 presents a list of activities that can be included in the personalised *Mentorship Plan* together with an open list of reference documents that may be specific to each institution.

The Curriculum Design component of the program, stemming for 4 sessions, is dedicated to understanding the process of designing a learning experience and the associated syllabus and educational resources. Specific aspects are considered, related mostly to the way the needs of the market and the desired competences in students are to be met and how these eventually translate into a series of topics. More, during the mentoring sessions, the mentee and mentor will analyse how a specific topic can be addressed and knowledge about it can be shared in relation with the student and what educational resources are best appropriate. Also, it is expected that the mentee will assist the mentor in the classroom in order to identify key actions that add value to the teaching-learning experience.

The objective of Educational Resource Creation component, also planned for 4 sessions, is to create new educational resources covering 4 course sessions (e.g. an equivalent “classic” syllabus of 35 – 40 pages), the associated practical work sessions (seminar, laboratory, project work, etc.) and the corresponding individual study sessions required from the students (estimated to an average of 8 hours). This component of the program is specific to the area of expertise of the mentee and mentor and is seen as a continuation of the former *Curriculum Design* component.

The forth part, Teaching/Learning Strategy Testing, aims to develop the competences and abilities of the mentee to teach and evaluate. The activities involve assistance in the class from the mentor, feedback and

evaluation of the whole approach to teaching taken by the mentee. This is seen as a mean to peer-validate the work performed by the mentee regarding curriculum design and educational resource creation.

The last component of the program, *Workplace Improvement and Personal Development*, refers to the ways the mentee can contribute to establishing a better work environment at the university and how it is expected to take on responsibility for future institutional development.

The following table briefly synthesizes the relative time share in the whole of the program allocated to each component together with a pool of working documents/topics to be covered. Also, suggestions for the expected actions to be taken by both mentor and mentee are included.

Table 1 Detailed structure of the activities in each component of the Mentorship Program

Component & expected no of sessions	Working documents / topics	Expected mentor actions	Expected mentee actions
Administrative – 2 sessions	Colleagues introduction University Charta Internal rules and regulations Governing laws in education Applicable ethics codes and codes of conduct University & department strategical plans Expected teacher conduct Resource management Work schedule others...	Introduces the mentee to fellow colleagues and presents the university hierarchy. Explains the most important / relevant aspects found in the working documents Conducts interactive talks about the working documents Explains aspects in the job description. Exemplifies key aspects in stress management, academic tenure, academic language, teacher – student relationship; Makes an invitation to a social event outside the university.	Examines all documents referenced to her/him. Writes down aspects that are unclear and discusses them with the mentor.
Curriculum Design – 4 sessions	Results of the economic environment needs assessment (according to provided template) Course description form (according to provided template)	How does a course description form look like? How to get relevant information from the market related to your line of expertise? How does one establish the competencies and abilities the students must acquire during a course? How does one establish a list of topics for a course? Choosing the right bibliography. Which evaluation practice best suits a given course / topic? Makes an invitation to a social event outside the university.	Choses a subject in the area of expertise for which a teaching / learning experience is created. The format specific to a university course is chosen: 4 lectures (2 hours each), 1 practical work session and a total of 8 hours of student individual study. Visits 5 industrial partners that require from their employers to master skills / knowledge specific to the proposed subject. Makes an analyses of the job market in terms of required competencies and abilities related to the proposed subject. Assists the mentor at 4 of his lectures and 4 of his practical work sessions with the students.
Educational Resource Creation – 4 sessions	4 course sessions (e.g. an equivalent “classic” syllabus of 35 – 40 pages), the associated practical work sessions questions, problems, etc. (seminar, laboratory, project work,	What are the main approaches to lecturing? What is a syllabus made of? What is required from a practical work session and what are the logistics involved? Evaluates the way (not necessarily the quality!) the mentee	Creates the expected educational resources according to the university format (if applicable) Creates a relevant bibliography together with the mentor for the chosen subject. Choses 2 teaching methods that

	etc.) plan for an estimated 8 hours of individual study for students relevant bibliography	approached educational resource creation. Discusses the peculiarities of different teaching methods: expositions, group talks, individual presentation, seminary, workshop, brainstorming, role study, case study, etc. Makes an invitation to a social event outside the university.	best suits the case to be tested with the students.
Teaching/Learning Strategy Testing – 4 sessions	How do students get evaluated? Managing examination and avoiding student fraud. Mentee's evaluation form (performed after class assistance by the mentor)	Assists the mentee in the classroom. Delivers feedback regarding chosen teaching style. Stresses on the progress made by the mentee and makes suggestions for further improvement. Makes an invitation to a social event outside the university.	Tests different teaching methods with the students.
Workplace Improvement and Personal Development – 2 sessions	Higher education carrier plan Alternative means for promoting student interests and add value to the educational services provided by the university.	Discussion about the mentee's carrier plan and choices. How to promote changes in higher education institutions? Makes an invitation to a social event outside the university.	Establishes her/his carrier plan. Presents at least 2 items that would improve the regular activities in the university / department / faculty.

3.3. Key Performance Indexes of the Program

The proposed Mentorship Program was evaluated at the end of the pilot year according to the indexes present in Table 2. These represent the way the university management tried to measure the efficiency of this pilot program and aimed at quantifying the evolution / progress of the mentee.

Table 2 The Mentorship Program performance indexes

Index	Definition	Measure / Quantification
Number of mentorship sessions	A total of 16 sessions are to be planned / scheduled: 2 in the first and last 2 months and 1 in the other months by each mentor – mentee team.	At least 12 sessions per team.
Mentee evaluations	Evaluation of the mentee performed by the mentor, comprising strenghts, weaknesses and development opportunities (according to provided template).	3 evaluation forms (after session 1, 8 and 16)
Carrier plan	According to provided template.	-
Meeting report	Filled-in document according to template.	Equal to the number of sessions
[New] Academic subjects developed	Fully available educational resources for a given subject.	-
Number of mentors	Present in the pilot program	50
Number of mentees	Present in the pilot program	200
Mentorship Program evaluation	Filled-in form submitted by both the mentor and the mentee (according to template).	-

4. Results

The pilot Mentorship Program was run in 10 of the top technical universities in Romania in 2013 and 2014 with 50 professors acting as mentors and 200 young teachers in the first years of their higher education carrier acting as mentees. There was an average of 4 mentees to each mentor and both the mentor and

mentee were from the same engineering field. Being a pilot program, mentors benefitted from a series of training sessions in the 3 months beforehand, in which the expectations from the program were detailed, together with thorough explanations of the actual structure and the manner to approach the one-on-one sessions with the mentee. Though aimed mostly at people in the first year of their academic teaching carrier, during the pilot, mentees that have already been with the university for 2 or 4 years were accepted. The reason was to benefit from their feedback in order to validate the proposed program structure and also populate the pool of proposed sessions topics and expected actions from the participants with relevant items.

Participating as a mentor, the professors reported several aspects that boosted their motivation and contributed to better achievements in generals. These were mostly in either one of the following:

- The feeling of passing on knowledge and a sense of meaning to their experience
- Answering the need of contributing to shaping the future of universities / higher education and of its teachers
- Self-improvement (related to the teaching component of the academic carrier), through teaching
- A means of contributing to the mandatory “institutional development” component
- Social recognition and personal branding

The mentees, at the end of the pilot program, recognised the benefits it offered and reported an increase in self-confidence and their academic performance (coming both from yearly student evaluations and the students results and interests in the taught subjects in general). The most notable areas where there was a clear perception of involvement from the university were:

- Counselling in developing practical skills for being an excellent teacher
- Counselling in managing a carrier in higher education
- Guidance in improving communication with the students
- Guidance in creating educational resources that are compelling but also relevant in providing market required competences in/for the student

Besides reported benefits by both the mentors and mentees in the pilot Mentorship Program, this had also an important institutional impact. Directly, it provided an active means for increasing the quality of the teaching service by addressing all aspects of the process: planning, educational resource creation, interaction and evaluation. Indirectly, due to its mandatory component that required each mentee to propose and create relevant educational resources for a chosen topic of expertise (though only at an estimated 25% of what is widely recognised to be a semester course) it contributed to updating and improving the academic offer.

5. Conclusion

The paper addressed the challenge on capitalizing on the know-how of the key-experienced-teachers who continuously distinguish themselves as being responsible for the added value in the perceived quality in the services provided by the university, irrespective of the technology available. It described in full a pilot structured mentorship program addressed to young professionals taking on a teaching carrier in higher education that was implemented and impacted 10 of the major technical universities across the Romania. According to the observed results, the action of institutionalising such programs on a regular basis is under strong considerations with efforts on the way to become a mandatory requirement for young teachers in

the first year of academic carrier. However, besides the straight forward advantage of offering a structured induction to the workplace, there are still challenges in terms of selecting proper candidates for the mentor positions, avoiding their over “exploitation” and taking them away too much from the students (where they outstandingly perform).

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Exploratory Teaching Space: Stimulating Innovation in Teaching

Colette Knight

RWTH Aachen University, Germany
knight@lfi.rwth-aachen.de

Thomas Dondorf

RWTH Aachen University, Germany
dondorf@lfi.rwth-aachen.de

Vera Eckers

RWTH Aachen University, Germany
eckers@ers.rwth-aachen.de

Heribert Nacken

RWTH Aachen University, Germany
nacken@lfi.rwth-aachen.de

Abstract

Over the past several years, RWTH Aachen University has been progressively using new teaching technologies to improve the quality of teaching and engage a larger fraction of its student population. The Exploratory Teaching Space (ETS) was initiated in 2009 to ensure that educators have the time and financial support to develop and try out innovative teaching concepts. Every year, educators are encouraged to submit proposals on innovative teaching methods. Between 2010 and 2016, more than 300 proposals were submitted, from which 88 were funded.

ETS projects aim to more actively involve students, appeal to a broad demographic range of students with diverse learning preferences and instill the competences in students that empower them to solve future challenges. Examples include projects in which mobile apps, virtual experiments, flipped classroom formats and serious games were developed. Even after the funding period, most of the projects have continued and are now well integrated into the RWTH teaching landscape. They still contribute to modernizing and improving the quality of higher education in Aachen. In this paper, we will describe our experience with the Exploratory Teaching Space and how it is transforming teaching and learning in the RWTH Aachen University.

Keywords: education, teaching, teaching innovation

1. Introduction

21st Century technology is changing the way people communicate and organize their daily lives. The way that people get information, learn new things, communicate and share ideas has been profoundly changed by the internet and social media. It is therefore not surprising that digital technologies are also changing and enriching the way that educators teach and students learn. Technology enables learning situations to be designed that actively promote student participation and collaboration while enabling greater flexibility.

Traditionally, teaching in higher educational institutions is done during live, face-to-face, synchronous events in which educators stand in the front of lecture halls and lecture to their students. While this form of information transfer is still prevalent, newer teaching technologies that enable asynchronous learning while promoting communication and collaboration and enabling students to personalize their learning experience is steadily gaining traction.

Innovating teaching technologies can be used to engage students and design more engaging courses. Videos of lectures and exercises uploaded onto web-based platforms enable students to learn independently where and when they choose to. Such videos can be used to “flip the classroom”. In flipped classroom formats, learners are expected to watch videos of lectures and use other resources in self-study phases to prepare the course material before attending the associated face-to-face event. This fosters critical lifelong learning skills such as independence and responsibility. Since the face-to-face events are not primarily used to transfer information, they can be used to go into more depth on particularly critical topics and check how well the students understand and apply their knowledge. Moreover, web-based platforms can extend the lecture room community by making it possible to connect with experts around the globe who can share their insights and experience. Interactive textbooks empower individuals to personalize their learning path rather than having to follow the designed learning path of lectures and paper textbooks. Learners can use hyperlinks to videos, animations, additional sources and assessments to find supplementary information and check how well they understand the material. Wikis provide a platform for discussion and debate. Learners and educators in the defined community of the users can use wikis to collaboratively develop documents that all users can edit. Students are also provided with a platform where they can pose questions to their peers and teachers and collaboratively discover solutions to problems. Social media networks enable educators and learners to readily share and access recommended links. Serious games and simulations reinforce and practice aspects of the coursework. All of these innovations have the potential, when properly implemented, to improve the student experience and quality of teaching in universities.

In the recent years, RWTH Aachen University has been actively developing teaching concepts that focus on improving the learning experience of individual students and supporting different learning styles (Leicht-Scholten & Nacken, 2010). The goal is to improve the success and on-time graduation rates without compromising the high standards of the university. In 2009, the university answered a funding call for Excellent Teaching published by the Stifterverband für die Deutsche Wissenschaft with a concept “Students in Focus of Excellence”¹⁰⁵ (Stifterverband für die Deutsche Wissenschaft e.V., 2009). RWTH Aachen was one of ten universities in Germany who were each awarded grants of one million Euro. One of the concepts described in the application was the Exploratory Teaching Space (ETS) (RWTH Aachen University, 2009).

Continually improving the quality of teaching and learning is an important goal in educational institutions. Approaches to improve the quality of teaching can be divided into different categories, such as retrospective and prospective approaches (Biggs, 2001). Retrospective approaches focus on acknowledging

¹⁰⁵ The term *excellency* (German: *Exzellenz*) is used in the context of the *Excellence Initiative of the German Federal Ministry of Education and Research* (Kehm & Pasternack, 2009). As part of the initiative, eleven universities in Germany receive additional funding to the amount of multiple million Euro. These eleven universities are often called *Universities of Excellence* (German: *Exzellenzuniversitäten*) or *Elite Universities* (German: *Eliteuniversitäten*).

and rewarding the quality of good teaching in the past. An example of a retrospective approach is the teaching award with which the university annually honours its best lecturers. This award includes a certificate and a budget which can be used for either research or teaching (RWTH Aachen University, 2015). Prospective approaches aim to improve teaching up front. In this case, the lecturer or researcher is given a budget which can be used to improve an existing lecture or to hire more teaching staff. The Exploratory Teaching Space presented in this paper is an example of a prospective approach which supports the development of high potential, high risk teaching and learning technologies.

2. Exploratory Teaching Space

The Exploratory Teaching Space (ETS) was established in 2009 as part of the university's institutional strategy for teaching. It was modelled after the Exploratory Research Space (ERS) (RWTH Aachen University, 2016a). This was established two years before within the Institutional Strategy of the Excellence Initiative to promote and fund interdisciplinary research projects with high potential, but too high risk to attract public funding yet. In this spirit, the Exploratory Teaching Space sought to fund highly innovative teaching concepts with high potential, which were considered to be risky since they were not yet well established in academics and/or were new to RWTH Aachen University. The initial idea was to yearly fund new ETS projects until 2014. This probably explains the high number of applications in that year as can be seen in Table 3 below. However, due to the success and resonance within the university, the office of the provost (rectorate) extended the Exploratory Teaching Space program until 2017.

The first call for ETS projects was published in March 2010 (RWTH Aachen University, 2010). All faculties were encouraged to participate and proposals covering all types of new teaching and learning concepts were welcomed. Concepts targeting students in early semesters were particularly encouraged. Projects are funded for a period of six to twelve months. The maximum grant per project is 30 thousand Euro. The funds can be used for material, travel and personnel costs. Since the launch of the ETS program in 2010, 312 proposals have been submitted, of which 88 have been funded. Approximately 2.2 million Euro have been awarded. This translates into an average grant of 25 thousand Euro and an overall success rate of 28%. The interest in the program has remained high. This is reflected in the steady number of submitted proposals as shown in

Table 3.

Table 3: Number of ETS projects submitted and approved

Year	Submitted	Approved	Success Rate
2010	35	9	26%
2011	44	11	25%
2012	35	12	34%
2013	27	12	44%
2014	89	22	25%
2015	44	10	23%
2016	38	12	32%

Proposals are consistently received from all faculties in the university. This can be seen in the distribution of submitted and successful ETS proposals in a single year (2016) as well as over all the years of the program.

Figure 3 shows the ETS proposals for the years from 2010 to 2016 (a) as well as the most recent proposals for the year 2016 (b). Figure 4 shows the accepted projects.

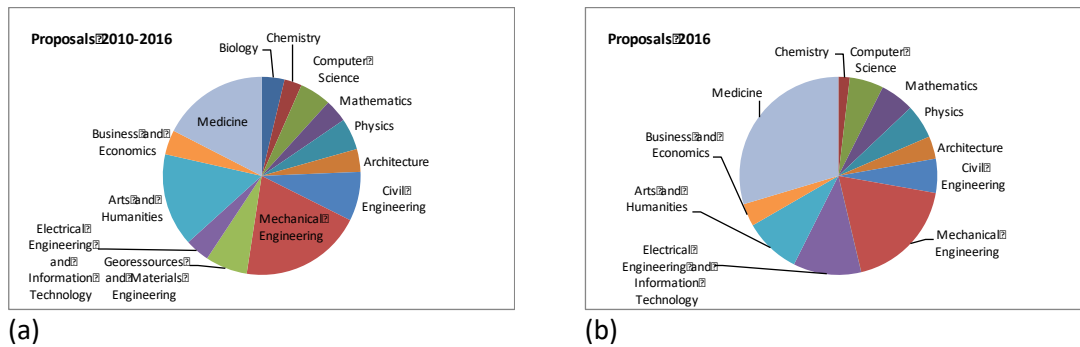


Figure 3: ETS Proposals

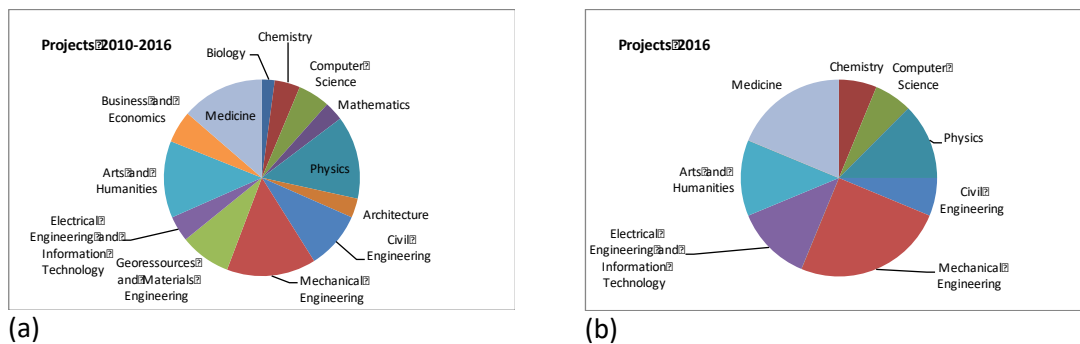


Figure 4: Accepted ETS Projects

The ETS process is schematically shown below in Figure 5.

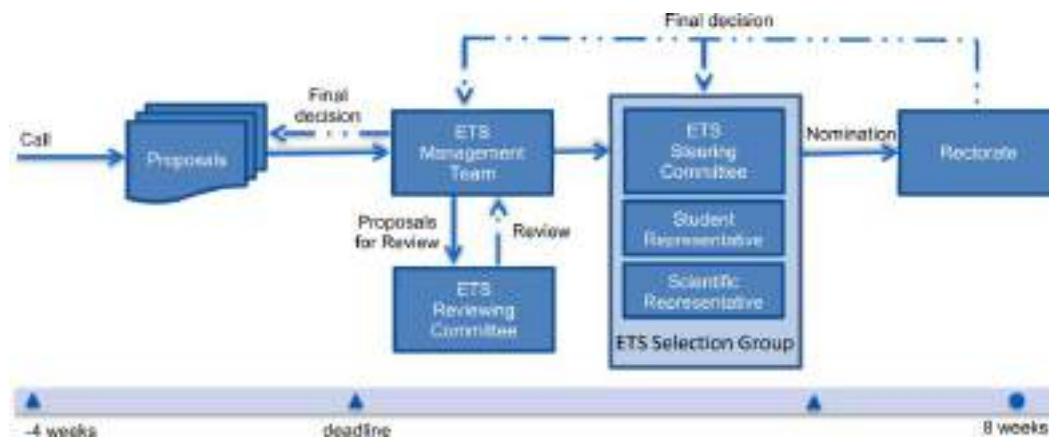


Figure 5: ETS process (RWTH Aachen University, 2016b)

A call for new projects is put out by the ETS Management Team in spring of each year, at least 4 weeks before the deadline for submission of new proposals. Proposals must be submitted via a website form. Before submitting the proposal, the project team has to agree that if the project is granted, they will prepare a short profile of the project after it is completed that will be available online. Each proposal is evaluated independently by three members of the ETS Reviewing Committee, consisting of people from all

levels of the university such as student representatives, scientific representatives and professors. The proposals are evaluated with respect to originality, whether they support the student's independent learning, synergy with other faculties, the size of the target audience and how the concept will be continued and consolidated after the funding phase. The evaluations are collected, anonymized and the results for each project summarized by members of the Management Team. Based on this overview, the ETS selection group consisting of the ETS Steering Committee, a student representative and a scientific representative, makes a recommendation as to which projects should be funded. This recommendation is reviewed and approved by the rectorate. Within eight weeks of submitting a proposal, the project team is informed about the status of their proposal. This occurs typically by the end of July. The funding is made available at the start of the new academic year in October.

Within three months of completing the project, the ETS project leader is required to write a short report on the results of the project, lessons learned and whether or not the project will be continued and consolidated. A number of these reports are available online¹⁰⁶, as mentioned above. This database offers a window into the diversity of ETS projects completed in the university.

2.1 Examples of ETS Projects and their impact on the teaching landscape of the University

The diversity of projects which have been funded by the ETS program can be seen in the examples listed below. Successful projects can be found in all faculties of the university. The examples also demonstrate the transfer effect of ETS projects and how this is changing the teaching landscape in the university.

Example 1: ETS Project – “Game based learning with Zinc & Co.” in 2010

In the first ETS call in 2010, three of the nine projects funded were to develop subject-specific serious games. The funded proposals were from the Department of Chemistry, Faculty of Mechanical Engineering and the Faculty of Electrical Engineering and Information Technology. The project in the Department of Chemistry, “Game based learning with Zinc & Co” is now integrated in “Introduction to Chemical Reaction Engineering” course. In this computerized learning game, students play the role of employees of a virtual chemical plant. In this function, they are required to apply their knowledge of synthesis reactions based on the material covered in the lectures to solve relevant problems. This enables them to practice, access and reinforce their knowledge of the chemical reactions. The positive impact of the game on the learning outcomes of the students has triggered other faculties to consider game based learning. In the past six years, a number of serious games have been developed in RWTH Aachen University and now form an inherent element in courses ranging from “Internal Accounting and Bookkeeping” in the School of Business and Economics to “Introduction to Biblical Theology” in the Faculty of Arts and Humanities. In all of the cases, the games are used to support independent learning of the students. The games provide a platform for repetition, competition, decision making and failure, which help the students learn and process the course material more sustainably.

Example 2: ETS Project - “Flipping the Introduction to Business Administration Course” in 2012

¹⁰⁶ Profiles of ETS Projects: <http://www.rwth-aachen.de/ets/steckbriefe>

Prof. Piller and his team from the School of Business and Economics applied for an ETS grant in 2012 to structurally reorganize the course “Introduction to Business Administration” from a traditional lecture-based format to a flipped classroom format to promote independent learning and give students the opportunity to discover solutions to challenging technical problems both independently and collaboratively. Prof. Piller had already been awarded the RWTH Aachen teaching award in 2009/2010 for excellence in teaching of this course. The ETS Project enabled a further step to improving the quality of teaching by focussing on the needs of individual students with different learning speeds and styles. The funding was used to develop appropriate online videos covering the topics of the course. The new flipped classroom format was implemented in 2013. Four to six videos, each approximately ten minutes long are used to replace each 90-minute lecture. All of the teaching videos end with a list of questions or links to quizzes. This enables the students to assess their level of understanding and if necessary, watch parts of the videos again, before attending the face-to-face session. The students attend the face-to-face sessions better prepared to discuss the learning goals of the session with their fellow students and professors. This makes it possible to go into more depth of the material and to have informed discussions about real-life examples relevant to the topics covered.

After the funding period ended, improvement in the implementation of the flipped classroom format in the course “Introduction to Business Administration” continued. The success of this format including the enthusiasm of the students and improvements in the average grades triggered other professors in the School of Business and Economics to develop and implement such formats. Moreover, professors from other faculties, ranging from the Faculty of Arts and Humanities to the Faculty for Mechanical Engineering experimented with flipped classroom formats and implemented such formats either partially or completely when it added value. Today, courses such as Mechanics, Thermodynamics and Principles of heat and mass transfer in the faculty for Mechanical Engineering in RWTH Aachen University with up to 1500 students use flipped classroom formats to replace some of the lectures.

Example 3: ETS Project: “Video Database of student internships” in 2014

Student internships are an obligatory part of many degree programs in RWTH Aachen University, including the Master’s program in the Faculty of Architecture. In 2014, the Institute of Architectural Theory was awarded an ETS grant to create a learning format so that the internship experiences of individual students could be shared with their peers as well as archived for future use. The idea was to create a video database so that beginning students could learn from the experiences of senior students and gain insight into how the topics covered in their academic studies have practical relevance for real-life careers. The students in the audience are free to ask questions. This interactive format of “students learning from students” is still used in the faculty. Every month, interested students get together and listen as a student who has just completed his or her internship is interviewed by another student. The interviewed students are also invited to share the insight they gained about the organizational structures and decision-making processes in the companies where they did their internships. The interviews are videotaped and edited and stored on a password protected video database of the faculty, if the interviewed student permits doing so.

Example 4: ETS Project “StatiGo - Learning-App for graphical dialog during self-study and lectures” in 2014

In 2014, the chair of Structural Analysis and Dynamics in the faculty of Civil Engineering successfully applied for an ETS grant to develop an online tool which enables students to access exercises in the topic of static analyses, check their results and get feedback and help at any time or place. The StatiGo learning app¹⁰⁷ was developed in collaboration with the IT Center of RWTH Aachen University. Students can use a desktop or smart phone to access a pool of exercises and display the solutions of the exercise problems using a simple graphical input. In contrast to other programs, StatiGo does not only focus on the final numerical outcomes of calculations. Instead, extensive plausibility checks are also made based on pre-programmed solutions. These checks enable the program to provide conceptual feedback and help to students, of the kind that they would normally only receive in personal discussions with educators. Figure 6 shows parts of the application. The red and blue shapes were added by a student and are then evaluated by the program. As described, StatiGo can be used for self-study, but it can also be used during lectures. In this case, educators can pose questions for students to solve individually or in small groups. This increases the student participation and interaction with the educator. The suggested solutions can be collected anonymously, evaluated and discussed. As a result of this interaction, common errors and sources of misunderstanding can be identified and addressed even during the lecture, when appropriate. StatiGo was implemented in the “Statics 1” lecture for the first time in December 2015. The resonance of the students was very positive and the learning app will be developed and optimized further. A number of other subject-specific learning and quiz apps are being developed in other faculties, including the Faculty of Mathematics, Computer Sciences and Natural Sciences, the Faculty of Mechanical Engineering, Faculty of Electrical Engineering and Information Technology and the School of Business and Economics. These apps give students more flexibility and provide help during phases of independent self-study. They also serve to promote the interactivity between the students and their educators, which is especially important in large lecture halls with many students.

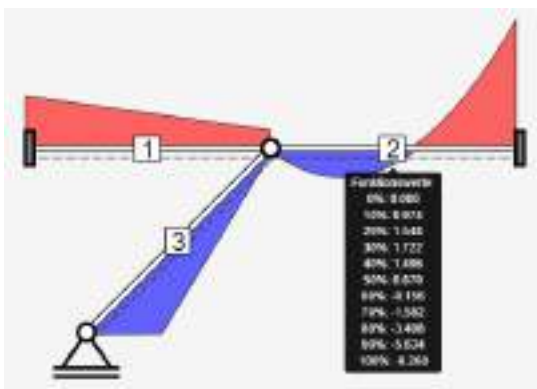


Figure 6: Screen capture of StatiGo

Example 5: ETS Projects to develop courses using modified problem based learning formats (2010 & 2015)

Problem based learning (PBL) is a student-centred approach in which students learn the subject matter by a combination of working together in small groups to solve complex, whole-task problems and independent

¹⁰⁷ StatiGo: <https://statigo.lbb.rwth-aachen.de/>

self-study. This learning design was developed in the late 1960's by the medical school of MacMaster University in Canada. Since then, a number of Medical Schools, including the Medical School in RWTH Aachen University have incorporated problem based learning in their medical programs. Maastricht University is an exception in that it has pioneered the use of Problem based learning in *all* of their study programs.

In 2010, an ETS grant was awarded to develop an interdisciplinary practical course based on the principles of PBL for engineering and natural science students following a medicine-track program. This problem based practical course (PBPC) covered topics of ECG, blood pressure, heart rate and peak flow spirometry and is structured as follows: After attending the respective lectures, students are equipped with the measurement devices and get together in designated small groups. Their task now is to discuss the practical course assignment, namely how they can use the device to measure the reaction of the body to different stimuli. Using all of the information they have at their disposal including from every-day observations, the groups determine which stimulus (e.g. stress, extreme sports, extreme hot or cold) they are interested in investigating and which body reaction they will measure and how. The students then define a measurement protocol which has to be approved before conducting the measurements. The student groups are responsible for all projects steps from the beginning to the end. Finally, the results are presented and discussed in the class (Baumann, 2009; Baumann, Gordalla, & Schmitz-Rode, 2013). This ETS project exposed engineering and natural science students in RWTH Aachen university, who would otherwise not be exposed to PBL to this teaching design. It also provided insight into how PBL could be extended to practical courses in other faculties.

In 2015, another ETS project was granted to develop a Blended PBL practical course. While the motivation of the students and the learning outcomes of the course described above were positive, experience showed that it was difficult to find appointments, outside of the designated lectures, when all students of the team could attend. Thus the group interaction was not as efficient as it could have been. This was aggravated by the fact that the teams were interdisciplinary and so the students often had different course schedules and different expectations about group work. The ETS project, Blended POL, served to address these issues by making team collaboration tools, such as video conferencing, remote desktop and collaboration office, available to the students. These enabled students to participate in the group discussions when they were away from the university. Furthermore, the students in the course became acquainted with and got the opportunity to use team collaboration tools, which they might later encounter in their professional lives.

Example 6: ETS Projects to develop computer programs for virtual experiments and augmented reality (2012 – 2015)

Experiments and demonstrations play a prominent role in natural science and engineering courses. They are used to enable students to acquire skills in experimentation as well as to illustrate scientific concepts and the functioning of technical equipment. There are however situations when it is not feasible for students to conduct experiments themselves because of issues related to access to the equipment, time, costs, or safety. Also it might not always be possible to show the desired demonstrations due to a lack of availability of the equipment or personnel to run the demonstrations during the fixed lecture time.

Moreover, students take on the role of passive observers during demonstration as opposed to active participants.

A number of ETS Projects have focussed on the use of virtual experiments or augmented reality to provide greater access and flexibility to students while helping them learn about experimental techniques and complex pieces of equipment. These interactive simulations facilitate measurement, data collection and analysis. Furthermore, they can incorporate quiz questions so that students can assess their level of understanding. Examples of such ETS projects include computer programs developed in the Faculty of Civil Engineering to simulate experiments measuring the mechanical properties of materials and display the measured data. In the course of this ETS project, the necessary experiments were conducted in the laboratory and digitally recorded with video cameras. The corresponding force/displacement curves were also recorded and stored. The architecture of the computer program developed enabled videos of the test procedure and measured quantities to be simultaneously shown during lectures on the topic. Feedback and test results of the students indicated that these demonstrations significantly increased their conceptual understanding of material properties and their requirements in practical applications, beyond that of solving the mathematical equations.

In the Faculty of Georesources and Materials Engineering, a virtual microscope was developed for the geosciences. In this application, the functionality of a polarization microscope is simulated. As part of this ETS project, scans of thin sections of different materials in high magnifications and under different light polarization and exposures were collected, combined to form complete data sets, stored and visualized using the virtual microscope. Annotations were included on the images to help students who used the program for self-study. In the lectures, both the virtual microscope as well as polarization microscopes were used. The virtual microscope was well received by both students and lecturers and its ease of use allowed more time to be spent on discussion.

Research in physical chemistry can involve the use of large pieces of equipment, such as microwave spectrometers. It is neither feasible to bring such equipment to the lecture hall, nor practicable to take large numbers of students to the research lab to demonstrate the use of the equipment. An ETS project was used to set-up a remote experiment so that students could access and control the microwave spectrometer located in a research lab from a laptop in a lecture hall via an internet link. The students learned how to create and test the program to control the spectrometer. The remote control provided the students with deeper insight into the functioning of the spectrometer, previously not possible to this extent.

An ETS Project was used to develop self-directed learning material in the form of augmented reality for a Textile Technology course offered in the Faculty for Mechanical Engineering. Students holding a tablet and standing in front of the assigned textile machine could autonomously learn how the textile machine operates. Marked points on the machine are recognized by the integrated camera of the tablet and shown on the display. Information in the form of texts, videos and animations provide background information, explain the individual components of the machine, their functions and control systems. Figure 5 shows the use of a tablet which shows additional information via augmented reality. Since it is not necessary for the machine to be in operation when the students are viewing and learning about it, it is also not necessary for

technical staff to be present. As such implementation of this concept offered more flexibility for students. Quiz questions are included so that students can assess their understanding.



Figure 5: The augmented reality application in use

3. Conclusion

Innovative teaching concepts need to be tested, evaluated and implemented to prepare students of all learning types for their future careers. The development and testing of such new concepts requires time, effort and funding. In this paper, we discuss the Exploratory Teaching Space program of the RWTH Aachen University and how it is catalysing changes in teaching at the university. The program awards a maximum grant of up to 30 thousand Euro for up to one year to fund innovative, high-risk teaching projects. Since its start in 2010, over 300 proposals have been submitted, of which 88 have been funded. The funding provides educators with the time and financial support to actively develop teaching concepts that focus on helping individual students become self-directed learners and develop the problem-solving skills that they will need to apply in future courses and their careers. The associated bureaucracy for educators who apply for ETS grants is kept to an absolute minimum. The awarded funds can be flexibly used to cover material, travel or personnel costs. The main requirement is that within three months of completing the project, the project leaders are expected to write a one-page report summarising the results and lessons learned so that others can benefit from their experience. A number of these reports are available online. There are different networking and communication platforms within the university to give others the opportunity to see and hear about ETS projects. This increases the awareness, provides contact names and triggers other educations to consider if such a format or a modified version thereof can add value in their courses. As a result, a number of new teaching formats have or are becoming well established in the university. These include videotaped lectures and exercises, flipped-classrooms, game-based learning and the use of subject-specific apps. The digitization strategy of the university is geared towards making further inroads with these and other new teaching technologies in all faculties. The ETS program is playing a critical role in this strategy.

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Active online education: a new educational approach at the Open Universiteit of the Netherlands

Kathleen Schlusmans

Coordinator Quality Assurance, Open Universiteit of the Netherlands
Kathleen.schlusmans@ou.nl

Rieny van den Munckhof

Researcher Quality Assurance, Open Universiteit of the Netherlands
Rieny.vandenMunckhof@ou.nl

Ge Nielissen

Researcher Quality Assurance, Open Universiteit of the Netherlands
Ge.nielissen@ou.nl

Abstract

In the last decade the Open Universiteit of the Netherlands has had serious concerns about student retention. Every year about 5700 new students start studying at the OUNL, about two thirds of them with the intention of obtaining a BA or MA degree but less than 15% actually gets the diploma. In 2013 the board decided to rigorously transform the educational approach by introducing a new system of active online education with an emphasis on degree programs instead of individual courses and with the introduction of more structure and social and academic integration. In September 2014 all the master programs were transformed and the first master students started in the new system. Evaluation data were collected at every step and the first findings suggest that dropout rates have decreased and that students study faster and achieve more credits per year. Student satisfaction was always very high at the Open University and in the new system it has not increased significantly but there was certainly no decrease in student satisfaction. The students like the online materials but the face-to-face tutorials and meetings are only rated highly when students experience real added value. Although part of the staff and part of the students were quite critical about the new system, most lectures now agree that teaching in the new system is more satisfying as they have more contact with the students and they can use more group activities. In September 2016 all the BA programs will be transformed as well. In this transformation the evaluation data of the master programs are taken into account.

Keywords: Improving the quality in higher education, blended degree education

1. Introduction

The Open Universiteit is the only open distance teaching university of the Netherlands. The OUNL was founded in 1984 and its basic philosophy was to provide (part time) higher education for independent self-directed adult students who could decide for themselves what, where and how to study. There were no entry requirements, there was no academic year and students could start studying whenever they wanted and write the exams when they felt they were ready for it.

These characteristics made the OUNL quite incomparable to other providers of part-time higher education on the Dutch market and also to other universities. The OUNL also held a unique position in the field of international distance universities as there was no other distance teaching university which offered such a degree of freedom to her students (van den Boom & Schlusmans, 1989).

When the Open Universiteit was established openness for all groups of students was a key issue and study success and student retention were only minor concerns. Nowadays however the reduction of student drop out and the increase of academic success are very high on the educational agenda and as far as output and success are concerned the Open Universiteit is now compared to other Dutch universities. And in this comparison the OUNL did not perform very well. Every year about 5700 new students start studying at the OUNL, about two thirds of them with the intention of obtaining a BA or MA degree but less than 15% actually gets the diploma (Open Universiteit, 2013). In its institutional plan 2012-2016 the OUNL stated "Our success rate can and must be improved and the traditional model of independent self-study is not sufficient anymore to serve this goal" (Open Universiteit, 2012, p. 5). With this goal in mind the board decided to rigorously transform the educational approach of the OUNL by introducing a new system of active online education with an emphasis on degree programs instead of individual courses and with the introduction of more structure and social and academic integration. In September 2014 all the master programs were transformed and the first master students started in the new system. In September 2016 the first degrees in the new system were awarded.

In this article we report on this whole transformation. First we describe the new model and the scientific foundation and evidence for the new model. Secondly we report on the evaluation study we carried out in 2014-2016. At the end of the paper we discuss the scope for improvements and the plans for the transformation of our bachelor programs.

2. A model for study success

A complex of factors is held responsible for academic success and student retention. Although there are factors that are related to the education programs, research shows that student-related factors are mainly responsible for academic success (Woodman, 1999; Simpson, 2003, 2012; Ergül, 2004). Student characteristics are not just personality traits and intelligence but also personal circumstances such as family life and work load. This is also evident from the annual student survey at the OUNL (Van den Munckhof & Puls, 2012, 2013). Students who dropped out gave a variety of reasons which mainly relate to personal circumstances, such as lack of time to study (in conjunction with parenting, work and other commitments) and life events (ill health of self, partner or children, moving house, divorce etcetera). Only a few mentioned institutional factors such as too much freedom, too little support and too little contact with fellow students. We also asked our active students if they had ever considered dropping out. About one third of them had actually thought of quitting because of the slow progress in their studies which had a very negative effect on their study motivation. When asked what made them stay, they contributed this to personal characteristics: they call themselves real go-getters, they do not give up and their perseverance helps them to go on with the study despite the bumps. They also mention the waste of invested time and money as a motivation not to stop prematurely. Only very occasionally students mentioned an action from the Open Universiteit as a reason to persevere.

The picture that emerges from this study at the Open Universiteit, agrees with the findings of studies at other distance teaching institutions (Ashby, 2004; Yorke, 2004; Simpson, 2003, 2012; Powell, 2009) which state that academic success is largely the result of a combination of factors outside or mainly outside the sphere of influence of the institution. However, this should not prevent a university to take action. Rather, an institution must consider how the opportunities that do exist can be better utilized. When the new educational model of the Open Universiteit was designed several potentially relevant measures were combined (Open Universiteit, 2014). We present these measure in a model for study success which can be used as a foundation for the new educational model.

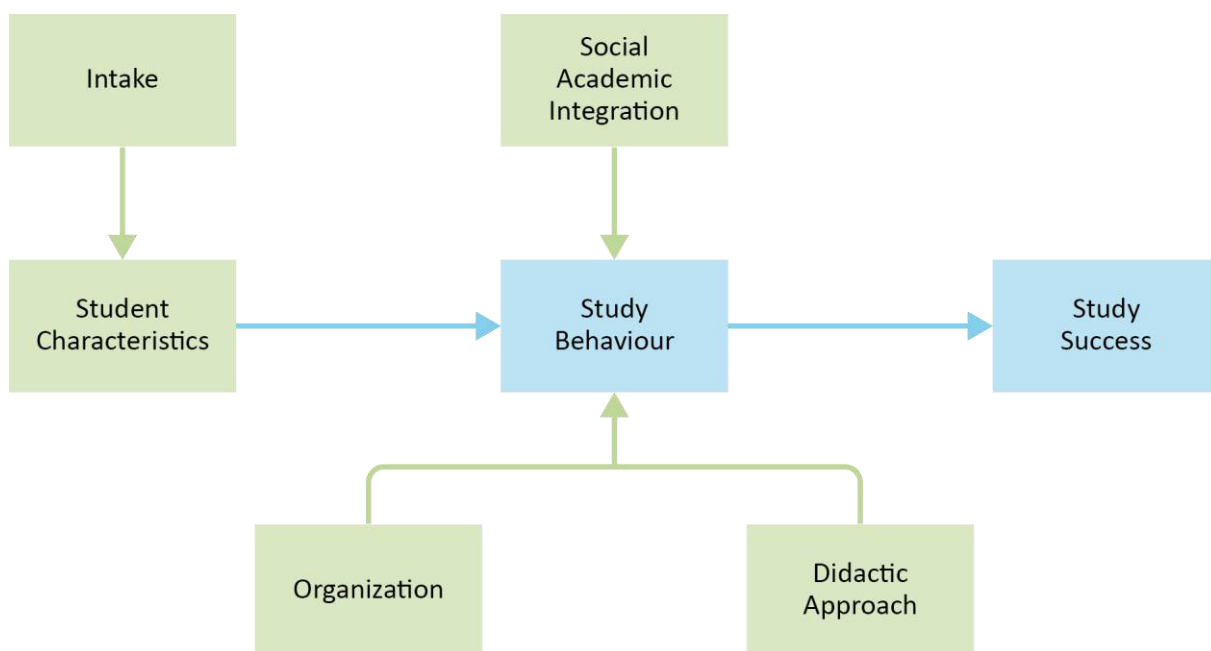


Figure 7 A model for improving study success

As stated before in this model we consider student characteristics as the most important factor for study behavior and in its turn for study success. Although student characteristics as such cannot be influenced by the institution, the study intake process can play an important role in the self-selection of the students and in their study choice (Simpson, 2003, 2012). Students often indicate that good information and a better introduction into the academic system probably would have helped to achieve more academic success. Students who are successful have spent more time and energy to choose and prepare for the study and have paid more attention to the match between the study and their own abilities (Kearney and Kearney, 1994; Warps, Hogeling, Pass & Bruckx, 2009; Nederlof, 2011). Part of the intake is also clarifying the expectations. Tinto (2009) indicates that high expectations for students are essential for study success.

Institutional factors do not lead to study success directly but can influence study behavior and study motivation which will in its turn lead to study success.

The first institutional factor is the organization of the program which can lead to the reduction of non-commitment by setting deadlines and providing structure (VSNU, 2011; Wijnen, Wolfhagen, de Bie,

Brouwer, Ruijter, & Vos, 1992; Baars, Adriaans, Godor, Hermus, & van Wensveen, 2012; Vermeulen et al, 2012; Vos, 1992, 1998). Also the reduction of parallel programming of course modules (Wijnen, et al, 1992, Jansen, 2004, van den Berg & Hoffman, 2005), the even distribution of the study load over the academic year (Wijnen et al, 1992) and the monitoring of student progress (Tinto, 2009) will contribute to more successful study behavior. Moreover financial issues prove to be a significant factor (Sandler, 2000; Breier, 2010). The impact of this is twofold. On the one hand, the height of study fees will have a positive effect on success because commitment will be larger if one has already invested more and has got more to lose. On the other hand if the costs are higher, students will choose more wisely and enroll less quickly.

The second factor is social and academic integration. Regular contact with the lecturers and professors and the sense of belonging to the academic community are critical to the academic success of students. Social integration is the extent to which students feel at ease among the students and teachers, accepted and feel connected. Any form of academic and social bonding contributes to improved academic achievement and to an increase of the degree of goal orientation and bonding of students to the institution. (Tinto, 1999; Pascarella & Terenzini, 2005; Severiens & Schmidt, 2009; Schmidt, 2012). This in its turn influences the decision either to drop out or to continue (Tinto 2004, 2009, Texas State Higher Education Coordination Board, 2004; Ministry of Education and Science, 2008; Goovaerts, 2012). The relationship between academic integration and study success has been demonstrated in a number of studies in recent decades (Chapman and Pascarella, 1983; Bean & Metzner, 1985; Ulriksen, 2009 Ulriksen, Madsen & Holmegaard, 2013) and these studies stress the importance of (informal) contact with lecturers about the subject matter, discussions with fellow students and participation in academic activities as factors related to study success.

The third factor is the didactic approach: the quality of the teaching materials and the testing are important for academic success. There is an optimal ratio between self-study and contact time (Gijssels & Schmidt, 1993; Vos, 1992, 1998; Schmidt et al, 2010). A limited contact with lecturers and professors will motivate students to study independently but too much contact will take up time which could be used for self-study. Also the use of active teaching methods (Merrill, 2002; Matthews, 2009; Zhou, 2012) and formative types of tests and the use of partial exams (Oosterzee et al, 2010; Bruijns, 2014) will contribute to study success.

3. The new educational model: Active online education

In the last decade the Open Universiteit has carried out several projects on study success (Oosterzee et al, 2010; Nederlof, 2011; Schlusmans & Schoevaart, 2013; Schlusmans, Boon, Van der Klink, & Schoevaart, 2015) but there was never an overall model for the whole university. In 2012 a task force was established to develop a new evidence based educational model which would increase study success (Koper et al, 2013). This new model attempts to integrate most of the study-promoting factors mentioned above.

The main characteristics of the new model are:

- Intake interviews with new student to clarify expectations.
- Reduction of non-commitment by introducing an academic year and a course schedule with fixed deadlines.
- Increase of social and academic integration by organizing more virtual classrooms, more f2f-meetings, a pro-active tutor and a study counselor who monitors student progress

- The introduction of a new educational approach with more active teaching methods, more working in groups, regular formative tests and partial exams.

In the table below all the measures are summed up

Table 4 The new educational model of the Open Universiteit

Factors influencing study success	Actions/measures
Intake	Intake with a student counselor Strict entry requirements comparable to other universities Design of a study plan Information about the level of the study and the amount of study time necessary
Organization	Introduction of an academic year Courses with fixed course schedules Exams at pre-arranged times No automatic renewal of registration No additional exams Deadlines within the course Active monitoring of the students
Didactic Approach	Online learning Active learning Assignments and feedback Study load more in accordance with credits
Social and academic integration	More contact with lecturers Introductory meetings and f2f-meetings Virtual classrooms More group work

The task force presented the new model in May 2013 and an institutional project was set up to transform all the master programs. The aim of the project was to train the staff, to transform the administrative procedures and to develop new programs in accordance with the new guidelines. In September 2014 the first master students started studying in the new model. In September 2016 the first degrees were awarded.

4. The evaluation research

With the introduction of the new educational model in the master program a parallel evaluation program was set up (Schlusmans, van den Munckhof & Nielissen, 2016; Münstermann, Giesbertz & Schoevaart, 2016; Giesbertz, Münstermann & Schoevaart, 2016), . The main questions of the evaluation were:

- How many students will enroll for the new programs?
- Does the new model lead to more study success on the course level and on the program level?
- Are students satisfied with the new model and what can be improved?
- Is the staff satisfied with the new model and what can be improved?

The evaluation research was conducted as follows:

- Every six months all the student registrations and results in the new model were analyzed.
- A field test was organized for each course in the new educational model. This means that students were asked to report each week on the study load and they received a comprehensive questionnaire at the end of the course.
- In June 2015 and in March 2016, all students studying courses from the new master were sent a questionnaire which asked how satisfied they were with the new program and how they perceived the workload and the program level. We also asked students to identify two positive and two negative points of the program.
- At the end of 2014 and in June 2016 focus groups were organized for the staff
- In July 2016 59 students of the new master program were interviewed. The emphasis in the interviews was 'How can we improve the programs?'

The new administrative procedures in the new model are very different from the old procedures. So it was difficult to really compare the old and the new groups of students. For the different results we tried to define a reference group for the old system. The reference groups were constructed as follows.

- Reference for study success on program level: students who registered in July-October 2013 for master courses and who did comply with the entry requirements in the new model.
- Reference for study success on course level: all master courses in the old model.
- Reference for student satisfaction: The student survey 2015 for students in the old master program and the National Student Survey 2016.

5. The first results

5.1 Student registration

In the table below the number of new students in the master program is presented. Students can start twice a year in September and in February. As a reference group we took the number of students who started in the master program in 2013 (Open Universiteit, 2016). The comparison is not completely fair as the entry requirements are not exactly the same.

Table 5 Number of new students

	sep/14	feb/15	sep/15	feb/16	Reference group (the whole of 2013)
Management Science and Technology	91	191	244	313	197
Psychology and Education	11	20	66	43	192
Cultural Sciences and Law	18	20	108	92	117

The number of students increases gradually. Especially in the faculty of Management, Science and Technology the numbers are really up. In the faculty of Psychology and Education the increase is much more slowly

5.2 Study succes

Study success on program level is measured by the number of credits a student earns in a year. The number of credits the students earned on average was calculated for each cohort separately. We also looked at a comparable group of students in the old model. Results are only reported when the student group was more than 8, the number of students is mentioned in brackets.

Table 6 Number of EC per year in the new and in the old programs

	Cohort September 2014	Cohort February 2014	Reference group 2013
Management Science	20,9 ec/y (n=52)	24,1 ec/y (n=124)	13,9 ec/y
Management and IT	19 ec/y (n=29)	20,6 ec/y (n=42)	9,8 ec/y
Law	19,9 ec/y (n=18)	19,5 ec/y (n=16)	15,2 ec/y
Educational Sciences	-	13,9 ec/y (n=15)	10,2 ec/y
Software Engineering	-	16,8 ec/y (n=18)	Was not offered in 2013

Compared to the reference group we see a considerable increase in number of credits per year in all the programs.

Study success on course level is measured by the percentage of students who get a course certificate within a year. As a reference group we looked at all the master courses per program in 2013 and calculated the average percentage of students who got a course certificate within a year. In brackets the number of course registrations the percentages are based on; We only report the results for those programs with more than 50 course registrations. At the course level a similar effect to the program level can be reported. The exception is cultural sciences, here we notice a slight decrease which can be partially explained by the fact that cultural sciences already offered a structured approach in 2013 for its master courses and already got a high percentage in 2013.

Table 7 Percentage of certificates within a year in the new and in the old courses

	Percentage 2015	Percentage reference group 2013
Management and IT	86% (304)	42% (274)
Cultural Sciences	65% (88)	75% (88)
Management	85% (870)	20% (346)
Educational	67% (169)	52% (456)

Sciences		
Psychology	70% (117)	50% (1082)
Law	75% (211)	49% (523)
Software Engineering	70% (196)	58% (230)

5.3 Student satisfaction

We asked the students to give an overall score for the program. In our student survey the same question was asked for the old program (Schlusmans & van den Munckhof, 2016). Programs with less than eight respondents are not included.

Table 8 Overall scores for the new and for the old programs

	New program	Old program
Management and IT	7.7	-
Cultural sciences	8.2	-
Management	7.7	7.5
Educational Sciences	7.5	7.6
Psychology	7.6	7.7
Law	7.7	7.5
Software Engineering	8.1	-

The average grade for the new programs is just over 7.5. There are some minor changes between the overall scores but they are not significant. In general students are still very positive about the new programs.

We also asked the students to rate various aspects of the program on a five point scale. These figures are shown in the table below.

Table 9 Satisfaction with different aspects of the program. In brackets the results for the old programs

	N	Content	Coherence	Up to date	Guidance and support	Combination work/study	Level
Management and IT	50	4.1	4.1	4	3.7	3.6	4.0
Cultural Sciences	28	4.5	4.1	3.6	4.0	3.4	4.3
Management	106 (40)	4.2 (4.1)	4.1 (4.0)	4.0 (3.8)	3.7 (3.4)	3.5 (3.4)	4.1
Educational Sciences	39 (48)	4.2 (4.2)	3.7 (3.9)	4.1 (4.0)	3.3 (3.6)	3.5 (3.6)	4.2
Psychology	22 (18)	4.3 (4.1)	4.0 (3.9)	4.0 (3.2)	3.8 (3.6)	3.7 (3.9)	4.2
Law	31 (17)	4.2 (4.1)	3.8 (3.6)	3.9 (3.5)	3.7 (2.9)	3.2 (3.9)	4.2

Software Engineering	20	4.4	4.2	4.0	4.2	3.7	4.3
OUNL total	312	4.2	4.0	4.0	3.7	3.5	4.1

In general, students are very satisfied with the content and level of the new programs. The students are least satisfied with the extent in which the study can be combined with other activities. In the law program we see a large decrease in the satisfaction in this regard. This could be explained by the fact that in the Law program there are a lot of parallel courses and parallel courses lead to an increase in the workload students experience.

The scores for guidance and support present a mixed picture. In most programs we notice an increase in satisfaction.

Students were also asked whether they would recommend the program to others. A large majority of students would recommend the program to others, only two students say 'definitely not' and four 'I do not think so'. Compared with the National Student survey (2016) the group of students who say that they would certainly recommend the study to others is somewhat lower.

The same picture emerges from the field tests of the courses. Students are generally satisfied with the courses in the new master, in particular the content, the tutor support, the testing and the materials score high. Although 60% of the students appear to appreciate the new structure with the tight schedule and say that they need deadlines and a tight schedule to get ahead, 15% of the students regret the introduction of deadlines and the reduction of freedom. For them it is more difficult to combine the study with other activities and a week's holiday or peak periods at work lead to delays. Those students also indicate that the new system is too rigid for adult education.

As far as planning is concerned attention should be paid to the parallel programming of courses. Students who study parallel courses complain about a heavy workload.

Another issue which is mentioned very often is the f2f-meetings. Students expect added value from those meetings and that is not always the case. In quite a lot of the course evaluations more than 20% of students indicated explicitly that they are dissatisfied with the quality of the f2f-meetings. The same goes for the virtual meetings where there are course evaluations where 25% of students say that they are dissatisfied with the quality and the added value of the virtual meetings. The open questions also show that there regularly are technical problems with the virtual meetings.

In the survey and in the interviews the following positive and negative points of the new programs came up:

Positive points of the new model:

- Ability to study independently (76)
- There is still enough flexibility (73)
- Quality of the content (65)
- The structure of the program with deadlines (64)

- Quality of the courses (54)
- Quality of the contact with tutors (47)
- Opportunity to study online (47)

Quite a lot of students were still very positive about the fact that it is possible to combine study and work. They felt that the new programs still had enough flexibility and that the structure with deadlines was helpful to them. They were also very positive about the content of the program and the quality of the courses. They especially liked the fact that they had more contact with the staff.

Negative points of the new model

- Organization (84)
- Too many online materials (65)
- Loss of flexibility (54)
- Quality and added value of f2f- and virtual meetings (39)
- Quality of the feedback (33)

Especially students who had previously got a bachelor degree in the old model regret the organization with much more restrictions and a reduction of freedom. Although they admit that deadlines help their progress, they feel that it is much more difficult to cope with unexpected events such as deadlines at work or a casualty in the family. They also regret that there are no activities in the summer holiday as for some students this is their preferred period for study. Students do not like parallel courses as often deadlines and peak periods come together.

Quite a lot of students complain about the fact that materials are only delivered online. They would prefer to have printed copies of readers and longer reading texts.

Negative comments about the virtual classroom were mainly about technical problems. In general students like the fact that they do not have to travel for a virtual classroom. They like f2f-meetings if they have added value but very often this is not the case. As students have to travel they really want to get something out of these meetings. Students also complain that the feedback they get on the assignments is sometimes very scanty and limited.

5.4 Staff satisfaction

In the autumn 2014 and in the spring 2016 we organized focus groups with the staff: lecturers and study counselors. In general the staff was initially very skeptical about the new model. They felt that the reduction of freedom affects the core business of the Open Universiteit. However in the last focus groups most members of the staff were pleasantly surprised by the new system. They appreciated that they had more contact with their students, they were happy with the fact that much more students finished their courses and they also got some very positive feedback from the students. Nevertheless they also mentioned that the workload had increased and that the tools they have to monitor students' progress are not sufficient. (Münstermann, Giesbertz & Schoevaart, 2016; Giesbertz, Münstermann & Schoevaart, 2016)

6. Conclusion

Although the numbers are still fairly small for some programs, we feel confident to say that it looks as if the new programs are successful. The students earn on average more credits per year than the reference groups and the percentage of course certificates in a year has increased considerably.

Student satisfaction was always very high at the Open University and in the new system it has not increased significantly but there was certainly no decrease in student satisfaction. The students like the programs and most of them like online teaching and more contact with their tutors. Also the staff who was initially quite skeptical is now more and more satisfied with the new ways of teaching.

However there is still scope for improvement. Students are critical about the quality and the added value of the f2f-meetings and in some cases of the virtual classrooms. This will be a major concern in the training of the staff in the near future. The technical problems with the virtual classroom will hopefully be a thing of the past as we have introduced a new system in September 2016. Parallel programming of courses will have to be looked into so that the work load of the students does not become too high. Tutors and study counselors need better tools to monitor their students' progress. Steps have been taken in this regard but this also remains a basic concern. Up till September 2016 students could still study in the old master programs. From this academic year onwards all students will have to study in the new programs. In the evaluation study we will continue to closely monitor the results.

The board of the Open Universiteit has decided that the new system will also be introduced in the bachelor programs. In the new bachelor programs there are minor adaptations. There is more flexibility than in the master program, not all courses have got fixed schedules and the bachelor program has got no entry requirements for the students. In 2016 all the bachelor programs have been redesigned according to the new model and in September 2016 the first students will start in the new bachelor programs. As most bachelor programs have much more students than the master programs, the huge challenge is going to be to offer active online teaching for large groups of students.

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Inspiring excellence in teaching: the Higher Education Academy approach

Professor Stephanie Marshall

Chief Executive Officer, Higher Education Academy, United Kingdom

www.heacademy.ac.uk

Stephanie.Marshall@heacademy.ac.uk

Abstract

Initiatives like the UK Teaching Excellence Framework are ensuring that the Higher Education sector has the preconditions in place to deliver excellent teaching. The five components of teaching excellence are:

1. Having professionally qualified staff, who are engaged in continuous professional development
2. Having a clear sense of what students say 'works' with respect to learning gain, and their experiences
3. Peer-to-peer learning approaches
4. Strategic leadership for teaching and learning, and a corporate approach to student success
5. Continuous curriculum development

This presentation describes the services and resources the Higher Education Academy has developed to support each of these components and inspire excellent teaching to drive student success. This includes:

1. Our Professional Standards Framework (the UKPSF), which underpins our work by providing a framework to benchmark success within HE teaching and learning. Our Fellowship scheme recognises achievement for individuals against this framework, and applies to all staff involved in teaching and learning, from support staff to Vice Chancellors.
2. A suite of surveys that enable universities to understand student experience and engagement, allowing universities to develop a continuous improvement cycle based upon student feedback
3. Research into mapping peer-led academic learning in the UK, informed by a sector wide survey, with guidelines on implementing peer learning for universities
4. Development opportunities for senior leadership teams, including our Executive Development Programme and Certificate in Leading Transformation in Teaching and Learning
5. Six frameworks covering the core areas of curriculum development, including transforming assessment and flexible learning.

Keywords: Empowering universities for excellence in higher education, improving the quality of higher education

1. Introduction

The importance of teaching and learning in Higher Education continues to grow, as the satisfaction of students with teaching becomes ever more visible through student surveys and league tables published globally. In the United Kingdom, the government is establishing a Teaching Excellence Framework which aims to monitor and assess the quality of teaching in universities and link tuition fee rises to performance

against the framework. This initiative aims to put the importance of teaching on a similar level to that of research, which has been assessed in the UK in some form since 1986.

The Higher Education Academy (HEA) is an international, not-for-profit organisation that aims to enhance teaching quality and drive up teaching excellence in Higher Education. The HEA was formed in 2003 and has developed a suite of services and resources to help Higher Education Institutions improve their teaching to deliver student success, as evidenced in impact studies conducted for the organisation. This paper describes and provides case studies that demonstrate the HEA approach to addressing the five components of teaching excellence:

1. Having professionally qualified staff, who are engaged in continuous professional development
2. Having a clear sense of what students say 'works' with respect to learning gain, and their experiences
3. Peer-to-peer learning approaches
4. Strategic leadership for teaching and learning, and a corporate approach to student success
5. Continuous curriculum development

2. Professionally qualified staff in Higher Education

Excellent teaching is an essential ingredient in the creation of an outstanding student learning experience. An OECD report *Fostering Quality Teaching in Higher Education: Policies and Practices* (2012) states 'There is evidence that participation and engagement in professional development activities are related to the quality of student learning.' (Hénard and Roseveare, 2012, p17)

In his report *Dimensions of Quality* for the HEA, Professor Graham Gibbs (2010) noted that, "Teachers who have teaching qualifications (normally a Postgraduate Certificate in Higher Education, or something similar) have been found to be rated more highly by their students than teachers who have no such qualification" and that a multi-country longitudinal study showed, "improvements on every scale of the 'Student Evaluation of Educational Quality'... and improvements in the sophistication of teachers' thinking."

The HEA supports the achievement of teaching qualifications and the ongoing professional development of academic staff through delivery and accreditation of programmes that align to the UKPSF (a globally recognised framework for teachers in Higher Education which the HEA is custodian of), and accrue HEA Fellowship. The aims of HEA Fellowship are:

1. to support initial and Continuing Professional Development (CPD) of staff engaged in teaching and supporting learning;
2. to encourage use of creative and innovative approaches to teaching and learning;
3. to demonstrate professionalism;
4. to acknowledge and celebrate the variety and quality of teaching (in disciplinary contexts);
5. to facilitate formal recognition for quality enhanced approaches to teaching.

The UKPSF itself describes the professional role of teaching and supporting learning in higher education (HE), categorises the teaching roles of academics in ‘dimensions’ (areas of activity, core knowledge and professional values) and uses four broad descriptors (four categories of fellowship).

Despite its name, the UKPSF is not a prescribed competency model and no absolute standards are specified. The framework was developed by academics in the sector and takes the practitioner perspective which focuses on enhancing the student learning experience. The levels of Fellowship which align to the UKPSF are:

- Associate Fellow - for those new to teaching or supporting student learning, wanting to formalise their experience
- Fellow - for those with a proven, sustained track record in HE teaching
- Senior Fellow - for those with an established record relating to teaching and learning and management/leadership of specific aspects of teaching provision
- Principal Fellow - for those with a sustained track record of strategic impact at institutional, national or international level, committed to wider strategic leadership in teaching.

Staff can become ‘Fellows of the HEA’ through a direct application submitted online or through undertaking an accredited programme or CPD-scheme. Institutions appreciate the flexibility of the UKPSF as they can align their own schemes to the needs of their institution, as well as the framework, and have their own scheme accredited by the HEA. In many cases, institutions apply to accredit their face-to-face programmes, such as their Postgraduate Certificate in Academic Practice. There has also been an increase in the use of a blended approach to providing innovative support for mentors and coaches based at a distance.

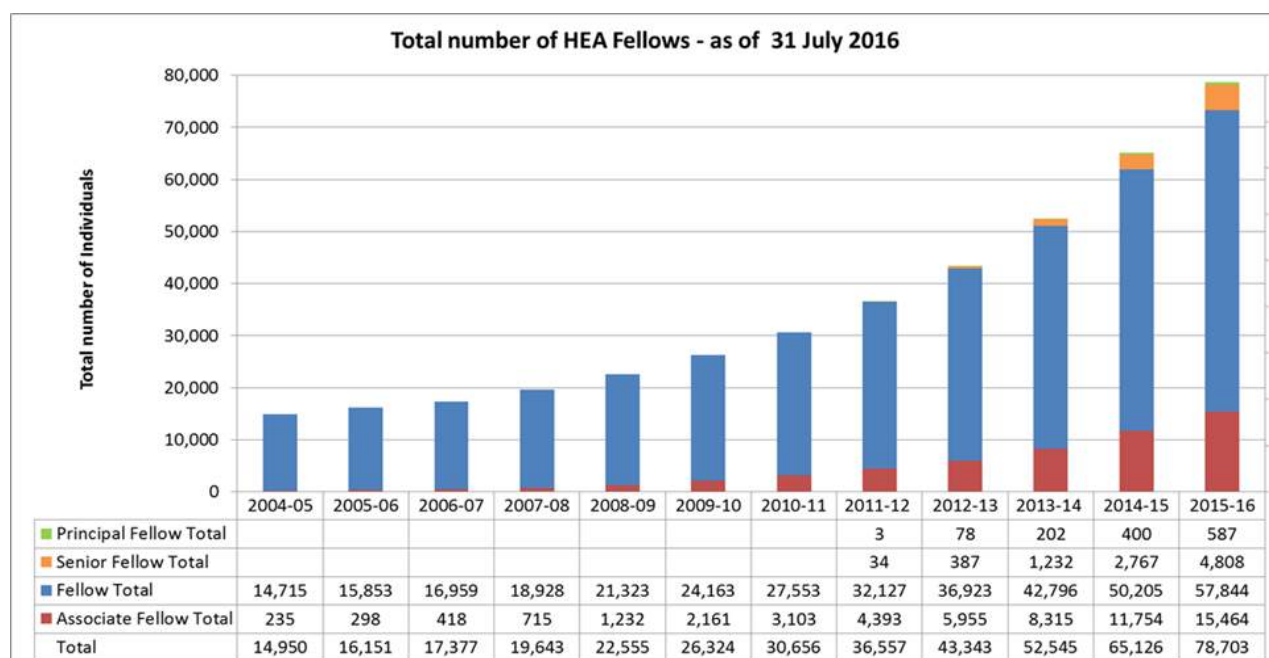


Figure 1: Total number of Fellows of the Higher Education Academy as of 31 July 2016

- As of 31 July 2016, over 78,000 colleagues have gained recognition against the framework, including over 25% of academics in the UK. Approximately 2,000 staff outside of the UK have achieved Fellowship, including colleagues in Australia, Bahrain, China, New Zealand, Saudi Arabia and USA, and accredited programmes are now being delivered or developed in Australia, Bahrain, China, Saudi Arabia, Thailand and USA.

3. Understanding student needs

Engaging with students as partners in learning, rather than as recipients or customers, correlates with positive learning outcomes and experiences (Healey, Flint and Harrington, 2014). Indeed, the Higher Education Academy consults with students directly to understand their views on a range of topics relating to teaching; for example, a 2014 study commissioned by the HEA explored students' views on the use of Open Educational Resources (OER), demonstrating that a majority were aware of OERs in their courses and were positive about their use in teaching (NUS and NUS Services, 2014).

Student surveys provide one vital method that institutions can use to engage with students and understand their needs. The HEA offers support for institutions analysing and interpreting their student survey results, and also a number of distinctive online survey tools:

- Postgraduate Taught Experience Survey (PTES) - Focussing on the experience of students on taught postgraduate programmes, such as MA, MSc or MBA programmes
- Postgraduate Research Experience Survey (PRES) - Focussing on the experience of research students, such as those studying for PhD, MPhil or MRes awards
- United Kingdom Engagement Survey (UKES) - The only undergraduate survey in the UK focussing specifically on student engagement, providing vital information to enhance student teaching and learning
- HEA-HEPI Student Academic Experience Survey (SAES) - Provides valuable insight into the nature of how full-time undergraduates rate their time in higher education and their attitudes towards relevant policy issues.

The HEA surveys offer the ability for institutions to benchmark their results against national and international comparators and provide a wealth of information to support improvements in teaching and inform institutional policy development. The PTES survey, for example, has over seven years of benchmarking data available and is undertaken annually by over 100 institutions in the UK.

The surveys have also been used by the HEA to analyse sector-wide issues. For example, data from the UKES survey was recently used as part of an HEA commissioned study into student engagement with Massive Open Online Courses (MOOCs). The study found that MOOCs can be effective in enabling personal development, higher-order learning, reflective and integrative learning and engaging with current research (Wintrup, Wakefield & Davis, 2015). The report found that collaboration and interaction between users of MOOCs was limited, however, and that learning was more dependent on the individual student than with face-to-face courses, and suggests a number of implications for practice. These included putting in measures to understand which parts of the course were engaging, and creating more opportunities for self-directed and open-ended learning.

Following the success of their use in the UK, the PTES and PRES surveys are now being offered to an international audience; from 2017 both surveys will be offered online through the iGraduate platform, allowing universities across the world to conduct the surveys in their own language and benchmark their results against national or customised peer groups, delivering important insights about students' views to drive institutional improvement.

4. Peer-led academic learning

A variety of definitions exist for peer-led learning, but typically these involve students providing support for other students on the same course, working across different years, and learning from each other in collaboration, rather than in competition (Keenan, 2014). The Higher Education Academy commissioned a survey in 2014 to explore the peer-led learning programmes in the UK, and also gathered information about provision and practice in the US, Canada, Australia, New Zealand, South Africa and Europe.

The survey clearly demonstrated that there were significant benefits of peer assisted learning schemes for students and institutions. These included:

- Benefits for the peer-leaders who improve their subject learning, personal and professional skills
- Benefits for students that participate in peer-led learning sessions, including reduced anxiety with transition into higher education, a greater sense of belonging and improved confidence in their academic work
- Improvements in progress, retention, employability and satisfaction data for institutions running peer-led learning programmes

A number of challenges were reported with running the schemes, most notably in gaining strategic support for them and in negotiating timetabling and administrative issues. However, the results of the survey were broadly supportive of peer-led learning schemes, and the survey report recommends their wider rollout at an institutional and national level (Keenan, 2014). Most recently, online approaches to peer-assisted learning have gained momentum.

5. Senior leadership development

The breadth of the challenges facing leaders in higher education has grown substantially in recent years, with the prevalence of key performance indicators used to measure success, and the pressure to demonstrate their improvement. It can therefore be difficult for higher education institutions to recruit and develop suitable leaders, particularly as leadership roles - such as Vice-President (Teaching and Learning) or similar - are not those which many academics aspire to (Marshall, 2016). Yet these roles are crucial to the success of students.

In order to support and develop higher education leaders and their institutions, the Higher Education Academy has developed a professional learning curve (figure 2) which reflects the characteristics and needs of those who teach and support learning. There are eight stages, each of which is designed to address the needs at different points in a person's academic career. The highest points of the curve are for those in senior leadership positions within higher education institutions.



Figure 2: The Higher Education Academy Professional Learning Curve

The Higher Education Academy offers a range of courses, events and development opportunities for the different levels of the learning curve. For example, the following programmes are offered for senior leaders:

- **Deans' Development Programme:** A six-month programme that offers support to Deans, Associate Deans and those aspiring to Dean level in the transition into their first cross-faculty leadership role.
- **Executive Development Programme:** A year-long vibrant and transformative programme for aspiring and new PVCs of learning, teaching and the student academic experience who wish to enhance their leadership capacity and consolidate their understanding of the dynamic HE landscape.
- **Global Insights Programme:** In partnership with Ranmore, we have created a new series of Global Insights experiences which focuses on three distinct dimensions of global engagement and its relationship to learning excellence and research. The programme provides the opportunity to explore three very different geographic regions: Australia, Ireland and the USA. Each event will provide complementary insights into HE policy and practice as well as being case studies of how leaders and leadership teams are responding to the evolving external context, locally and globally.

In addition to these programmes, the HEA provides coaching programmes over a six month period for senior executives responsible for the learning and teaching agenda. Our Pro-Vice-Chancellors, Vice-Chancellors and Deputy-Vice-Chancellors Network (PVC Network) also provides a unique forum for attendees to share successful strategies for enhancing HE teaching and learning. The network meets twice a year, and we also run three PVC working groups on specific topics relevant to leadership in teaching.

Our reputation for supporting leadership in higher education in the UK has led to the development of similar programmes across the world. For example, the HEA has recently developed materials for a Professional Certificate in the Leadership of Teaching and Learning at the University of Hong Kong (HKU), delivered using a blended approach. This includes a range of resources, including podcasts and research articles, that participants can use to support their learning, with three face-to-face workshops exploring key leadership themes identified by HKU as priority areas for their development. The programme is aligned to the UKPSF and participants will be well placed to apply for Senior or Principal Fellowship of the HEA following completion.

6. Curriculum development

Designing and developing the curriculum is essential for student learning outcomes and satisfaction. Pegg (2014) undertook a detailed research study into curriculum reform with three universities, including a large Australian university with substantial online provision. The study reveals several key ingredients in the success of curriculum change initiatives:

- Having a clear and consistent vision shared amongst participants
- Full engagement of staff and students in design and implementation
- Implementing both short-term and long term staff development programmes

Several universities have used students as consultants in developing their curriculum, either at a small scale or institutional wide level, with the experience described by some as transformational, deepening the learning experience for students and improving faculty development (Healey, Flint and Harrington, 2014).

However, undertaking curriculum change at a University level is a daunting task that has many pitfalls and challenges. As Pegg (2014) notes, it is often difficult to accurately estimate the resource it requires; even if an accurate estimate is achieved, the scale of the task is likely to lead to strategic inertia. Additionally, evaluation of curriculum change initiatives is challenging and many universities start the process without defining an evaluation model, and therefore find it difficult to demonstrate impact.

The HEA has also undertaken practical research into developing the curriculum for specific disciplines. For example, Lewis (2014) reviewed the impact of using virtual tools for teaching in laboratories in the Biological Sciences. The study found major benefits of using the tools, such as making the learning active and enquiry based, allowing students to study at their own pace, and reducing the cost of laboratory teaching. It also recognised that there are some limitations with these methods, including a lack of hands-on experience of specific techniques and of health, safety and ethical issues.

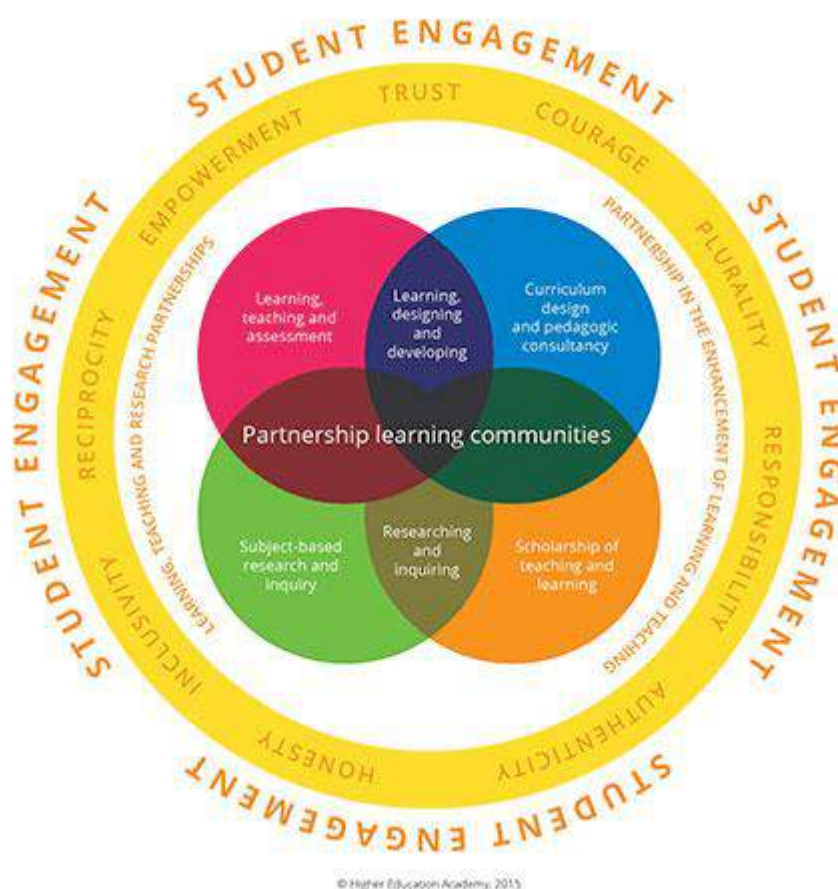


Figure 3: Student Engagement Through Partnership Framework

In order to help institutions improve their curriculum, the HEA offers consultancy and change programmes to help universities manage the change process. The HEA also offers a Framework for Student Engagement Through Partnership (Figure 3), based upon our research in this area. The Framework explores six areas where institutions can work in partnership with students - including curriculum development - and the HEA can help institutions by auditing against the framework, providing support for delivering improvements, and by evaluating the impact of any interventions.

7. Conclusion

The importance of teaching and learning in Higher Education continues to increase internationally. The Higher Education Academy has a range of offerings - from fellowships and consultancy to frameworks and research - that help staff, institutions and governments improve teaching at a local, institutional and national level. The work of the HEA is applicable to a range of providers and has been used by small teaching-focussed universities to large research intensive institutions, and equally by those focussed on online, blended or distance learning, along with traditional, face-to-face taught courses. As a charitable organisation that has worked directly with the sector and for the sector for over twelve years, we are ideally placed to help inspire teaching excellence to ensure excellent student outcomes.

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Improving the Quality and Relevance of Vocational Teacher Education in Finland

Maija Kärnä

Tampere University of Applied Sciences, Finland
maija.karna@tamk.fi

Päivi Lehtonen

Tampere University of Applied Sciences, Finland
paivi.lehtonen@tamk.fi

Abstract

One of the main aims set by the Government of Finland in 2015 for educational development is the modernization and digitalization of learning environments and the exploitation of the affordances of new pedagogies in learning. At the same time half of Finnish teachers estimate their pedagogical skills in digital learning moderate or even poor.

To improve the relevance and quality of vocational teacher education the School of Vocational Teacher Education at Tampere University of Applied Sciences has launched a development and research project on mobile learning. The aim is to study how updating the learning environment with mobile learning tools affects the formation of teacher identity of 21 teacher students with earlier teaching experience from nil up to 13 years. Stories of what kind of mobile teachers the students see themselves were collected before the studies commenced. The qualitative data was analysed by two researchers using Beijaard, Meijer and Verloop's (2004) framework as the lens for analysis. A second story will be collected at the end of the training.

Representations of the four features of the analysis framework could be identified in the data. Students' processes of teacher identity formation were at different stages, and role models in childhood, like teachers, played an important role in the ongoing process. Sub-identities representing students' former professions and that of an educator could be identified. Mobility as part of teacher identity presented itself at this point rather vaguely, in many cases as a tool for achieving different goals.

Key words: quality of higher education, teacher education, mobile learning

1. Introduction

Along with the worldwide proliferation of the use of internet and social media in education the Finnish educational system and the used learning environments have been put under rigorous scrutiny both at national and institutional level. A governmentally led reform-operation has started at all educational levels focusing among other things on digitalization of education. These reforms challenge also teacher education. While digitalization of learning is becoming a pivotal element of the new learning environments teachers aged 40 to 65 years, who are the biggest age-group of teachers in vocational education in Finland, find the use of computers challenging. Additionally, they also seem to lack of pedagogical skills and models for the use of the e-learning tools which leads to infrequent use of computers in class especially in the context of vocational training. (European Commission, 2013.)

The challenges caused by the continuing shift of education paradigms towards online learning, hybrid learning and collaborative models on one hand and the insufficient pedagogical skills of the majority of the academic staff in vocational training to implement these changes on the other hand have been met by the Tampere University of Applied Sciences School of Vocational Teacher Education (TAOK) by launching a research and pedagogical development project in 2013. TAOK offers training for future professionals mainly in vocational and higher education institutions which have lately been faced with severe cuts in funding and at the same time with the need to reform and update their pedagogical approaches.

After the first research and development cycle in 2013-2014 a new learning environment integrating the parallel use of learning platform Moodle and various asynchronous and synchronous social media tools was launched. The current research is a continuation of the above project with the aim of integrating the use of mobile tools into the active learning environment of teacher students. The project focuses on a cohort of 23 vocational teacher students giving them a hands-on experience of the use of different mobile learning tools and their applicability in teaching and learning.

While teacher identity formation and teacher identity as such is an area that has been widely studied, research on teacher identity at vocational and higher educational context, and especially online and mobile teacher identity, has been elusive (Richardson & Alsup, 2015; Simon 2012, 23; Baran 2014). In recent years the growing research interest in mobile learning has focused mainly on understanding the enablers and barriers in the adoption of mobile learning technology by university students (Hashim, Tan & Rashid, 2015). Research on the influence of mobile technology on teachers' professional identity is an area which needs studying. This paper reports the results of the initial study phase at TAOK with the overall aim to study how updating the learning environment with mobile learning tools affects the formation of teacher student identity formation with earlier teaching experience from nil up to 13 years. At this study phase the interest lies mainly on identifying the main features and form of teacher identity among the cohort before the studies have commenced. Special attention is paid on how mobile learning manifests itself in their current perceptions of their professional identity. The findings will be used to support the development project of learning environment of teacher students at TAOK.

2. The complexity of online vocational teacher students' identity formation

2.1 Reforms in Finnish vocational upper secondary and university level education

To understand the context of this article it is necessary to describe shortly the system of vocational education in secondary, higher and adult educational contexts in Finland. After primary education approximately 40 percent of students continue to vocational upper secondary education. The initial vocational education can be completed in three years –long educational programmes at vocational schools or by apprenticeship training. Further vocational qualification training and specialist vocational qualification training can be taken after a few years in working life. Vocational adult education is provided in Finland by a variety of institutions ranging from vocational institutions and vocational adult training centres, national and private vocational institutions, liberal adult education centres to universities of applied sciences. (Vocational education and training in Finland.) At universities of applied sciences learning outcomes are defined based on competences and learning is implemented in learning environments combining theoretical and practical learning through learning projects and other forms of cooperation with working life (Studies and degrees, 2016).

The whole Finnish educational system is currently undergoing a thorough reform from primary school to higher education. Both the pedagogical basis of education and the contents are under reconstruction. At university level the reform has pushed forward at an accelerated speed integration of online and mobile learning as well as tighter cooperation with working life into the learning environments. For the vocational upper secondary education and training, the reform brings by 2018 more efficient integration of digital learning into learning environments as well as competence-based learning in on-the-job learning environments. (Key projects reform Finnish education, 2016; Prime minister's office, 2016.)

For vocational teachers at different levels and types of vocational education these reforms create a need for new skills and knowledge as well as adaptation to the reconstructed, often digitalized, learning environments. Teachers at universities of applied sciences and vocational institutions in Finland are traditionally pedagogically relatively competent as they have been required to complete vocational teacher education (60 ECTS credits) which is organized in Finland by five Schools of Vocational Teacher Education in affiliation with universities of applied sciences. Today, there is no legal obligation for teachers at universities of applied sciences to have pedagogical education, however, in practice, all universities of applied sciences require their academic staff to have completed it. For teachers working at vocational upper secondary level institutions the legal obligation of pedagogical training still stands. Both at universities of applied sciences and at vocational upper secondary education and training teachers are expected to have a university degree in the subject of teaching and three years of working experience. However, in some cases, at vocational secondary education the university degree can be compensated by a long and deserving career in the profession to be taught. (Ammatilliset opettajat, 2016; Ammattikorkeakoulujen opetushenkilöstö, 2016.)

2.2 Online teacher identity

Although development of identity has been recognized as a salient factor in teacher development (Beauchamp & Thomas, 2009; Malderez, Hobson, Tracey & Kerr, 2007; Korthagen, 2004) and has lately been at the focus of increasing research interest (Vähäsantanen, 2008), it has proved to be difficult to find a shared understanding and to write an unambiguous definition for the concept of teachers' professional identity (Beijaard, Meijer & Verloop, 2004). Generally, professional identity can be seen as a combination of teachers' perceptions of how they see themselves as teachers. Teacher identity represents teacher's beliefs and opinions concerning the idea of "good teaching", and it is closely related to professional values, beliefs, ideologies, interests, responsibilities and attitudes. (Beijaard et al., 2004; Vähäsantanen, 2013).

The definition of teacher identity is further complicated when we consider teacher identity in the context of online and mobile teaching and learning. Palloff & Pratt (1999) note that online teaching is significantly different from face-to-face teaching. An online teacher is faced with new types of challenges and expectations. (Palloff & Pratt, 1999, pp.22-26.) While teachers before the beginning of teaching might expect to be able to be themselves online, they soon notice that an online environment requires a different type of teacher than face-to-face learning environments (Williams, 2012; Richardson & Alsup, 2015). For example, the idea of joyful teaching might need redefinition in online settings. While the joy of teaching is often based on interaction in face-to-face –teaching, online it might be connected to written discourse or to the possibility of closely following the evolution of student thinking. (Richardson & Alsup, 2015.) Thus, teacher's sense of teacher self can be seen specific to the online context and not as an extension of the teacher self in a traditional setting.

Becoming an effective online teacher demands re-thinking the existing beliefs and ideas related to face-to-face teaching. (Richardson and Alsup, 2015.) These beliefs might need further reconsideration when mobile learning is introduced into the learning environment. Authenticity, collaboration and personalisation which characterise the pedagogy of mobile learning require yet another type of approach to learning from a teacher. (Kearney, Schuck, Burden & Aubusson, 2012.) Thus, an online or mobile teacher might have to unravel his or her existing teacher identity and rebuild it. Such reconstruction work is important as teacher's identity influences the way a teacher implements online teaching, and reciprocally, the affordances of online tools may influence the pedagogical decisions made by a teacher and his or her development of teacher's identity (Richardson & Alsup, 2015; Henderson & Bradey, 2008). For example, the intuitively easy to use nature of mobile devices enable teachers to construct their skills together with students in a way that is playful and experiential and free from linearity (Beauchamp, Burden and Abbinett 2015).

Orientation for work is typically a basis from which teachers derive their perceptions on their professional identity. Teachers tend to see themselves as experts of either subject matter, pedagogy or didactics. Teacher's professional identity can be formed through different combinations of the above while one type of orientation can dominate over the others, or the orientations can be in balance. (Beijaard, Verloop & Vermunt, 2000.) Teachers with a strong subject orientation see their authority to be based on a good command of the subject matter. They underline the necessity to keep up with the development of their profession. Teachers with didactic orientation base their teaching on a careful planning, execution and assessment of teaching and learning processes. For them it is important organize teaching in accordance with the level of students. They like to make learning interesting through variations of teaching methods. Pedagogically oriented teachers want to approach their students in a respectful, positive and open manner. They focus on creating an open, relaxed and safe atmosphere for learning. Teaching and learning is student-centred, and the welfare of students is the most important thing in their approach. According to the findings of Beijaard et al. (2000) subject orientation tends to be emphasised at the beginning of teachers' careers. During further career development a significant shift towards didactic and pedagogic orientation takes place in teachers' orientation perceptions.

Another relevant topic in the research of teacher identities have been the typical features identified. They have been widely discussed in research, and different views of the most important elements have been presented depending on the chosen approach. In their review of 22 research articles on teacher identity Beijaard et al. (2004) resulted in identifying four essential features of teachers' professional identity. Firstly, teacher identity development is an *ongoing process*, identity is not fixed or stable (Beijaard et al., 2004; Day et al., 2006). It can be seen as a dynamic, and continuously changing learning trajectory intertwining together the past and the future (Wenger, 1998). Identity comprises of continuous interpretation and re-interpretation of experiences (Kerby, 1998, p. 7). In other words, identity development answers not only to the question "Who am I (professionally) today" but has a strong perspective towards the future by asking further: "Who do I want to become in the future?" (Beijaard et al., 2004).

Secondly, identity implies both *person and context*. Beijaard et al. (2004) note that teacher identity is not completely unique. Teacher identity is influenced by external factors (Beauchamp & Thomas, 2009) like expectations set for the teacher by teachers' professional community, students or students' parents concerning the way a teacher is expected to behave or what professional characteristics they should have. However, internal factors like personal characteristics, emotions, values and beliefs determine how an individual teacher adopts the external influences as part of his or her professional identity (Pillen, Beijaard & den Brok, 2013). Teacher's beliefs about teaching and learning shape the decisions that she or he makes concerning how things should be taught or which technological tools could and should be used in teaching. (Henderson & Bradey, 2008). Need for more intensive planning and strict time management required in online learning environments have been found as two elements that will need re-thinking from teachers concerning the way they teach (Richardson & Alsup, 2015). A significant discrepancy between the personal goals and aspirations of a teacher (ideal teacher self) and the expectations set by the environment as well as the responsibilities with regard to their work (ought-to teacher self) (Kubanyiova, 2009) may influence negatively on teacher's motivation, well-being and commitment to work (Day et al., 2006; Day & Kington, 2008).

To keep up teacher's efficacy and motivation, it is important to find ways to balance the internal and external expectations (Kubanyiova, 2009; Beijaard et al., 2004). In an online teaching and learning environment technology can provide teachers tools to satisfy both institutional needs as well as his or her own professional aspirations (Henderson & Bradey, 2008). Learning technology can provide new ways of organizing and timing teaching as well as guiding responsibilities over the net. In other words, technology can serve as a bridge between academic and professional identities. (Henderson & Bradey, 2008.)

Thirdly, teacher identity consists of several *sub-identities* reflecting the different contexts and relationships in which teachers act (Beijaard et al., 2004). According to Day, Kington, Stobart and Sammons (2005) identity is not a fixed unity, but can be more or less fragmented at different times and different phases in life and career or during changes in organization (Day, Kington, Stobart & Sammons, 2005). The highly organized online teaching structure may cause contradictions for teachers with an otherwise laidback manner of teaching. Further, the challenge caused by the lack of two-way verbal exchange requires an online teacher to rethink the organization of presence and new ways of communication in an online environment. (Richardson & Alsup, 2015.)

The expectations and beliefs connected to different sub-identities might not always meet. A disharmony between different sub-identities can lead to tensions (Pillen et al., 2013) in teacher identity. Therefore, it is important that there is a balance between the different sub-identities (Beijaard et al., 2004). In an online context the use of learning technology can act as a mediator and balancer between teachers' multiple sub-identities and their contradicting forms (Henderson and Bradley, 2008).

Lastly, by *agency* Beijaard et al. (2004) refer to teachers own activity as an important element in the process of developing professional identity. Changes in organisational environments, introduction of online learning, situational demands, and constraints may cause a need for changes in teachers' professional identity. Teacher's active agency in such situations may open avenues for professional development by making occupational choices based on teacher's own interests and motivations. (Vähäsantanen et al., 2008.) In an online learning environment personal agency and freedom to modify

online courses and control the existing activities is very important for the motivation and positive identity development of online teachers (Richardson & Alsup, 2015).

2.3 Learning to become a vocational teacher

Beijaard et al. (2004) argue that both social and individual aspects influence professional identity building. They continue to define identity formation as “a process of practical knowledge-building characterized by an ongoing integration of what is individually and collectively seen as relevant to teaching”. In the context of vocational teachers’ identity formation Fejes and Köpsén (2014) draw on the socio-cultural approach and on the ideas of Wenger (1998) and Lave and Wenger (1991) concerning the learning process of newcomers in becoming members in communities of practise. They define identity formation as a process of “acquiring the knowledge and competences needed to understand and carry out the common goals of the specific community of practise”. Vocational teachers move between different communities of practice representing their prior occupation and teacher profession. Through this process of participating in different communities across contexts an individual widens his or her professional and personal positions. Referring to Tanggaard (2007) Fejes and Köpsén name this process as “boundary crossing”. (Fejes & Köpsén, 2014.)

A student teacher’s biography including past experiences, role models, own school memories, has an important influence on the development of teacher identity (Beijaard et al., 2004). Teacher identity is further influenced by participation in teacher training (Izadinia 2013). According to Izadinia (2013) teacher students’ identity consists of three major elements: educational context including relationships with colleagues; learning communities including cognitive knowledge, confidence and teacher voice of the student; and prior experiences consisting of a sense of agency, self-awareness and critical consciousness. Teacher students often experience tensions between these areas while building their teacher identity. (Izadinia, 2013.) In the context of Finnish vocational teacher students, tensions are caused by the discrepancy between the long professional history and sometimes older age of some teacher students compares with their peers or even their teachers, and their new position as novice teacher students. These career change students need to reconcile between their expert and novice identities (Williams, 2013) through continuous negotiations to build their new identity balancing the contradicting positions of professional experts and novice teachers.

The reasons for starting teacher education and wanting to become a teacher can vary. One of the main reasons for career changers to become teachers and to participate in teacher education is the desire for personal and professional growth (Williams, 2016). Specifically, in the context of vocational education as other reasons for entering teacher education Fejes and Köpsén (2014) mention additionally health reasons or interest in pedagogy grown through experiences in acting as a supervisor in apprentice training. In some cases, pressure from the educational institution to gain official teacher education in order for a teacher to keep his or her job precedes a teacher student’s decision to participate in teacher education. (Fejes & Köpsén, 2014.)

Teacher training helps vocational teacher students to find their way and legitimise their participation into the community of teaching. They also learn how to transform their occupational knowledge and skills

effectively to fit into teaching. While strong experience from the prior occupation gives a vocational teacher credibility, a strong relationship with occupational communities of practice may also hinder the development of a teacher identity. On the other hand, membership in both teacher training community and occupational community seems to give teachers the best credibility and feeling of legitimacy as teachers. (Fejes & Köpsen, 2014.)

Recently there has been a growing interest in studying the methods of preparing teachers for using mobile learning. Schuck, Aubusson, Kearney and Burden (2013) found in their study that there is a need for distinguishing between mobile learning and mobile usage. They also found it important to further explore the pedagogical potentials of mobile learning (Schuck, Aubusson, Kearney and Burden, 2013). Concerning the integration of mobile learning into teacher education Baran (2014) found that there are two typical ways for the implementation: Teacher training about mobile learning which aims at teaching teachers how to integrate mobile tools into classroom teaching and Teacher training with mobile learning which aims at enhancing teachers' learning how to teach with mobile tools (Baran, 2014).

3. Methodology

The focus group in this research compiled of 23 teacher students who started their vocational teacher training in spring 2016. 21 of the students gave their permission to use the narratives written by them as material in the research. The students in the cohort were chosen among applicants who applied specifically for a programme focusing on mobile learning. They form an ethnically homogenous group which consists of 13 men and 8 female students. Their ages range from 28 to 53 three years, the majority (17 students) being 38-45 years old. Their experience in teaching ranged from sporadic teaching or guiding experiences up to 13 years of teaching experience. (Table 1)

Table 1. Distribution of students' experience in teaching

Years of experience in teaching	Number of students
over 10 years	4
3-5 years	5
1-2 years	6
less than 1 year	6

Most of the students (11 students) had teaching experience from 1 year to 5 years. Nearly one third of the students had less than one year of experience, out of these two had practically no experience at all in teaching. Four students had 11 to 13 years of full-time or part-time teaching experience.

As a consequence, part of the student teachers was at the beginning of building their professional identity as a teacher, whereas for those who have already worked as a teacher for a longer time the studies constitute a challenge to develop their existing concept of teaching and learning. The length of the careers in the prior occupation of the teacher students was not specified in the narratives but could be assumed to range from three years to even decades. Ten of the students represent vocational upper secondary education and training institutions, two work in adult vocational institutions and two in vocational special

education (institutions for students with learning challenges), while nine are employed in higher education (universities of applied sciences).

The length of the vocational teacher studies is 1,5 years with an option of doing them in one year. Three students chose this option. After the studies they will have the qualifications to work in secondary and higher education including vocational training institutions and universities of applied sciences.

To assess the status of teacher identity of the students before the studies commenced and to see how mobile learning (mobility) manifested itself as part of it, qualitative data was collected. The students wrote a narrative of their development of becoming a teacher and their ideas of how mobility can be seen as part of it under the title: “My road to becoming a mobile teacher”. According to Beijaard et al. (2004) teachers’ narratives represent the development trajectory of teacher identity and can be seen “as a sound theoretical basis for researching teachers’ professional identity”. The collected narratives were from 1,5 to 5 pages long with an average of approximately three pages. The students were identified during the analysis by codes M for male and F for female student together with a sequential number for example M1, M2...F1, F2... .

The narratives were analysed by two researchers using content analysis which is an analysis method “for the the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh & Shannon, 2005). The analysis process had three main phases each consisting of reading and analysis of the material done by two researchers individually followed by discussion and comparison of notes between the researchers. The analysis process is shown in detail in Figure 1 below.

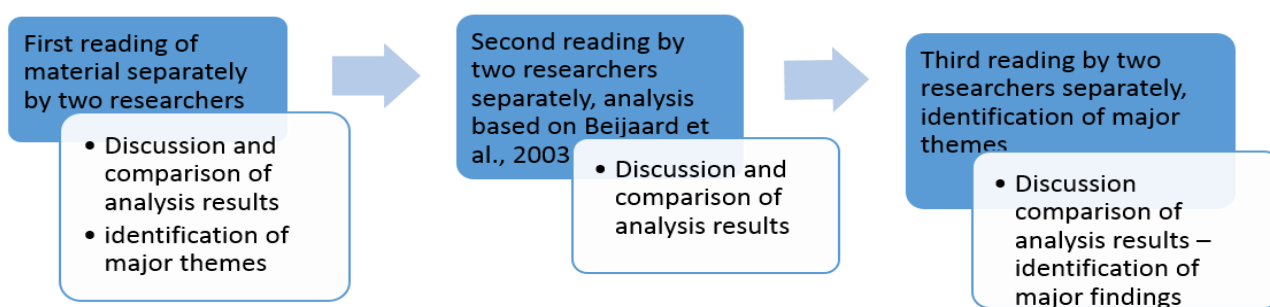


Figure 1. Analysis process

Different approaches to content analysis were used in various phases of the study. The first round of reading and analysis was done using a conventional (data-driven) analysis. As typical for data-driven analysis process researchers allowed the main categories and their names to emerge freely from the data (Hsieh & Shannon, 2005). After comparison and negotiation of major findings together a detailed, individually implemented analysis of data done by both researchers followed using directed (theory-based) analysis. The analysis results of the first reading were compared with and a more detailed analysis was done through abductive reasoning. As a loose lens for the new analysis was used the framework presented

by Beijaard, Meijer & Verloop's (2003) which identified four typical features of teachers' professional identity: professional identity is an ongoing process and can be seen as a process of lifelong learning; professional identity implies both person and context; teachers' professional identity consists of sub-identities; agency is an important element of professional identity.

After the second round of analysis findings were discussed and compared between the two researchers. As typical for theory-based content analysis an additional theme was identified and added to the analysis framework (Hsieh & Shannon, 2005): mobile learning.

In the third round of individual analysis the findings were analysed further. Especially in the analysis of the mobile learning –theme summative analysis was used. Summative approach to qualitative analysis starts by identifying and quantifying certain words or content in a text (Hsieh & Shannon, 2005). In this study the words and phrases connected to the use of technology in education were identified and counted. In the second phase latent content analysis (Hsieh & Shannon, 2005) was applied, and underlying meanings of the words were identified in the context they were written.

4. Results

4.1 Orientations of teacher student for teaching

The focus cohort of 21 students in the study represented a heterogeneous group with regard to their experience in teaching. As the majority of students did have some experience in teaching it was our assumption that the three work orientation types introduced by Beijaard, Verloop and Vermunt (2000) could be identified in their narratives. The analysis of the narratives revealed that only two thirds of the students (15 students) discussed issues concerning actual teaching like experiences, contents, arrangements of teaching or pedagogical issues. Further, among these students we could identify not only the expected subject-orientation which is typical for teachers at the beginning of their career (Beijaard et al., 2004) but in addition an occupational orientation which focused on issues concerning the prior occupation of the teacher student and in some cases had no reference to the teaching of this profession to the vocational students. The rest of the students (6 students) were identified as "non-teachers" who did not discuss teaching at all in their narratives, or being "in-between" expressing uncertainty of their current position.

The majority (9 student) of the 15 students discussing teaching related issues in their narratives described both an occupational orientation and subject orientation for work. Only one of these teachers had a long work history, the rest of the group had less than three years of teaching experience. These teacher students had a strong vocational identity related to their prior occupation but through their experience in teaching they had already been able to transform their knowledge to suit the teaching in vocational education. The last mentioned is a process which typically occurs during, and is supported by, teacher training (Fejes & Köpsén, 2014).

Further, six of the above mentioned nine students could be described as having a balance between the three orientations described by Beijaard et. al (2000) namely (occupational and) subject orientation, didactic orientation and pedagogical orientation. It could be noted that they had a relatively short experience in teaching (less than four years) and that even before the beginning of the teacher training

these students had a strong foothold in the community of practise of teachers which they expressed by discussing the different tasks of a teacher, assessment of the quality of teacher's work, pedagogical reflections and by using expressions like "we" referring to the community of teachers in general or the community of teachers in their work place.

Three students out of the 15 discussing teaching had a very strong occupational orientation without much reference to the related subject being taught. The focus of their narratives was on their own pursuit in keeping up their professional identity as a strong member in the community of practise of their prior profession. The support for the development of the professional identity of their students was left with lesser attention. On the other hand, there were, also, three teacher students who were very subject oriented. Typical for the writers of these narratives was the diffuse nature of the discipline that the writer had studied earlier. Their prior professional profile had thus been left vague with an unclear position as a member in any particular community of practice.

The rest of the narratives expressed positions of "non-teachers" (two students) or being "in between" (four students). Interestingly enough both of the students classified as "non-teachers" already had some experience in teaching. In both cases the narratives were very occupationally oriented discussing in length the prior professional history of the writer. Teaching was either not mentioned at all or only as the last step in a long chain of career changes.

Four students were described as being "in-between" meaning that their narratives described student's uncertainty of his or her current position. They discussed with great enthusiasm their hopes and ideas of becoming a teacher but for various reasons had they not yet been able to take the step of becoming a member of the professional community of teachers. These students had only very little real experience in teaching, and they draw a relatively idealistic picture of the kind of teacher they wish to become.

"...my own career as a teacher is just at the starting point...There are a lot of challenges concerning planning the courses, looking for my own role as a coach/teacher, learning the different (teaching and learning management) systems and practices. When I left my prior work place I wrote to my colleagues that my work at X (name of the institution) will be like jumping into cold water.", M6

4.2 Features of teacher identity

The four typical elements (ongoing process, context and person, sub-identities, agency) of teacher identity identified by Beijaard et al. (2004) manifested themselves in our research of vocational teacher students clearly. The *ongoing process* of teacher's identity development was elicited as a process which in many cases had started already in the youth of the student, and was now continued through teacher training. The process had been influenced by the biography of the students (Beijaard et al., 2004) intertwining together the past and the present (Kerby, 1998) through positive and negative role models of teachers, own experiences of various guidance and teaching situations, positive and negative childhood memories of going to school as well as recent experiences of teaching. Nearly all student teachers discussed their future describing what kind of a teacher they would like to be.

"(I was) longer than the other girls with dark hair, who stood in the school photos in the back row...never in the front row with the nice blond girls. I remember how one of my primary school

teachers connected blondness and blue eyes and an angle like disposition with good conduct and good school performance – and even said it aloud. I felt it was unfair, as I, too, behaved like a good girl should”, F4

Context seemed to have a major influence in the professional behaviour of the teacher students. The insecurities of the students concerning their qualification to work as a teacher and their wish to become a legitimate member of the teachers’ community of practice showed in the narratives frequently. One of the reasons mentioned for attending teacher education was pressure from the institution. Colleagues were also mentioned as influencing the development of the teacher’s teaching skills. In some cases, the writers used the form “we” to indicate closeness to students and willingness to modify their teaching to better motivate and support their professional development.

“We have started with my group (of students) a group area in Facebook and we chat on WhatsApp. We use youtube..and we make work demonstration videos”, M9.

Most of the teacher students have recognized that they have several *sub-identities* (see Beijaard et al, 2004). They discuss mostly their professional identities based on their prior occupation and their work as a teacher but in some cases they also mention their identity as a parent or a coach in a hobby group. Some of the students mentioned disharmony between their different identities but some were already doing “boundary crossing” (Fejes & Köpsen, 2014) between different communities of practise. They did for example part time work in their former occupations during their spare time or vocations. These teacher students have been able to find a balance and harmony between their different identities and are able to widen their professional positions accordingly (Fejes & Köpsen, 2014).

“...keeping a touch with working life is important. I try to do a gig(job) once a month.”, M2

Teachers’ own activity or *agency* in the development of their teacher identity (Beijaard et al. 2004) manifested itself in the narratives through goal orientation. About half of the students expressed in the narratives their specific wish to become a teacher. Many of these students had for years pursued acceptance in teacher training. The reason for these students to apply for the teacher training was their interest in pedagogy that had grown through acting as a supervisor in apprentice training (see Fejes and Köpsén, 2014) or their wish develop themselves and to share their existing knowledge with their colleagues as well as with their students (see Williams, 2013). The last mentioned students were looking for more skills specifically in mobile learning to legitimize their position in their work community (see Fejes & Köpsén, 2014) and to develop the work environment and themselves further.

The other half of the students had more or less drifted into the profession for various reasons including health issues (see Fejes & Köpsén, 2014) or work related reasons like a wish to find a new occupation due to unemployment or pressure from the institution to complete teacher education to secure their existing work position. Through teacher education the students wished to get more skills to compete in the labour markets or they were looking for the last piece of qualification making them eligible to get a permanent position in a vocational institution.

4.3 Mobile learning and teaching

The theme of mobile learning and teaching was discussed by 19 teacher students in their narratives. Two students did not mention mobility in the context of learning and teaching at all. The majority of the students felt that they did not have adequate skills in mobile technology or pedagogy and that they expected help in building their skills during the teacher training.

A typical way of discussing mobility was through technical aspects like listing several types of mobile tools or application suitable for teaching. About half of the students discussed mobility from the didactic point of view explaining the ways mobile tools or application had been or could be used in teaching. Discussion on the pedagogic views like how mobile tools and application could be used in learning or to support learning was seldom touched on. For the other half of the students the talk on mobility was on a superficial level. The expressions used were non-committal and taken from the general speech used in media or in everyday discussions, or the focus was on the challenges that using mobile devices causes the writer.

“For the young people the use of mobile devices and learning to use new applications is part of everyday life. But for myself it takes time; to internalize new and for what purpose each new thing is meant for. “, F1

One of the ways mobile learning was included into the identity work was through the hopes and plans that the students discussed concerning their future development towards becoming a teacher. Mobile learning was seen as a way of legitimizing the new teachers’ position in the community of teachers.

“ I believe that during the upcoming year I shall develop on this area (mobile learning and teaching) considerably and can start sharing the learned things also with other teachers (in my institution)”, M4

5. Conclusion

This study produced a few findings which are of interest when developing teacher training and specifically mobile teacher identities of teacher students. One of the major findings was the observation that we did not find any evidence of a direct correlation between the length of experience in teaching and the development teacher identity. According to the findings there were students in the cohort who had already found a balance between the subject, didactic and pedagogical orientations (Beijaard et al., 2000) in spite of their relatively short experience in teaching. On the other hand, there were teachers with long experience in teaching who had to a very limited extent touched on pedagogical issues in their narratives or who were classified as “non-teachers” with no mention of teaching in the narratives. The role of teacher training seems to be crucial in initiating and supporting the development of teacher identity apart from the length of teachers’ career.

In the context of vocational education in Finland, the majority of teachers belong to the age-group of 40-65 years who according to studies (European Commission, 2013) have the most inadequate skills in digital learning. The majority of teacher students in this study represented the same age-group. Only a small part of the students felt themselves confident in using mobile tools, the rest expected support and training in their use. Additionally, pedagogical aspects of using mobile tools were needed by all of the students. Most of the student talk on mobile learning was either on surface level or focused on the technology of using the tools. The versatile levels of skills call for personalisation in teaching mobile learning which takes into account the different needs of students.

Based on the above findings it seems necessary to first secure the technical skills of teacher students in using mobile technology. This could be attained both through special training as well as peer assisted teaching and learning in small group contexts. After the necessary assurance in using mobile technology has been gained, it will be possible to continue to learning and reflecting the pedagogical aspects of mobile learning. Such a combination of learning trajectories could be in our opinion be gained through using a combination of the basic ways of integrating mobile learning into teacher training (Baran, 2015): teacher training about mobile learning and teacher training with mobile learning. The arrangement is in line with the findings of Kearney et al. (2012) concerning the typical features of mobile learning including *authenticity* – authentic learning by teacher students in their own working environments through experimenting, *collaboration* – learning together with peers, colleagues and students, and *personalisation* – starting mobile learning from the personal level of skills.

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Digital teacher training. A tool for excellence in Higher Education.

Lourdes Pérez Sánchez

(Instituto Nacional de Educación a Distancia – UNED)
lopesanc@gmail.com

Rubén Gómez Palomo

Vicerrector Adjunto de Internacionalización – UNED
sgomez@issi.uned.es

Ana María Martín Cuadrado

Directora del Instituto Universitario de Educación a Distancia – IUED, UNED
amartin@iued.uned.es.

Abstract

Aware of the need to improve and achieve teaching practice in higher education, with the goal of achieving levels of excellence, universities around the world have been forced in recent years, to review one of the essential factors in achieving that goal. This factor is the professional performance of teachers and the quality of their training and their ability to adapt and update to a changing society, which requires education to change faster and faster.

This education, in constant process of change is determined by the educational innovation, new methodologies or the inclusion of new information and communications technology in teaching and learning processes. All this forces the university teachers to remain in a constant process of continuous training or upgrading.

There are many issues that influence the development of the career of university teaching, but there is a very clear, the need to "update" digital divide.

If you need to be up to date on methodologies, strategies or new techniques of teaching and learning, it is even more pregnant in acquiring digital skills teachers, updating and training as responsible for the education of the youth of the new millennium, our future professionals who require teachers not only experts in their subjects or curriculum, but in resources, channels, methods, applications or digital strategies.

It is in this sense, we will work our presentation, reviewing what arises from institutional bodies and what is asked from the university reality. The result of this analysis, a proposal on two fronts or two lines of action arises. On the one hand, a complete and complex type questionnaire to learn and research in our own institution the real situation of the training of our teachers and what their real needs. On the other hand, we propose a proposal for digital training from an initial level to an advanced level, relying on a series of competitions collected by the Ministry of Education and recognized as fundamental to a complete mastery of them and their transfer to the educational environment.

Keywords: excellence, higher education, teacher training, teaching digital literacy, continuing education, education for excellence, teacher professional training.

1. Introduction

As Julio Cabero states in his book "Educational Technology. Design and use of teaching aids", one of the characteristics of the so-called knowledge society is that it is built around ICT as a core element thereof.

It is necessary to consider that new technologies occupy increasingly more space in our lives, the way we interact, and are becoming the main source of meaning for the constitution of our identity.

"In this new framework it is necessary that subjects are trained to mobilize and use the new tools of information and communication at their disposal in the knowledge society and this necessarily involves a new kind of literacy that focuses not only in print media and their verbal codes, but also in diversity in media and media with which we are "(Cabero, Llorente and Martin, 2012).

We can, based on the implied need for training, expressed above, establish that, it is necessary that society needs citizens who are able to learn to read, produce and evaluate mid speeches expressed in different media supports.

As it is shaping and developing life in this new society "... individuals that don't know cope with digital technology intelligently (namely connect and browse networks, search for useful information, analyze and reconstruct it, communicate it to others users) will not be able have access culture and market information society.

This digital illiteracy (or be digital illiterate) will produce a series of difficulties in access and promotion in the labor market, helplessness and vulnerability to manipulation of information and inability to use the resources of digital communication.

In this situation, is seen as necessary consideration to carry out a process of digital literacy understood this by some authors (Lankshear and Knobel, 2008; Ambrós and Breu, 2011, Commission of the European Communities, 2009) as one that allows the training and assimilation of knowledge, skills and attitudes needed to know and use properly and optimally, the information technology and communication, to access the media understand and evaluate analytically the coming articles of informational environment and its contents received through different sources of communication, and to respond critically also using different forms of communication in different contexts.

2. Current situation. New teacher professional profile.

Until a few dates, one of the main concerns teacher training, it was the need for change in the performance of education professionals, questioning the effectiveness of traditional education compared to the role he has to decorate the daily work of the "new teachers", aimed at new knowledge, skills and knowledge. This questioning of tradition is no longer such to move on to consider the "innovative training" as something as necessary and urgent.

This new concept has generated a new professional profile in teaching, considered so far "innovative" but that's going to be necessary and therefore daily. This is leading to new training demands, new educational

experiences, etc., that will help teachers adapt to the needs and demands of students, future professionals and citizens.

Within this new professional profile of teachers, ICT plays a key role, becoming considered an essential element in the development of teaching practice.

Currently in our universities is facing this situation, through conducting training proposals to help the group of university teachers trained in the use of ICT to support new forms (distance learning, e-learning, virtual campus, ...) or support the teaching of attending classes (web pages support teaching, virtual tutoring, teaching platform, ...), as established by Anton Ares, P. (2005).

The same author states that "Teacher training in information technology and communication is a priority issue for considered one of the keys to allow the incorporation of education to new forms derived from the information society and knowledge "(2005b).

This immersion of teachers in the ICT world, brings a series of implications that will alter the way they work, how they investigate, to communicate, to form, to convey knowledge.

To this must be added the change that occurs in the role of the teacher. "The teacher ceases to be a source of all knowledge and happens to act as guide to the students, encouraging them to use the resources and tools they need to explore and develop new knowledge and skills; happens to act as manager of the host of learning resources and to enhance its role of counselor and mediator "(Salinas, 2004). More specifically, will play roles as tutor, mentor, pedagogical engineer, expert technologist, designer of didactic materials, documentarian, evaluator, document editor, adjectives established by several authors (Salinas: 1999; Silva: 2004; Liberman and Wood ; 2002; Krzemien and Lombardo: 2006 Day: 2005).

3. The knowledge society, information. The domain of Information and New Technologies.

Digital teaching competence.

With technology training seeks to develop a purely instrumental hardware and software domain to achieve qualified human resources in the management of these tools provide a democratic training to citizens trying to assimilate that life in society is not only governed by interests economic, but to consider a set of values and attitudes that make them adopt critical positions in society and to technological progress. Ultimately it seeks to form educated citizens and critics in the media and technologies. In this sense the four main objectives must pursue technological literacy (Area Moreira, 2001):

- "Become experts in technical management of each technology (practical knowledge of hardware and software that uses each medium)
- Possess a set of specific knowledge and skills to search, select, analyze, understand and recreate the enormous amount of information that is accessible through new technologies,
- Develop a cluster of values and attitudes toward technology so it will not fall or a technophobe positioning (ie, they reject them systematically consider evil) or an attitude of uncritical and submissive acceptance thereof,

- Use mass and technologies in their daily lives not only as resources leisure and consumption, but also as environments for expression and communication with other human beings. "

From our point of view we believe that everything related to the acquisition of skills and management skills of new technologies, different systems, etc., is essential, but we believe that should be emphasized in training critical users. It is at this point that we must deepen in forming, technologically literate citizens. Thus, the user will be able to technically use the different resources that are made available from different points, but will do so in an intelligent way, being able to understand the information, how it is structured, as presented, and how these influences in the form of receive and use.

Digital competence has emerged in today's society, in the context outlined in the preceding paragraphs, in order to cope with new challenges, to be able, as education professionals to integrate properly the use of ICT in the classroom and that teachers have the necessary training in that competence.

Digital competence is part of the general skills of teachers. It seeks therefore facilitate their domain to promote the use and full integration of ICT in education, adapting teaching methods to the new educational reality.

In this sense, an update on the profiles and appropriate training oriented to a world where information and knowledge are the working tool, the currency and the fundamental element of transition is necessary.

As Gallego, Gámiz and Gutierrez indicate in his article The future teacher to the competition in the use of information technology and communication for teaching, "Digital skills have been associated with two key objectives of the preparation of future teachers on the one hand meet and reflect on the technological context in which students operate and, secondly, to develop new skills to use technologies to foster meaningful learning ".

The authors cited in the preceding paragraph believe the key digital future teacher competence is "knowing how to use and properly incorporated into the teaching-learning activities the information and communications technology. "

The acquisition of teaching competence by the teacher must be accompanied by didactic knowledge. You should know how to apply that power to work logically educational content.

In this line, Trujillo and Raso (2010) materialize further saying "The future teacher should be able to create curriculum materials, or search for them, and generate their teaching translation as well as knowing the interdisciplinary relationship between different subjects in the curriculum for present a global vision of knowledge".

In these new scenarios, the teacher has to present a profile with a series of tasks and responsibilities that bring together both the digital aspect, as the didactic (Cebrián, 2003; Gallego, 2011; Tejada, 2009). In this sense, the current teacher has to play as an adviser and guide learning resource facilitator, designer of new environments of learning with ICT adapter materials from different media, designer and producer of teaching materials and evaluation of the processes they occur in new environments, among others. In addition, it must possess the ability to analyze and question the application of ICT in education, use and

incorporate into the learning activities the information and communications technology, know how to manage information and possess knowledge related to field of study among the most important.

There have been numerous research and experiments that have been carried out to study the applicability and appropriateness of the use of ICT in the classroom, in education, and very many who have been learning and experimenting on the fly, while some years ago, it is fully aware of the importance of teacher training in new technologies and the acquisition of digital skills.

Mayorga and Nunez in his analysis of "Digital competence of teachers: training and updating Web 2.0", collect the results of research conducted by Cabero et al (1999), Majó and Marques (2002) and Tejada (1999) on what should be the core competences in new technologies that teachers should have, synthesizing them in the following:

- Have a positive attitude towards ICT, instrument of our culture that should know how to use and apply in many domestic and work activities.
- Know the uses of ICT in education.
- Understand the use of ICT in the field of their area of expertise.
- Use deftly ICT in their activities: text editor, e-mail, Internet browsing ...
- Acquire the habit of planning the curriculum integrating ICT (as a means instru-mind within their own area of expertise activities as teaching me-gave, as a mediator for cognitive development).
- Propose training students to consider the use of ICT activities.
- To evaluate the use of ICT.

Tejedor and García-Valcárcel (2006) investigated at the university level, the attitude of teachers as a key element in training for the use of new technologies in their teaching. Your attitude will influence greatly on the commitment of teachers and therefore the success or not of the changes that are trying to accomplish.

Another of the many investigations, was to Guitert, Romeu and Perez-Mateo (2007) in which generic skills that can be developed through the use of ICT were analyzed and, as such, are common to all degrees. Very briefly, the pick below:

- Teamwork in virtual spaces.
- Virtual cooperative work.
- Skills virtual and asynchronous communication.
- Quality of interaction, consistency in the exchange of information.
- Ability to decision making, critical analysis of ideas and opinions.
- Planning and organization based on rules developed collectively.

- Search and information management.
- Skills for conflict resolution, argumentation, consensus decision making, etc.

In these and many others, we can deduce that the inclusion of ICT in the teaching-learning and therefore the necessary domain by teachers of the same, will mean a number of changes and influences that could be detailed as follows according to Collins (1998):

- The passage of a global, indiscriminate and impersonal to individual instruction based on student learning pace of instruction.
- Replacing the master class, based on the speech and receptive / passive attitude of the students, the student's attitude to face training and be agents of their own knowledge, from the constructivist approach.
- ICT has enabled the teacher release time so you can focus on students.
- Proper use of ICT generates increased activity and autonomy of students, keeping it control over their own learning.
- Replace one based on tests by one based on individual progress evaluation assessment.
- From a competitive attitude, centered in qualifying, it has been a cooperative attitude, through putting together knowledge and promote mutual assistance through interactive learning.
- they have been replaced homogeneous multidimensional programs, where students are selecting content based on your interests or preferences of your career path.
- Development of visual thinking versus verbal.
- Using the computer awakens in students greater interest in learning activities, spending more time on homework and awakening a playful sense that diminishes the fear of failure and that, in turn, enhances the research capacity and personal initiative.
- Given the high level of competence of some pupils with ICT, allows the role of the teacher / student change, facilitating a relationship between equals.
- ICT allows recording and evaluating the activities of the student; however, it allows more advantages such as to adapt the tests and their corre-tooth assessment, depending on the student's disability.

Moreover, this new situation caused by these changes brings with it the need to train both teachers and pupils and students in a series of digital skills, which tangentially to the contents of the subjects to study, will allow cope with these new tools, enriching their teaching and facilitating their learning.

This idea is strongly supported by UNESCO (2008) in its document "Standards of ICT skills for teachers", in which the idea that all this requires skills and new competencies of teachers is collected, when he says "to achieve the integration of ICT in the classroom depends on the ability of teachers to structure the learning

environment of non-traditional way, merging ICT with new pedagogy and promote dynamic classes at the social level, encouraging cooperative interaction, learning and collaborative group work. This requires purchasing a different set of skills to handle the class. "

Following this line of thought, we can establish that it is the teacher who bears the pedagogical responsibility, as it marks the times, makes decisions, define the spaces, groups, select the tools and design activities in general. Thereof, it is in your hands so decide and evaluate the status of their digital skills and training needs required.

4. The world begins to move.

During the last fifteen years or so, it has been increasing in several countries and international organizations concerns about the digital competence of university teachers and students of different educational levels required.

UNESCO, as we saw above, always concerned about this issue, defined in 2008 the "ICT Competency Standards for Teachers" based on three approaches:

1st basics of ICT,

2nd deepening of knowledge

3rd generation of knowledge,

that link education policies to economic development and where "each approach has different implications for both reform and improving education and each also has different implications for changes in the other five components of the education system: pedagogy, practice and training of teachers, curriculum (curriculum) and evaluation, organization and administration of the educational institution and use of ICT".



Figure 1. Standards of ICT skills for teachers. UNESCO.

In 2011, UNESCO developed the document entitled "UNESCO ICT Competency Framework for Teachers". This document provides an update of the 2008 document before seen. This updated version of 2011, focuses not only on the information and communications technology and its role in teacher training, but also focuses on aspects relating and related pedagogical and educational work of teachers.

In this work, as reflected Duran Gutierrez and Prendes (2016) in their paper, the framework of ICT skills for teachers around three main approaches aimed at developing human capacity is made.

1. Development of technological literacy
2. The deepening of knowledge and
3. Creation of knowledge.

These approaches overlap with the six aspects of the work of a master:

1. Understanding ICT in Education,
2. Curriculum and Evaluation,
3. Education,
4. ICT,
5. Organization and Administration
6. Professional Learning Teacher.

Thus forming finally 18 modules which describe, for each module, both curricular objectives and teaching skills.

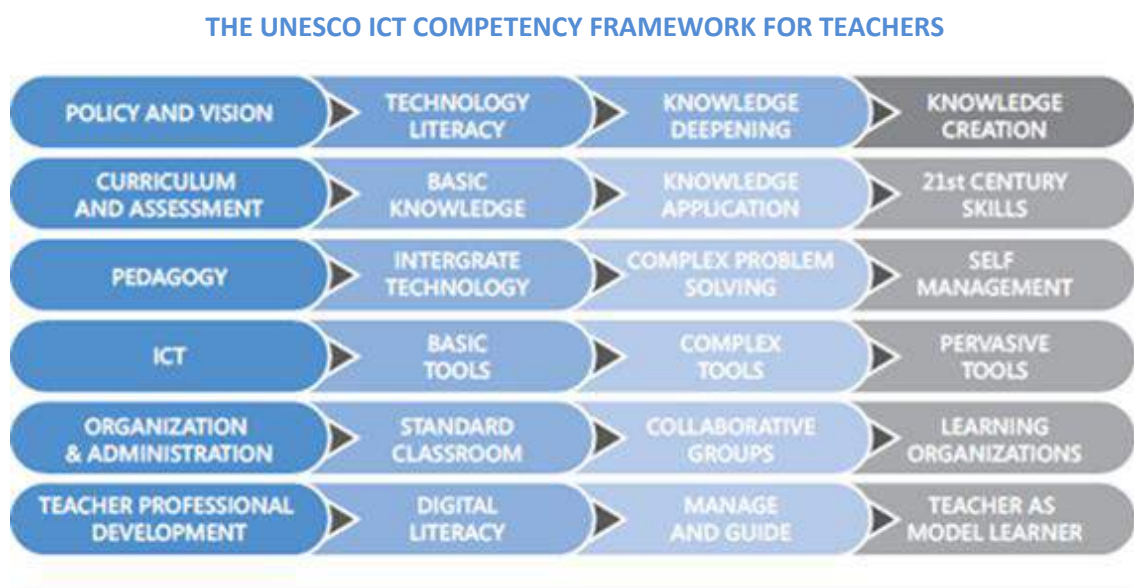


Figure 2: The UNESCO ICT Competency framework for teachers
Source: <http://unesdoc.unesco.org/images/0021/002134/213475e.pdf>

The International Society for Technology in Education (ISTE) published in 2000 and 2008 national standards in information and communications technology for do-adoles-. In the first edition (ISTE, 2000) they are set with their respective performance indicators six standards by which teachers:

1. Demonstrate understanding of the concepts and operations with ICT.
2. Plan and design effective learning environments and experiences supported by ICT.
3. Implement curriculum plans that include methods and strategies to use ICT to maximize student learning.
4. Apply ICT to promote a variety of effective forms of assessment and evaluation strategies.
5. Use ICT to enhance their productivity and professional practice and
6. Understand the concerns of the social, ethical, legal and human involving the use of ICT throughout the process of schooling and apply that understanding in practice.

In the second (ISTE, 2008) are updated and standards are reduced to five, so that teachers:

1. Facilitate and inspire learning and creativity of students;
2. Design and develop learning experiences and own evaluations of the Digital Age;
3. Modeling work and learning characteristic of the digital age;
4. Promote and model digital citizenship and responsibility
5. Undertake professional development and leadership.

These five dimensions and twenty indicators are considered in terms of four performance levels (ISTE, 2008):

- a) Initial or beginner: what is hoped that a student teacher or teacher trainees know play.
- b) Medium: teachers with more experience in the use of ICT.
- c) Expert: a part of a great experience with ICT, demonstrates efficient and effective use for improving student learning.
- d) Transformer: the teacher explores and adapts ICT so that substantially changes its-processes of teaching and learning, so that meets the needs of an increasingly globalized and digitized society applies.

Between 2001 and 2002 the University of Western Sydney (UWS), the Australian Curriculum Studies Association (ACSA), the Australian Council for Computers in Education (ACCE) and the Technology Education Federation of Australia (TEFA) developed for the Department of Education of Australia (CDEST, 2002) a proposal for the development of a framework of ICT skills for teachers. This is a significant contribution that sets standards for five different groups in terms of faculty and staff of academic

institutions concerned: teachers in initial training, inexperienced teachers in the use of ICT, teachers with proven experience in the use of ICT, school administrators and teacher trainers. The proposal also distinguishes four levels of development of the ICT competence of teachers: least developed, innovative leader.

Also the UK government (TDA, 2007) establishes a set of standards in the teaching profession according to differentiating, performance and training, five levels ranging from initial teacher to teacher qualification with advanced skills. Standards, cumulative from one level to another, are grouped in a three-dimensional structure: professional attributes, knowledge and professional understanding and professional skills.

In the Latin American context the Ministry of Education of Chile developed in 2006 a total of 16 standards in ICT for initial teacher training, grouped into five dimensions (pedagogical area; social, ethical and legal, technical aspects, school management and professional development), deployed in a total of 78 indicators.

The Ministry of Education of Quebec in Canada established twelve professional competencies for the teaching profession in childhood and secondary education, primary. For each of them, concrete various levels of competence and specifying the expected levels of mastery. The eighth competency -integrating ICT to prepare and direct the activities of learning, teaching and managing for development professional- establishes five elements of competency in the domain to be achieved by future teachers at the end of their initial training (Ministère de l'Éducation du Québec, 2001): (1) exercise critical thinking in relation to the advantages and limits of ICT to support teaching and learning as well as challenge and commitment to society; (2) evaluate the educational potential of computer tools and networks in relation to the development of skills training program; (3) communicate using various multimedia tools; (4) use effectively for-form ICT to build networks of collaboration and continuous training in their field of teaching and teaching practice and (5) help students to appropriate ICT use for learning activities, evaluate their use of technology and judge critically the information found on the network.

Recently the Ministry of Higher Education and Research (MESR, 2011) the French state has issued a certificate in computer and internet higher education accrediting professional skills in the pedagogical use of digital, common and necessary technologies for all teachers and trainers.

In Spain they have been conducting numerous investigations that have been studied and involved large samples of universities, who have studied what they are and what should be the digital skills of university teachers.

In a national research, with a sample of 546 professors and researchers from 59 universities, Prendes (2010), Gutiérrez Porlán (2011) and Prendes and Gutiérrez Porlán (2012) develop a model in which ICT skills of university teachers. They are given in the three basic areas of performance (teaching, research and management) and for each area set three levels of cumulative domain: (level 1) domain of the bases underlying the action with ICT; (Level 2) design, implementation and evaluation of action and ICT (level 3) personal and collective analysis and reflection of the action carried out with ICT. In each of these levels they lie ICT skills and specific indicators setting up a profile university professor in those powers.

De Pablos and Villaciervos (2005), in which 22 Spanish universities participate involved appreciate that ICTs generate high expectations among teachers and their integration "is perceived as an alternative that

provides greater flexibility, by developing options and give students control of their own learning process; promote mastery of skills in the use of ICT, especially when that domain is part of the objectives of the training itself; Journal of University Teaching, Vol.10 (2), May-August 2012 283 foster interaction between teachers and students, have more channels for communication; and ultimately, encourage better adaptation of students to plan formative work. "(Idem, 2005).

Rué and De Corral (2007), which discusses plans for teacher training in 52 Spanish universities itself identifies that ICT is part of the methodological content of such plans.

5. European Commission collects the ball

Before the whole situation seen before, the institution of the European Commission through various documents and studies, begins to respond to society, governments, education, ..., offering a series of recommendations and documents that generally collect what should be the general guidelines that should govern the different aspects of both the education sector and society in general, in digital competence is concerned.

To achieve this transformation, levels of accessibility and quality required in digital skills for our educational systems, with an education more effective and more open learning, the European Commission has been working through various documents and initiatives such as "New concept of education "(COM (2012) 669)¹⁰⁸, " European higher education in the world "(COM (2013) 499)¹⁰⁹, and its flagship initiative " Digital Agenda "(COM (2010) 245)¹¹⁰; all seeking to achieve the stated objectives of Europe 2020 to boost competitiveness and growth of the European Union.

As stated in the Communication from the European Commission entitled "Opening Education: Teaching and innovative learning for all through new technologies and open educational resources" (2013), and in a situation in which the European Union in a laggard regarding the implementation of strategies to reshape ICT-based educational and training systems, the actions proposed in this line are (COM (2013) 654)¹¹¹ position:

- "Help learning centers, teachers and students to acquire digital skills and learning methods,
- Support the development and availability of OER,
- Connect the classrooms and deploy devices and digital content,
- Mobilize all stakeholders (teachers, students, families and inter-announcers economic and social) to change the role of digital technologies in schools"

In this line, the European Commission, through the Institute for Prospective Technological Studies (IPTS) produced a report, the result of DIGCOMP (Digital Competences) project aimed at developing a framework proposal for digital competence for all European citizens. This was based on the collection of data resulting from a survey at European level, case analysis, review of existing studies, and so on. From the data

¹⁰⁸ <http://eur-lex.europa.eu/legal-content/ES/TXT/?uri=COM:2012:0669:FIN>

¹⁰⁹ <http://eur-lex.europa.eu/legal-content/ES/TXT/?uri=COM:2013:0499:FIN>

¹¹⁰ <http://eur-lex.europa.eu/legal-content/ES/TXT/PDF/?uri=CELEX:52010DC0245&from=en>

¹¹¹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0654:FIN:ES:PDF>

obtained it was intended to create a conceptual framework that could serve as a reference for initiatives, curricula and certifications current.

A Spanish level, with reference to this document (DIGCOMP), was born "The Common Framework for Teaching Digital Competition" intended to provide a descriptive reference that can serve as a starting point for setting goals or objectives in the training process and in the process of evaluation and accreditation.

It is part of both the "Plan of Digital Culture at School" and the "Strategic Development Framework Professional Teaching", whose set of projects are the result of the process of shared reflection that the Spanish Ministry of Education (MECD) opened with the active participation of the Autonomous Communities (CCAA) and presentations which also involved external and responsible for various units of the ministry experts.

Following the recommendations of the European Commission and the Ministry of Education digital skills are shaped by five major areas of competence:

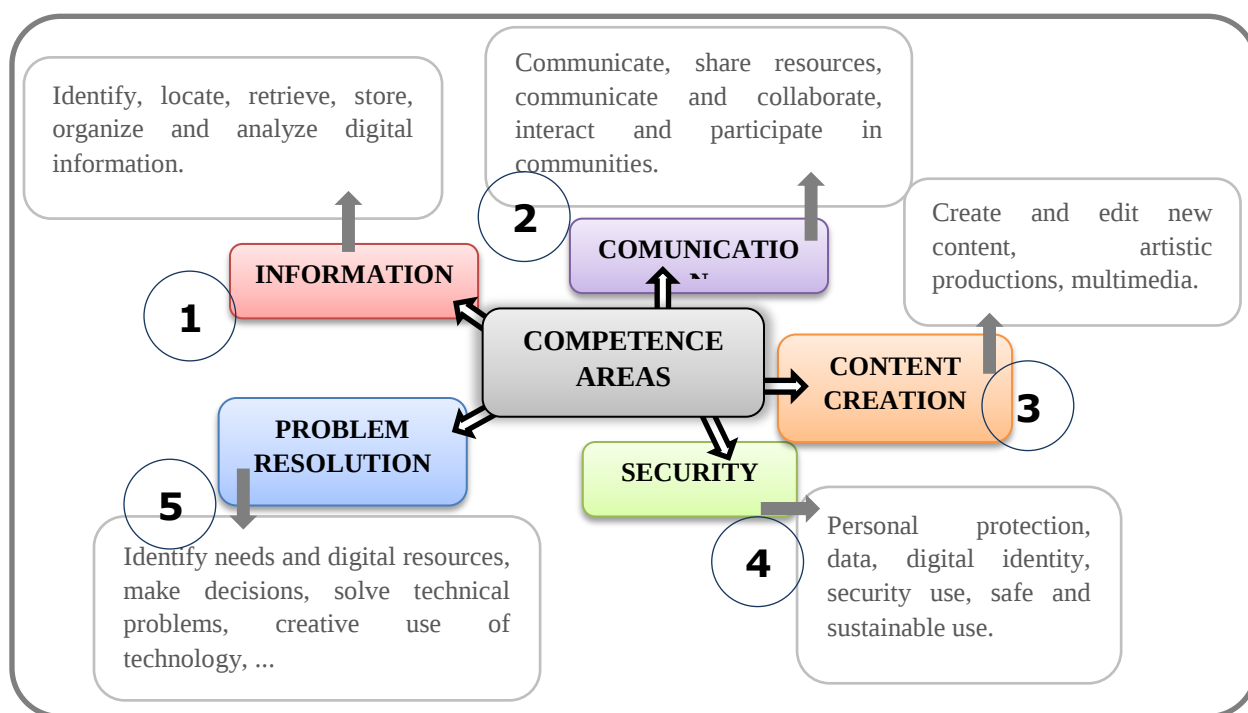


Figure 3: Main competence areas that make up the body of knowledge of digital literacy.

Produced by Lourdes Pérez Sánchez.

Anyone who master these five areas is competent digitally speaking.

6. Training proposal in Digital Competition from the UNED.

In this sense, from UNED, through the Institute of Distance Education (IUED), we have designed the proposal presented here, with which it seeks to develop all digital skills for the training of future professionals and current teachers can update and catch up on technological aspects for application in the teaching, the research, and life in general.

From this big goal or premise, the proposal made by the UNED, through the IUED, has resulted in the presentation of the NOOCs referents (Nano MOOCs or Nano Online Open Courses) at Digital Skills explained in previous sections, which they encompass the five competencies defined in the European framework. As a pilot proposal, the jurisdictional area of information will work, the first area.

It consists of three races:

1. Navigation, search and filtering information.
2. Evaluation of information.
3. Storage and retrieval of information.

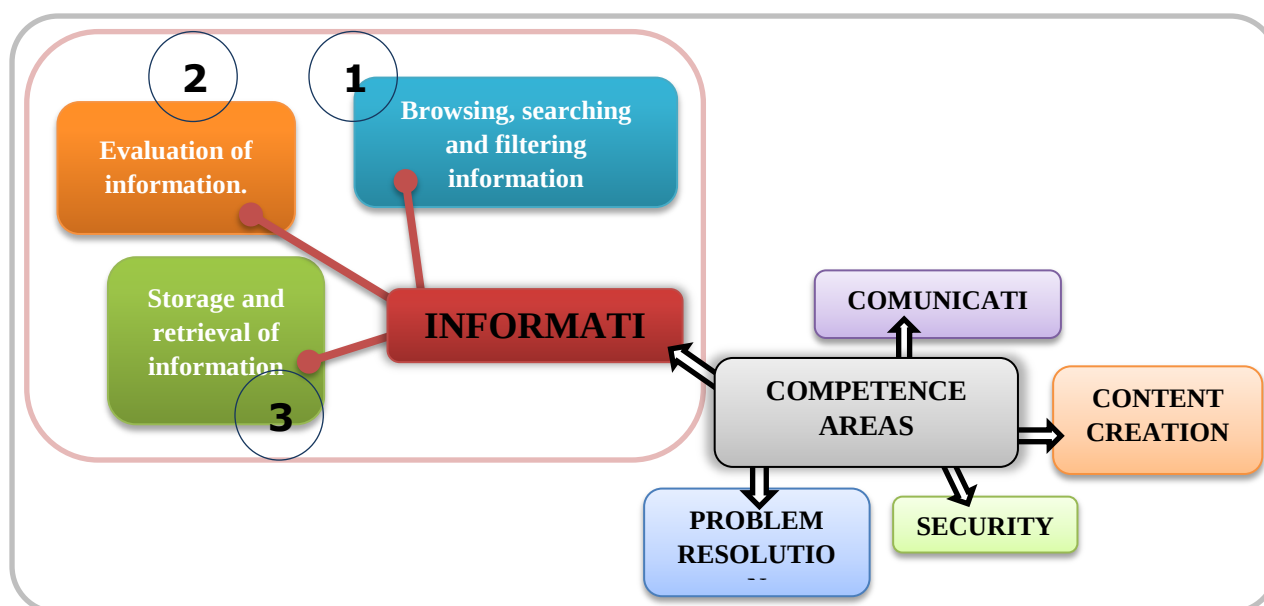


Figure 4: Competence area of INFORMATION and its three digital skills.
Produced by Lourdes Pérez Sánchez.

Each of the information skills to work is composed of three difficulty levels: Basic, Intermediate and Advanced.

Each student must carry out a test of comprehensive self-assessment that will allow you to assess what knowledge point is, determining who can be competent in Navigation Advanced level, Basic level Assessment Information and Intermediate level storage and retrieval information; or you may notice that you need to perform all NOOC or short courses.

Each of the NOOC will last for 5 hours maximum and can be done for a week. This implies that each level of difficulty of the competitions will last five hours, achieving full competition in 15 hours in case of need to perform all three levels. This situation, as examples, is contained in the following graph.

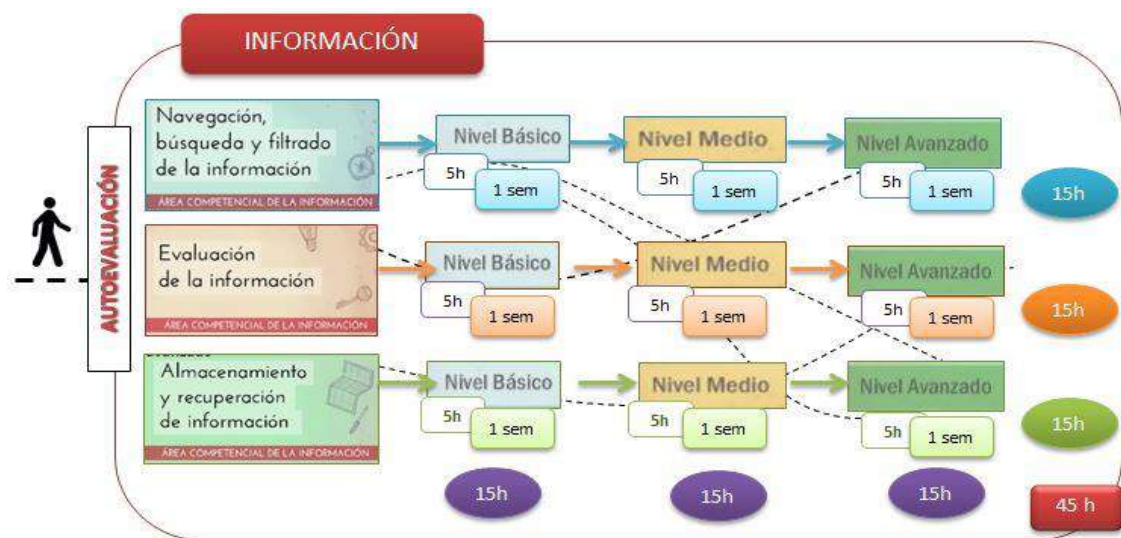


Figure 5: Representation of the process forward towards achieving digital skills that make up the competence area of information.
(Original version in Spanish)
Prepared by Lourdes Pérez Sánchez.

Each of the skills to study, is therefore composed of three levels and can be completed in three courses or NOOCs.

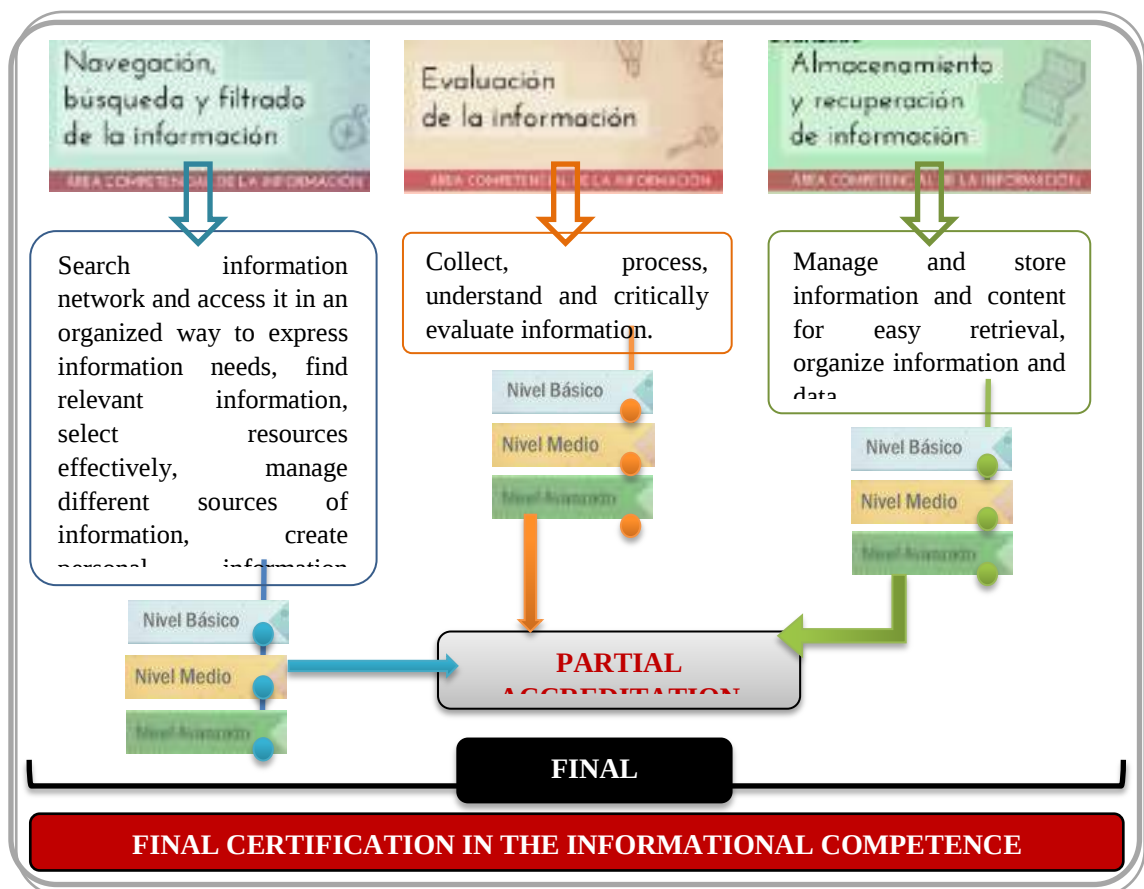


Figure 6. Process development of skills that make up the informational competence until the Final Practice. (Partial translation)
Prepared by Lourdes Pérez Sánchez.

From each of the skills, concepts, procedures and skills on each of the competencies through three levels of difficulty they will be learned. Overcome one or more enable the student to achieve different accreditations, to achieve final certification after passing the preparation of the Final Practice.

Very Overall, through these courses or NOOCs the student will learn to navigate optimally, applying criteria of quality and being able to manage information obtained properly.

7. Conclusions

Given the requirements of the knowledge society will apply to future professionals and thus to the requirements that current teachers and trainers of these professionals, is considered a fundamental task to build a solid training structure and quality digital skills for teachers, and for use in teaching.

Due to the characteristics of the knowledge society, neither the administration nor the teachers can remain aloof from technological changes and new training needs requires teachers and their students.

The professionalization of teachers is a continuous process that begins when the student enters the university for initial training, but hardly know when it ends.

It may seem redundant the idea of preparing future teachers in the skills worked on this document, educate them so that they know and can cope properly with the new teaching modes; however it should be thought in teacher training active.

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Reflections on the inaugural Empower Online Learning Leadership Academy (EOLLA)

Tom Farrelly

Institute of Technology, Tralee, Ireland
tom.Farrelly@staff.ittralee.ie

Ana García-Serrano

ETSI Informática – UNED, Spain
agarcia@lsi.uned.es

Ruth Schaldach

Hamburg University of Technology, Germany
ruth.schaldach@tu-harburg.de

Jeroen Thys

UC Leuven-Limburg, Belgium
jeroen.thys@ucll.be

Abstract

The academy's inaugural leadership workshop provided the participants with a valuable opportunity to develop their own e-learning leadership skills and be exposed to a wide variety of experts and viewpoints. However, while the case studies presented by the various experts certainly informed the participants thinking; arguably it was the simulated planning exercise which required the participants to work in groups that provided the greatest learning opportunities.

This paper captures the thoughts and reflections of one group of four participants who came together from Belgium, Spain, Ireland and Germany; who in the space of three days learnt more from working together than they could have otherwise achieved.

Keywords Badging, Higher Education, Blended Learning, Empower Online Learning Leadership Academy.

1. Introduction

The EOLLA academy (<http://empower.eadt.eu/eolla>) is part of a joint initiative from the EADTU Empower programme and the European Consortium of Innovative Universities (<http://www.eciu.org/>). A short list of experienced and senior institutional leaders in teaching, through its lectures, provided attenders with contextualization and challenges in leading, developing or implementing new technology-enhanced models of teaching and learning. While the series of lectures was an integral aspect to the programme the other key aspect was the scenario based case studies which enabled the participants to work closely together in order to address 'real' digital learning issues for higher education providers.

In terms of conference themes, participation in the academy can be seen as helping with the development of institutional policies; the empowerment of universities for excellence and the modernisation agenda. The concrete topics addressed this first academy were:

- Introduction and Practical Work supervision, Fred de Vries (Fred.deVries@ou.nl).
- Taking the lead in an era of change, Mark Brown (mark.brown@dcu.ie).
- Making the right choices for your institution, Covadonga Rodrigo (covadonga@lsi.uned.es).
- Building a culture of learning innovation, Antoine Rauzy (antoine.rauzy@upmc.fr).
- Scaling up within and across your institution, Mark Brown.
- Looking to the future, Antoine Rauzy and Covadonga rodrigo.
- Future Challenges Scenarios, Fred de Vries and Mark Brown.

Even in the world of technology enhanced learning it is all too easy to see the world from one's own perspective. Priorities that are important in one country may not even register in another and thus the shape and thrust of a programme will vary. In fact, one of the most striking aspects of the academy was the realisation that the design of a strategic programme can vary from country to country depending on constraints and priorities.

2. European collaboration applied in the EOLLA academy

EADTU has a previous well known initiative to make Europeans to collaborate, in the subject of quality assurance for Higher Education, and coordinating the defined OpenupEd label [Rosewell, 2013 and Willians et al, 2012]. This is the first MOOCs initiative which goes Europe-wide, with the support of the European Commission and refers by its name indirectly to the European program Opening up Education, launched in September 2013. The OpenupEd mostly is involving open universities, but focused on reaching new partners that perform MOOCs and are keen on opening up education for all. It aims to be a quality brand embracing the diversity in (institutional) approaches to open up education by the use of MOOCs. Although there's a clear diversity of institutional approaches, the partnership has agreed on a framework of eight common features in order to open up education to a maximum level. OpenupEd label is based around the E-xcellence approach of using 32 benchmarks for quality assessment, which has been already tested at UNED MOOCs [Rodrigo et al, 2014].

In the academy, the collaboration between the attendants was organized around the so-called "Future challenges scenarios", a practical work organized in teams of four members, in order to think strategically about online learning and act as the leaders of a dreamed institution. The methodology was organized around of periods of working time to discuss a plan to develop a strategic response to one key question in a specific challenge scenario, in order to identify and define the factors that will enable a change in the institution. Tin turn the proposed plan of action was negotiated within the group before a set of actions were decided upon. Finally, the outcome of the practical work was presented and discussed with the members of a Senior Institutional Leadership Panel.

2.1 Five future challenge scenarios

In this section, the EOLLA academy proposed five scenarios are presented in short, in order to show the kind of practical work organized regarding five types of universities, having different goals according to the institutional strategies and the current status of the university. In the statement of each scenario there was

a background description, an outline of the challenges and opportunities facing the university and the working group task to be performed.

In the following table, you can find summarized for each scenario,

- the descriptive name,
- the supposed year of establishment,
- whether it is supposed that is ranked or not at the Quacquarelli Symonds (QS) world university ranking, (https://en.wikipedia.org/wiki/Quacquarelli_Symonds) and *Times Higher Education magazine* (THE) ranking (https://en.wikipedia.org/wiki/Times_Higher_Education) from 1971-2008,
- the efforts previously performed to support the digital era, using (modest, new, immature) IT infrastructure, or eLearning platforms,
- the University emphasis on research (high, modest, links to industrial partners, good enough),
- whether is currently offering MOOCs,
- Internationalization efforts and/or international students at the University.

Table 1: Five scenarios at a glance

Descriptive Name	Established	Ranked	Supporting Digital Era	Research	Offering MOOCs	International.	References
Oldish University	1698	Slipping (QS and THE)	Modest	High	No	Not known	• Banerjee, 2015 • Mapstone et al, 2014
Newish University	1987	Yes (THE)	New IT infrastructure	Not Known	Yes	Not Known	• Oliver, 2016
Resource University	1967	Going down last few years	Immature IT infrastructure	modest	No	Yes	• Senack and Donoghue, 2016 • Fischer et al, 2015
Expansive University	1930	No	eLearning platform	Not Known	Yes	Yes	• Lester, 2013
Alliance University	1970	Ranked (QS, THE)	eLearning platform	Good	Yes	Yes	• Lester, 2013

The 'class' were divided into groups of three and four people but were given the chance to pick which of the five institutions they wished to be. Interestingly enough there was no overlap with each of the groups picking to be one of the five institutions listed in table one.

Table 2: Main goals of the five scenarios

Oldish University	Whether University should develop a suite of online programmes targeting international students to help position itself for digital age and to potentially open up new sources of revenue.
Newish University	Whether the institution should develop a digital badging initiative to help better recognise and showcase to employers a wider range of skill and qualities of graduates.
Resource University	How should University respond to open textbooks and the growth of the Open Educational Resource movement?
Expansive	Decision on start an online learning delivery of courses through a suitable partner University

University	(China/India) to obtain a higher number of new foreign students by developing a formal partnership.
Alliance University	Evaluate the potential opportunities and challenges of joining a new consortium of leading universities in online education for MOOC and online learning provide.

3. Case study: To Badge or not to Badge

The practical work addressed in our group was to address the future challenge scenario for the so called Newish University that was described in the following terms:

- A great IT infrastructure and blended learning experience,
- Strong industry links,
- Ranked in the Top 100, for universities under 50 years of age,
- Strong in providing access to non-traditional student groups,
- Good growth in student numbers but it need to be mindful to identify further opportunities.

In the Newish university scenario, the strategic imperatives were identified as:

- Maintain/Enhance Reputation,
- Build on commitment to utilise IT delivery & infrastructure,
- Strengthen links with industry and the wider community,
- Maintain high student enrolment numbers,
- To deliver high quality innovative teaching,
- Commit to facilitating Life Long Learning.

While the scenario provided the basic details and characteristics of the university, the group felt that the first order of business was to produce the university's mission statement providing as it does the framework through which the university articulates its goals and values. Drawing on the details provided the team devised the following mission statement: To be recognised as a university that has a commitment to providing an environment that fosters innovative and creative thinking that has strong links to industry and the wider community.

Having established the university's mission statement and its wider strategic imperatives the group were set with addressing a specific issue; in this instance the issue of micro-credentials. The University wants to be the first in the country to take advantage of the emerging micro-credentialing and digital badging movements. The Senior Leadership initial concern is that any attempt to recognise a wider range of skills through new credentials could potentially risk the University's growing international reputation. The working group at EOLLA had to investigate whether the institution should develop a digital badging initiative to help better recognise and showcase to employers a wider range of skill and qualities of graduates.

3.1 Digital Badge Context

The rise of web connectivity increased the online learning trough informal courses, so in order to accredit different levels of knowledge, informal skills or a level of competency acquisition, the badges are gaining in popularity (Open University, 2016). "A digital badge is a clickable graphic that contains an online record of an achievement, the work required for the achievement, evidence of such work, and information about the organization, individual, or entity that issued the badge" (Oliver, 2016). The badging benefits any university

because it suppose that it will strengthen the teaching & assessment strategy as well as offer flexibility and a transparent way to acknowledge development to Lifelong Learners and industry links (Mah, 2016).

In investigating the possibilities afforded by digital badging in the case of the Newish University the group identified the following types:

1. Non ECTS award. The provision of online badges (open badging) for demonstration of a prior skill, competency or knowledge.
2. The sequential acquisition of ECTS allow entry to a degree/could be a bridge into UG/master programmes where courses are missing.
3. Students undertake a micro course and/or demonstrate a competency and are awarded a digital badge.
4. Courses developed in conjunction with industry partners; as much as possible utilise existing content. In this case the employers will pay per badge.

For a university that positions itself in close alignment with fostering close both community and industry links a comprehensive digital badging system offers much in terms of flexibility and progression. From the working group's (and the university's) perspective digital badging provided the means of facilitating non-traditional learners an access route into higher education and additionally a mechanism through which closer practical links with industry could be fostered. This last point is worth noting, providing as it did some debate regarding the direction of the group's proposal; namely, how much should the university position itself towards meeting the needs of industry vis-à-vis the needs of the community? As outlined above digital badges (in theory) offer a number of advantages that can benefit both industry and the wider community. However, as badging represents a new challenge to the university with the attendant costs the group acknowledged that working with industry may offset much of the initial expenditure which in turn will ultimately benefit the wider community. At the same time the proposal will act as a proof of concept to the benefits afforded by digital badging to those within the university's academic community who are sceptical about micro-credentialing with little financial exposure to the university.

3.2 The proposal

The proposal consisted of three distinct but interrelated phases: a scoping phase; a pilot implementation phase and a roll-out phase. The scoping phase involves liaising and collaborating with five biggest local industry (in terms of number of employees) links to identify and develop micro credential courses that university can provide as CPD. The plan of action consist in the three stages shown in Figure 1.



Figure 1: Plan of action

The University Units involved at Stage One, are the Academic Affairs, the Learning Strategy Unit, the New Technology Unit Relevant Academic Depts. and the Industry Links. During the second stage are going to be the Learning Strategy Unit, the ICT and the Lecturers together with the Industry Links and Students. The opportunities and challenges are shown at Table 3.

Table 3: Opportunities and challenges adopting digital badging

Opportunities	Challenges
• Future student recruitment	• In-house development and curation or outsource?
• Forge closer links with industry partners	• Integrity of assessments? – Paid proctoring or other arrangements.
• Establish further links with other partners (State, NGOs) & Public	• Staffing compliments
• Develop expertise in micro-credentialing and badging	• Recognition of badges
• Data Analytics	• Data Analytics (Ethics)

Any proposal will ultimately be judged terms of its ability to deliver on its outcomes. In order to assess the impact the following measures were proposed:

- Funding received from five partners (Estimate €120-150K),
- Evaluate impact on CPD in companies including ROI,
- Analytics of number of members of public undertaking badges/courses,
- Research Outputs including evaluation report,
- Assess public brand recognition,
- Number of students transferring from badges with ECTS

In drawing up the list of measures the group were mindful of the need to assess both the commercial and community impact. The main issue with assessing impact is the vexed question of what counts and what doesn't count, in particular when it comes to assessing impacts at a community and individual level; personal development and growth is not as easy to 'measure' as the number of badges issued by a company.

4. Reflections

Thus far the paper has talked about the work that was undertaken in the face-to-face setting in Brussels. However, it must also be acknowledged that the process began in advance with the establishment of the virtual academy where the participants were invited to engage in a number of tasks such as required readings and introducing ourselves (via a discussion forum) to the other members of the upcoming group. While the asynchronous forum was useful in establishing a presence, it might be worth considering a synchronous event such as a webinar prior to the face-to-face sessions as well.

There is a realisation that management and leadership are not the same thing, even if they are sometimes used synonymously. John Kotter (cited in Ratcliffe, 2013), the Konosuke Matsushita professor of leadership at Harvard University defines leadership in the following terms: "It is about aligning people to the vision,

that means buy-in and communication, motivation and inspiration.” Many of the EOLLA attendees did not occupy positions that could be described as managerial; however, many were to a greater or lesser extent ‘digital leaders’ in their respective institutions. As such, though communication and inspiration they are in a position to shape and influence the direction of digital provision both at an individual with respect to their peers and though a ripple effect at an institutional level.

We are often presented with the concept of the charismatic leader, the late Steve Jobs being one such example. Leadership, we are told is something innate and cannot be taught; you either have it or you don’t have it is the inference. However, in reality there will only be a limited number of hugely charismatic leaders. Initiatives such as EOLLA strongly suggest that leadership attributes can be honed and improved albeit with people who are already having achieved some degree of leadership within their respective institutions. Overall, the Newish University working group were very positive about the EOLLA experience. The scenario based case study approach coupled with expert speakers to help inform and stimulate was a lively and engaging couple of days. By working through a scenario based case study we were able to explore the different values and approaches that we brought to the academy from our different institutions and countries. At the conclusion of the workshop there were a number of discussions with regard to how the academy idea might develop. One suggestion was that the workshops could be rolled out on a country by country basis with attendees coming together from different parts of the country. However, we reflected that one of the primary benefits of the academy was that we had been afforded the opportunity to come together from different parts of Europe. In this way we brought our different perspectives and experiences to bear and in turn helped to foster a better understanding about the issues that both separate and bind us; in short, the creation of a European network of distance leaders.

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E-students' readiness to adjust to online learning technology

Di Mele Luciano

International Telematic University UNINETTUNO - Italy

Cosi Gianluigi

International Telematic University UNINETTUNO - Italy

Paciello Marinella

International Telematic University UNINETTUNO - Italy

Abstract

The development of new technologies has permitted an upsurge of Smart Universities based on online courses and the effectiveness of e-learning has been widely demonstrated. Yet, the predicting variables at the basis of e-students' success are still in question. Several authors in the field of face-to-face learning have proposed that their future achievements are linked to their readiness to adjust to the learning environment and cope with new studying strategies in the first months of course attendance. However, currently there is little research with regards to online students. To this aim, we recruited N=100 freshmen at Uninettuno University (31% males; mean age 33.9) who were requested to participate in the present pilot study and fill in an ad hoc questionnaire assessing demographic information, students' skills in the use of technologies oriented towards *social interactions* (SI) or *information gathering/productivity* (IGP). A regression analysis was performed to verify whether achievements were predicted by students' skills and readiness in using technology for the scope of their learning goals. IGP predicted higher grades at the end of the first semester, whereas SI predicted the frequency of students' accesses to the online learning environment. This allows for a preliminary profiling of e-learners with regards to their use of technologies, thus adding new useful support for the planning of tailored online courses in higher education, specifically during the first months after enrollment.

Keywords: e-learning, students' profiles, digital literacy, students' readiness

1. Introduction

Over the past decade web-based technologies have radically modified the teaching and learning habits and strategies at university level. This phenomenon has been fostered by the increasing trend of MOOC courses. In the US the 32% of postsecondary course enrollment is Online (Allen & Seaman, 2013). 'Growth in online course enrollments is clear and many researchers agree that the future of higher education is tied to some form of online course delivery' (Atchley, Wingenbach, & Akers, 2013, p.1). Consequently, several researchers have examined e-learning students population finding no significant differences between face to face and distance learners with respect to their academic performance. They nevertheless found a significant difference in other academic outcomes (Atchley, Wingenbach, & Akers,

2013). This type of students indeed seem more at risk to drop-out of on-line courses and to have difficulties in adjusting to an e-learning education system. In fact on-line education is characterized by constantly challenges, due to the continuous updating of technology environment (Johnson et al., 2000). Teachers constantly use new technologies to explain and clarify content of their courses, provide feedback on assignments, exemplify theoretical models by using on line practical simulations, and in general interact with students during e-learning processes. Therefore, students have to be equipped to efficaciously interact with teachers and other students by using ICT (Information and Communication Technology), to use various e-learning tools, and to regulate their learning strategies in technologically mediated educational context.

In addition, e-students have to manage different private and work commitments during their education - that could lead to drop out (Santana et al. 2014). Indeed, the population of e-students can be heterogenic not only with regard to previous technological skills and experiences but also with regard to age and occupational status. Some students, in emerging adulthood, are digital native and for the first time in their lives they are the protagonist, the real producer of their choices, setting their future occupational paths (Arnett, 2000). Others are adults actively involved in social and professional roles who must manage all the life tasks and responsibilities in several realms (family, job....), having learned to use technology later. In this wide spectrum of e-students' characteristics we can find different motivations, logistical conditions and personal goals, that may lead to their academic success. Working students and young students may have different concepts of success as the latter are not yet involved in the working world. On the other hand, we must take into account the teachers' concept of success, the academic achievement should include students' critical skills (Watkins, Leigh & Triner, 2004). The effectiveness of adult learners in the digital age is an open question and needs more time to be better understood to avoid the increasing gap with the young learners (Steinke & Bryan, 2014). However, apart from technology determinism, the academic performance has many non-intellective correlates, such as motivation, self-regulatory learning strategies, and psychosocial contextual influences (Richardson, Abraham & Bond, 2012).

"Overall, the potential for information and communications technologies (ICTs) to allow people to learn at all stages of life has been seized upon as a ready means of establishing inclusive 'learning societies'" (Selwyn, Gorard & Furlong, 10, 2006). This sort of democratization occurred thanks to technologies of education and new perspectives in lifelong learning have opened up as a result. However, this kind of learning system is characterized by high flexibility and complexity that, on the one hand, permit to study without limitations of space and time but, on the other hand, require new technological, social and self-regulatory skills to manage successfully the e-learning process. The main challenge for distance education is to better clarify why some students cope better than others with on-line demands and, therefore, how is it possible to help them in adjusting to e-learning system.

Based on the premises, the present study aimed to provide a more comprehensive picture of the e-freshmen population. This framework could be useful for teachers and institutions to draw students' profiles and to identify those technological expertise's that could be useful for academic adjustment (e.g. performance). This could be crucial for educators, mentors and tutors for helping freshmen in developing instrumental technological skills to successfully master the e-learning environment, when necessary. The importance to investigate student's motivation and demographic characteristics is well-known in literature on distance education to predict positive academic adjustment (Garrison, 1987) or e-dropout (Jun, 2005). In

this work we will consider the above dimensions. However, in the current digital society other aspects specifically related to use of technology need to be more effectively examined in order to understand e-students' academic adjustment. For example, the capability to access, search, evaluate, and interact with digital social media, are skills generally important in the use of technology (Ng, 2012) that can help freshmen to self-manage their e-learning process and achieve their academic goals. For these reasons, we considered students' technological expertise to examine their readiness in starting their e-learning educational path. This construct, in fact, seems to encompass several variables that account for student's capability of adaptation in the e-learning environment and usage of technologies (Hashim & Tasir, 2014). The e-learning readiness assessment measures students' ability to adapt to the technological environment and it includes diverse sub-factors; for example self-directed learning (Pachnowski & Jurczyk, 2000), learning styles, and study habits (Chan & al., 1999). The pre-existing technological skills and experiences of freshmen could deter positive academic outcomes in an initial phase of e-learning process and this could compromise the initial students' motivations and expectations. This technological aspect is particularly important to know even at the beginning of the first year, because it is well known that positive academic feed-back in the first semester is an important predictor of later academic adjustment (DeBerard, Spielmans, & Julka, 2004).

2. Digital competences in higher education

The strong rise of digitalization is transforming economy, social relations, identity, citizenship and access to knowledge (Castells, 2011). The society is constantly changing, and people need to know how to deal with new problems. Consequently, the notion of literacy needs to be updated, it must enable people to achieve their goals for life, in different environments and conditions (Rychen & Salganik, 2003). People generally have difficulty in applying the knowledge acquired at university and at school to the practical problems of life. Intelligence is an emerging option located in a context. The school looks very different from the social reality, where it is clear that the skills are needed to address the problems. A great challenge for educators is to find a development of the concept of competence also in formal education places (Jonnaert & al., 2006). For this writing and reading skills are no longer sufficient, people need also technical, social skills and they should be able to master cognitive strategies in their own learning processes. The concept of competence is more appropriate to include a set of capabilities that address always new situations and problems (Le Boterf, 1994). The European Union has definitely promoted this educational vision by developing key competences for lifelong learning: communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, cultural awareness and expression, digital competence, learning to learn, sense of initiative and entrepreneurship, social and civic competencies¹¹². As we can see part of these key competencies are clearly oriented to the social life and part to personal knowledge. Communication in the mother tongue and in foreign languages are competencies for self-expression towards the others and intercultural dialogue. Also social and civic competencies and sense of initiative and entrepreneurship deal with active participation to the democratic and working life. People should be equipped "to participate in an effective and constructive way in the community". Other competencies are needed for personal empowerment both at the cognitive and meta-cognitive level, like basic competencies in science and technology or the ability in learning to learn.

¹¹² <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:c11090>

According to the Dublin descriptors¹¹³ the education system is slowly evolving towards the competencies as its main framework. Higher education is adapting to the new notion of competence, however there is a lack of literature in the third level of education (Mengual-Andrés, Roig-Vila & Mira, 2016). The courses are designed beyond individual disciplines and including complex activities for students. ISTE (International Society for Technology in Education) proposes specific standards to empower students' skills as learner, citizen, creator in the digital era¹¹⁴, however the assessment of competence is an open question and deals with shared criteria.

3. Objectives, aims

The aim of the present study is two-fold:

First, we aimed to evaluate freshmen's perceived technological competency in a sample of distance university students. We hypothesized that the use of technology could be related to some specific students' skills, such as self-regulatory capabilities - for example in the case of online behaviors aimed to plan actions, search and select information, organize activities, tasks and social skills. For example in the case of online behavior aimed to create and maintain relationships, participate actively in one's own on-line community, sharing and socialization.

Second, we aimed to test the predictive power of identified technological dimensions on two outcomes related to positive adjustment, such as average grade of exams at first semester and accesses to the e-learning environment.

Our hypothesis is that identification of technological dimensions and the examination of their relationship with two important outcomes for students (grade of exam, access to e-learning platform) could be useful to understand which elements are intervening in the e-learning process and therefore promote e-students' readiness already to adjust to online learning technologies.

Moreover, in line with literature suggestions we examine the possible role of age and gender in understanding pre-existing technological skills and experiences

4. Method

4.1 Sample

Freshmen enrolled at the Faculty of Psycho-social Disciplines at the International Telematic University Uninettuno (UTIU) during the period July-October 2015 voluntarily participated in the research. Participants were 100 adult individuals (31 males and 69 females) aged between 20 and 77 (mean = 33.9, standard deviation = 12.72). Level of education of the sample is medium-high: 89.9% of individuals had a high school diploma and 10.1% of them had an academic degree. They are mainly worker-students (79.6%), the majority of which had full-time jobs (67.6%). Their university achievements (i.e. average grade of exams) and the amount of their accesses to the UTIU online learning environment were analyzed at the end of the first semester, on 31st March 2016.

¹¹³ http://ecahe.eu/w/index.php/Dublin_Descriptors

¹¹⁴ <http://www.iste.org/standards/standards/for-students-2016>

4.2 Procedure

After being adequately informed about the objectives and purpose of the research, 171 freshmen enrolled in the period ranging from July to October 2015 were invited to participate in the study. 100 out of 171 (58.5%) agreed to be interviewed. An online questionnaire was designed to collect demographic data and investigate the frequency of use of Internet apps (5 items) and the purpose of use of Internet applications (12 items). Objective data related to university achievements and the number of accesses to the UTIU environment were obtained from the official student record database.

4.3 Measurements

Frequency of use of applications: An ad-hoc scale (5 items) was built in order to measure the frequency of use of Internet applications. As expected, a factor analysis revealed two dimensions depending on the technological use of the applications: one factor collects two *Social Interactions* applications (Facebook, Instagram); the other factor collects three *Information Gathering/Productivity* applications (blog, cloud computing, Google Maps). The question was “How often do you use the following Internet applications?” and responses were evaluated using a 6-point Likert-type scale: “never”, “once a month”, “twice or three times a month”, “once a week”, “twice or three times a week”, “every day”.

Purpose of use of applications: An ad-hoc scale (12 items) was built in order to measure the purpose of use of the previously listed Internet applications (items related to the frequency of use). The question was “For which purpose do you use the above-mentioned applications?” and responses were evaluated using a 4-point Likert-type scale: “never”, “sometimes”, “often”, “always”. A factor analysis revealed two dimensions: one factor reflects a purpose oriented to *Social Interactions* (7 items, e.g. “to share my mood”, “to express my opinions”); the other factor reflects a purpose oriented to *Information Gathering/Productivity* (5 items, e.g. “to seek information”, “to work better”).

4.4 Analysis

We analyzed the “frequency of use” and the “purpose of use” scales in order to investigate their psychometric properties by using an Exploratory Factor Analysis. Factor extraction was based on scree plot assessment (eigenvalues exceeding 1), percentage of explained variance, content validity of items, factor loadings of items. More specifically, the principal axis factoring method was used to investigate: 1) the factor structure of the “frequency of use” scale, with no factor rotation; 2) the factor structure of the “purpose of use” scale, performing an Oblimin rotation of the factor axes.

A descriptive analysis of the control variables, i.e. gender and age, was preliminarily conducted using one-way ANOVA (Analysis of Variance). Five age groups were created: 1) 18-25 years (34%); 2) 26-35 years (23%); 3) 36-45 years (25%); 4) 46-55 years (12%); 5) older than 55 years (6%). Groups were chosen with the aim of comparing the results with other studies on traditional university students in initial education, generally contained in the age group 18 to 25 years, taking into account a difference with other demographic researches which use a larger corresponding age group (e.g. 18 to 29 years).

Furthermore, we calculated the correlations between the following variables: “average grade of exams”, “number of accesses to the UTIU e-learning environment”, “frequency of use of IGP applications”, “frequency of use of SI applications”, “IGP purpose of use of applications” and “SI purpose of use of applications” (SI = *Social Interactions*, IGP = *Information Gathering/Productivity*). Lastly, we built regression

models using “frequency of use” and “purpose of use” as independent variables, “average grade of exams” and “number of accesses to the online environment” as dependent variables.

5. Results

5.1 Psychometric properties of the “frequency of use” scale

Results of the exploratory factor analysis revealed two factors explaining 60.5% of the total variance. As seen in Table 1, the first factor consists of 3 items related to IGP applications (35.4% of explained variance, eigenvalue 1.8), whilst the second factor consists of 2 items related to SI applications (25.1% of explained variance, eigenvalue 1.3).

Hence, based on the content of items, we named the first factor “IGP-frequency” (i.e. “frequency of use of *Information Gathering/Productivity* applications”) and the second factor “SI-frequency” (i.e. “frequency of use of *Social Interactions* applications”).

Table 1 - Factor structure of the “frequency of use of IGP/SI applications” scale. Extraction method: Principal Axis Factoring. No rotation of factor axes needed.

	IGP- frequency	SI- frequency
<i>How often do you use the following Internet applications?</i>		
Blog	.85	.10
Cloud Computing (e.g. Dropbox, Google Drive)	.58	-.09
Google Maps	.46	-.17
Facebook	.05	.65
Instagram	.05	.32

Correlation coefficients exceeding .30 are in bold print

5.2 Psychometric properties of the “purpose of use” scale

The factor analysis revealed two factors explaining 58.2% of the total variance. Performing an Oblimin rotation of the factor axes, we obtained a factor structure as described in Table 2: the first factor consists of 7 items related to the purpose of IGP (37.1% of explained variance, eigenvalue 4.5), whilst the second factor consists of 5 items related to the purpose of SI (21.1% of explained variance, eigenvalue 2.5). Based on the content of items, we named the first factor “IGP-purpose” (i.e. “*Information Gathering/Productivity* purpose of use of applications”) and the second factor “SI-purpose” (i.e. “*Social Interactions* purpose of use of applications”).

Table 2 - Pattern matrix of the “IGP/SI purpose of use of applications” scale. Extraction method: Principal Axis Factoring. Rotation method: Oblimin with Kaiser normalization.

	IGP- purpose	SI- purpose
<i>For which purpose do you use the above-mentioned applications?</i>		
To share my mood	.84	-.15
To discuss and share my opinions	.75	.05
To express my opinions	.73	.11
To share photos and videos of special moments	.72	-.21
To create interest groups	.64	.18
To expand my social network	.52	.17
To know what other people do	.49	.03
To work better	.03	.80
To study and enrich my cultural baggage	.15	.76
To seek information	-.18	.68
To organize my activities	.15	.67
To view updates	.02	.61

Correlation coefficients exceeding .30 are in bold print

5.3 Gender differences

There are no statistically significant differences for the dimensions of average grade of exams, IGP-frequency and SI-purpose between males and females. As far as the number of visits to the e-learning environment concerns, results indicate that female students access more than male students [$F(1.98) = 5.09$, $p = .026$] (see Table 3). With regards to the dimension of SI-frequency, results show that female students use *Social Interactions* applications more often than male students do [$F(1.97) = 7.45$, $p = .008$] (see Table 3). Eventually, with respect to the dimension of IGP-purpose, results indicate that female students use Internet applications for the purpose of *Information Gathering/Productivity* more than male students do [$W(1,40.8) = 4.65$, $p = .037$] (see Table 3).

Table 3 - Mean and standard deviation of dimensions with a statistically significant gender difference

	<i>E-learning Accesses</i>		<i>SI-frequency</i>		<i>IGP-purpose</i>	
	Mean	SD	Mean	SD	Mean	SD
Males	237.48*	141.87	2.75**	1.42	2.99*	.79
Females	320.99*	182.49	3.67**	1.60	3.33*	.52

*p<.05; **p<.01

5.4 Age differences

Regarding age groups, our results show there is a statistically significant difference for the dimension of SI-frequency, using the Tukey HSD post-hoc test. The youngest students, aged 18-25 and 26-35 years old, use *Social Interactions* applications more often than students over 45 years old do [$W(4,26.4) = 4.84, p = .005$] (see Table 4).

Table 4 - Mean and standard deviation of the dimension of SI-frequency

	<i>SI-frequency</i>	
	Mean	SD
18-25 years	4.17*	1.77
26-35 years	3.54*	1.62
36-45 years	2.96	1.07
46-55 years	2.50	1.09
over 55 years	2.17*	1.29

*p<.05

5.5 Relation among frequency of use and purpose of use of applications, university achievements, visits to the e-learning environment

We performed the bivariate correlations between the variables that have been investigated in the present study. According to the data, the dimensions of “frequency of use” and “purpose of use” are significantly correlated to each other in a consistent way: the frequency of use of IGP applications is associated with the IGP purpose of use of applications (.36***) and the frequency of use of SI applications is associated with the SI purpose of use of applications (.40***). Furthermore, the average grade of exams at the end of the first semester is associated with the frequency of use of IGP applications (.40***) and the IGP purpose of use of applications (.37**), whilst the number of accesses to the e-learning environment is associated with the frequency of use of SI applications (.26**).

Table 5 - Pearson's correlation coefficients (two-tailed) between the main dimensions under investigation

	IGP- frequenc y	SI- frequenc y	IGP- purpose	SI- purpose	Average grade of exams
SI-frequency	-.02				
IGP-purpose	.36***	-.09			
SI-purpose	.16	.40***	.32**		
Average grade of exams	.40**	.10	.37**	.11	
E-learning accesses	-.05	.26*	-.01	.05	.14

*p<.05; **p<.01; ***p<.001 - Correlation coefficients exceeding .30 in absolute value are in bold print

Two regression models were created (see Table 6) in order to examine the contribution of each of the two dimensions of "frequency of use" to both the students' achievements and the number of visits to the e-learning portal. Also, a regression model was created (see Table 7) with the aim of studying the contribution of each of the dimensions of "purpose of use" to the students' achievements.

Table 6 - Contribution of frequency of use of applications to the average grade of exams and to the number of e-learning accesses

	Average grade of exams	E-learning accesses
	β	B
SI-frequency	.13 (ns)	.25*
IGP-frequency	.41**	-.05 (ns)
R ²		.18**
		.06*

*p<.05; **p<.01

Table 7 - Contribution of purpose of use of applications to the average grade of exams

	Average grade of exams
	B
SI-purpose	-.02 (ns)
IGP-purpose	.37**
R ²	.13*

*p<.05; **p<.01

The results of the regression models show that students' achievements at the end of the first semester are influenced by the frequency of use of IGP applications (18% of explained variance) and by the IGP purpose of use of applications (13% of explained variance). It also emerges that the amount of visits to the e-learning environment at the end of the first semester is influenced by the frequency of use of SI applications (6% of explained variance).

6. Discussion

The results tell us that students practice two types of use of technology and that both identify a different outcome in academic studies. A first type of technological behavior is linked to the use of apps like Google Maps, the attendance of Blogs and the habit of using online data storage. The skills needed to use these online applications are referable to cognitive ability to select, organize and manage information in order to achieve a personal goal. In fact, the cloud storage requires not only technical skills, but also storage and document retrieval strategies. Likewise the use of Google Maps can be associated to a capacity planning and forecasting of actions, these capabilities are components to support cognition. Although blogs have become a web niche phenomenon, they are still present and represent the interests and special knowledge bottom-up. Those who frequent the blogs demonstrate an ability to select sources of knowledge, to look deep into the web, to accept the specialized knowledge sharing. Thus, the use of this kind of applications could be related to meta-cognitive processes that could support a self – regulated learning process (Novak & Gowin, 1984). Indeed, students who said they use these apps frequently are also those who were more prepared in facing the exams: this specific technological expertise predicted significantly and positively the average grade of exams demonstrating a better readiness of some students in taking advantage of technological academic resources and in coping with learning tasks.

A second way of technological behaviors are related to the participation in social media as FB, or the use of fast interpersonal communication apps like Instagram. The use of these apps regards ability to manage relationships mediated by technologies. So students more active on social media have the ability to participate in online groups, create events and use the technology of communication and expressive purpose. Students who prefer social interactions in web were also those who have had more access to educational platforms. However the use of this kind of applications did not influence academic performance; likely the social competence related to ICT need to be oriented strategically by the teacher in

order to transform a possible sense of belonging into an effective collaborative learning process. The purposes of use of application are consistent and congruently correlated with the two motivational dimensions identified from the factor analysis: the IGP (Information Gathering / Productivity) and SI (Social Interactivity). The IGP is related to the desire for self-fulfillment or knowledge, while the SI is related to the desire for belonging and social sharing.

An interesting data regards differences in gender and age. Indeed the Uninettuno students are distributed in all age groups. They all use the technologies at the same levels of effectiveness, but it should be noted that younger students make greater use of social media. They prove to be always connected, there is no time to be in or out of the virtual environment. We have to think that they are always a click away from access to the platform. Moreover, there are only few noticeable gender differences: males have a higher number of accesses to the platform, while females make greater use of Facebook and Instagram.

7. Conclusions

The opportunity to know the psychological profiles and aptitudes of the students and their use of technologies allows a great advantage, especially for students who attend distance courses at the university. The students' data on two factors, IGP and SI, can be predictive of university adjustment. In particular, they allow to check if a student is brought to have a greater readiness in exams or to attend more the platform.

In addition the analysis of these dimensions allows the university to plan particular educational countermeasures. For instance collaborative tasks or peer-regulated activities can be offered to students who are result-oriented, while other tasks improve concentration and readiness for social students.

The syllabus of the course can be tailored to the student's characteristics or even to offer them tasks to complete their aptitudes.

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Quality & Faculty Satisfaction in Higher Education Online

Danila Scarozza

International Telematic University Uninettuno
danila.scarozza@uninettunouniversity.net

Marco De Marco

International Telematic University Uninettuno
marco.demarco@uninettunouniversity.net

Alberto Romolini

International Telematic University Uninettuno
a.romolini@uninettunouniversity.net

Abstract

In the last decade, online education has become a fast-growing delivery method in higher education in Italy. According to data provided by the Italian Ministry of Education, Universities and Research during the academic year 2014-2015, 60.000 students were enrolled in a Telematic University, experiencing a 33.7% growth rate in the last three years. Moreover, according to data provided by ANVUR, the 72% of students come from a public university. In this frame it is important to inquire about student and faculty perceptions of quality in online courses in order to assist University leaders in changing policies that will lead to improvement of teaching and learning conditions, if necessary (Bolliger, Wasilik, 2009). Faculty satisfaction is one of the five pillars of quality, together with student satisfaction, learning effectiveness, access, and institutional cost-effectiveness (Sloan Consortium, 2002). Components of faculty satisfaction and its implications on students satisfaction and students' outcomes need to be investigated as online education becomes more prevalent and dynamic forces such as adoption rates, learner expectations, levels of support, and other conditions continue to change.

Keywords: online teaching; quality; faculty satisfaction; higher education

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1. Introduction

In these years, online education has become a fast-growing delivery method in higher education in Italy (Garito, 2013, 2015). Evidence of the embracement of online education is provided through the analysis of trends over the last decade (Garito, 1993). According to data provided by the Italian Ministry of Education, Universities and Research during the academic year 2014-2015, 60.000 students were enrolled in a Telematic University, experiencing a 33.7% growth rate in the last three years. Moreover, according to data provided by ANVUR, the 72% of students come from a public university. The current economic downturn has increased demand for both online courses and programs it is expected that this trend will continue.

Maeroff (2003) maintained that developments in online education are not “just a fad” but a “sea change” (p. 2). The amalgamation of knowledge and technology permits higher education to provide learning anytime, anyplace, and to anyone (Aggarwal & Bento, 2000; Garito, 2001; Pittinsky, 2003). Today, online education represents a firmly embedded part of the higher education landscape: networked digital communication has facilitated an explosive growth in this relatively new method of reaching learning populations to the point that the higher education trend to produce distance education units and programs has been referred to as a “land rush” (Molenda & Harris, 2001, p. 6) to get online.

In the light of the fissure between how education is classically delivered, what we know about how people learn (Palloff & Pratt, 1999), and trends in how distance education can become commoditized, the question at hand becomes: “What leads to successful teaching and learning in online education?” When teaching and learning leaves the four walls of a classroom and enters an electronic environment, a new educational paradigm must be adopted in order to facilitate student success. Successful students lend credence to what makes higher education unique. “In this new e-learning environment there is no viable option for the university to do as it has always done. To do so will be to become more and more marginalised” (Spender, 2001, p. 25). We must then consider that distance education is more than the simple transfer of an existing instructor’s verbal lecture to an electronic textual/ image/audio environment which is enclosed within the pre-packaged structure of an off-the-shelf Internet-based course administration application. Computer-mediated distance education classes have a distinctive social structure, unlike those found in a face-to-face class. This social structure has a strong influence on students’ learning and students’ satisfaction with the class and on the method in which the class is presented in the digital world (Swan, 2001).

Concurrent with the phenomenal growth in online learning, stakeholders in education continue to demand greater accountability and evidence of effectiveness in teaching (Wilbur, 1998). Research in this area tends to focus on whether online learning is as effective as face-to-face learning in achieving learning outcomes. According to the previous studies on the effectiveness of online learning fall into three broad categories: (a) students’ outcomes, focused on test scores and grades; (b) student attitudes about learning; and (c) overall student satisfaction with online learning. Findings largely support the view that the learning outcomes of students online are similar to those in face to face settings (Palloff & Pratt, 2001).

However, along with students’ satisfaction, also faculty’s satisfaction is a critical building block of quality (Sloan Consortium, 2002) in online education. Faculty’s satisfaction is quite important, given that it affects faculty’s motivation, which, in turn, contributes to enhancing students’ learning experience. Webster and Hackley (1997) stated that the positive attitude by e-learning instructors toward technology, interactive teaching style, and control over technology contributed to some of the success of effective learning. Selim (2007) also found that instructor’s attitude toward interactive learning was the most critical success factor

in e-learning. According to Meyer (2002), the need to understand how individual qualities of the faculty, such as age and motivation, as well as issues of policy and satisfaction impact also student's outcomes is critical. It is not a stretch to suggest that the members of the faculty who are satisfied teaching online are more likely to continue teaching online. In this frame it is important to inquire about student and faculty perceptions of their satisfaction in online courses in order to assist University leaders in changing policies that will lead to improvement of teaching and learning conditions, if necessary (Bolliger, Wasilik, 2009). The focus of this research was to develop a conceptual model useful for a better understanding of the level of satisfaction among online faculty and students, and to see what sort of relationship exists between satisfaction and student students outcomes in online education.

2. Theoretical Framework

Critics of online education have questioned the value, effectiveness, and quality of online education. Ulmer, Watson, and Derby (2007) examined perceptions of faculty pertaining to the value of distance education and reported statistically significant differences in findings between faculty with and without distance education experience. Their results suggest that experienced faculty view on-line education as effective in terms of student performance and instructor-to-student interaction, and they promote and recommend engagement in this type of education' (p. 69). However, researchers have reported conflicting results regarding the performance of online students (i.e. *students' outcomes*). Some experts (Hislop, 2000) have reported no significant differences in levels of performance, whereas Schutte (1996) reported that student performance was higher in an online course than in a traditional course. Undoubtedly, this topic warrants further investigation before we can draw conclusions about the effectiveness of online learning. Quality is important in the delivery of all courses and programs, regardless of the environment in which they are delivered. Two of the five elements in the Sloan Consortium's quality framework for online education are student satisfaction and faculty satisfaction. These pillars of quality (Sloan Consortium, 2002) need to be assessed on an ongoing basis. The five pillars of effective online learning (Moore, 2009) are student satisfaction, learning effectiveness, cost effectiveness and institutional commitment (recently renamed as 'scale'), access, and faculty satisfaction, and are very much inter-related. Faculty and student satisfaction, for example, play a role in learning effectiveness and vice-versa. System theory supports the notion that change made to one part of a system affects all other parts of the system (Maguire, 2009).

Two of the several elements in the Sloan Consortium's quality framework for online education are student satisfaction and faculty satisfaction. These two pillars of quality (Sloan Consortium, 2002) need to be assessed on an ongoing basis.

2.1. Faculty Satisfaction

Faculty Satisfaction is a multi-faceted phenomenon can be defined as the perception that teaching online is effective and professionally beneficial (definition provided by the American Distance Education Consortium). Bolliger and Wasilik (2009) point out that faculty satisfaction is a “complex issue that is difficult to describe and predict” (p. 105).

A study of faculty satisfaction conducted by Ambrose, Huston, and Norman (2005), found both internal, intangible factors and external, tangible factors can impact a faculty member’s decision to stay at or leave an institution. Factors tend to be classified as intrinsic versus extrinsic, motivating versus inhibiting, and/or promoting satisfaction versus promoting dissatisfaction (Clay, 1999; Cook, Ley, Crawford, & Warner, 2009; Giannoni & Tesone, 2003; Schifter, 2000). Cook et al. (2009) classified factors as intrinsic or extrinsic and investigated the impact those factors had in contributing to the motivation or inhibition of experienced online faculty to continue teaching in the online education system. Intrinsic factors included desire to help students, opportunity to try something new, intellectual challenge, personal motivation to use technology, overall job satisfaction, the ability to reach a broader student audience, and the opportunity to improve teaching. Extrinsic factors included release time, support and encouragement from institution administrators and departmental colleagues, merit pay, monetary support, technical support provided by the institution, workload concerns, and quality concerns. This study showed that intrinsic factors positively contribute to ongoing and increased motivation to participate in the online education while failure to adequately address extrinsic factors can be found to contribute to greater inhibition to participate in the online education. Giannoni and Tesone (2003) used a similar classification. Their findings indicate that a mix of both intrinsic (i.e. personal satisfaction, teaching development, professional prestige, intellectual challenge, and recognition) and extrinsic factors (time, technical support, monetary issues, job security, and promotion) contribute to faculty satisfaction.

Several studies illustrate also the impact of faculty satisfaction on student outcomes. Hartman et al. (2000) suggest a co-linear relationship exists between student outcomes and faculty satisfaction. The authors point out in the review of their study that faculty satisfaction is influenced by a number of environmental factors including infrastructure, faculty development opportunities, faculty support and recognition, as well as institutionalization of online learning. Their conclusion, that faculty satisfaction drives student outcomes, and vice-versa, that student outcomes drive faculty satisfaction provides a unique perspective on the inter-relatedness of factors within the online learning environment. Bolliger and Wasilik (2009) report that a positive correlation exists between faculty satisfaction with online learning and student performance, which implies that a faculty dissatisfied with online learning may in some way contribute to lower student outcomes. Bolliger and Wasilik developed a survey tool, the Online Faculty Satisfaction Survey (OFSS) that

can be used to determine faculty satisfaction with online teaching and learning in terms of student-related, instructor-related, and institutional-related factors. A valid, reliable measurement instrument, as this tool was deemed to be, provides the ability to survey faculty and use the findings in conjunction with other measures such as student outcomes. This has the potential to provide further validation and support for the idea that faculty satisfaction with online teaching and learning can impact the outcomes of the students taught by these members of the faculty. Ulmer et al. (2007), developed a survey instrument that attempts to measure faculty perception of the comparative value and efficacy of distance education, as well as the perception of status of distance teaching. Though no attempt was made to correlate the survey results with student outcomes, the authors suggest that would be a likely next step. The study did show that instructors who have experience with online education have a better perception of it than those who have not had that experience. This suggests that experience may also play a role in overall faculty satisfaction with online and distance learning. The point is made that a successful distance education program is reliant upon a dedicated and committed distance faculty. A positive perception of distance education and satisfaction with the distance-learning environment are likely contributors to that success. Faculty satisfaction is a complex idea; it is an interaction of conditions related to the students, the institution, the department and even an instructor's own experiences and attitudes. Developing a deeper understanding of the aspects of faculty satisfaction that have the potential to positively and negatively impact student outcomes will be very useful when creating professional development programs for online faculty. Faculty who feel well-supported by their institutions, who have, for example, adequate technical and pedagogical support, and adequate professional development opportunities are reported to be more satisfied with online teaching overall (Tabata & Johnsrud, 2008).

2.2. Student Satisfaction

It would be remiss to consider faculty satisfaction without also considering student satisfaction. The interaction between faculty satisfaction and student satisfaction is both complex and recursive; each impacts the other. Student satisfaction is a critical consideration because it has been shown that students who are more satisfied with their online courses are more likely to complete them, thus contributing positively to overall successful completion (Swan, 2001). Menchaca and Bekele (2008) showed a positive correlation between student satisfaction with their online educational experiences and their willingness to continue taking online courses at the same institution. Jackson, Jones, and Rodriguez (2010) substantiated similar findings while pointing out the importance of student satisfaction to student retention in online programs. Indeed, student satisfaction and success are excellent indicators of online program quality (Sampson, Leonard, Ballenger, & Coleman, 2010). Numerous studies have been conducted to determine

factors associated with student satisfaction. A study by Ortiz-Rodriguez, Tieg, Irani, Roberts, and Rhoades (2005) revealed that four factors could be linked to student satisfaction: communication and timely feedback, good course design with rich media, administrative issues such as good software, and good support. Similarly, Evans (2009) was able to determine that faculty involvement, curriculum, student engagement, and flexibility were factors that significantly contributed to student satisfaction. Of special interest to this study is the frequency with which faculty-related factors have been shown to contribute to student satisfaction. Bolliger and Martindale (2004) demonstrated that the instructor is the main predictor of student satisfaction. Strong relationships have been found between timeliness/accessibility of the instructor and student satisfaction. Clearly stated expectations by the instructor as well as instructor enthusiasm have been shown to have a positive correlation with students' perceived value of the online course (Jackson et al., 2010). Swan (2001) reported that students who had high levels of perceived interaction with the instructor also had high levels of satisfaction with the course.

Those same students also reported higher levels of learning. Instructor feedback was determined to be the most significant transaction in support of quality communication in online courses (Ortiz-Rodriguez et al., 2005). It is evident that aspects of student satisfaction in the online education, and by extension, successful completion by students in this setting are tied to faculty-related issues. Hartman et al. (2000) uncovered a strong relationship between faculty satisfaction and student outcomes. This is an excellent indication that most members of the faculty are motivated by, and feel rewarded by student success in their online learning endeavors (Meyer, 2002). Frederickson, Pickett, Shea, Pelz and Swan (2000, p.258) confirmed this idea; "Those who felt that their on-line students did better also felt significantly more satisfied with on-line teaching." Working to better understand this relationship has potential for improving professional development programs geared towards online instructors and improving the overall quality of online programs.

3. Conceptual model and Hypotheses

This study focuses on faculty-related issues in the online learning environment. The problem to be addressed by this study is the development of a theoretical/conceptual framework in order to investigate the effect faculty satisfaction with online teaching and learning might have both on students satisfaction and on the outcomes of online students. This paper, in fact, represents only a first phase of a more ambitious study aiming to develop a better empirical understanding of the relationship between faculty satisfaction, students' satisfaction and student success in Italian higher education Universities. Various factors exist that help to describe and define the faculty experience of online education. (Betts, 1998; Bower, 2001; Durette, 2000; Fredericksen et al., 2000; Hartman et al., 2000; NEA, 2000; Palloff &

Pratt, 2001; Panda & Mishra, 2007; Passmore, 2000; Rockwell, Schauer, Fritz, & Marx, 1999; Simonson et al., 2009; Sloan Consortium, 2006). However, according to Bollinger and Wasilik (2009) these factors can be categorized into three groups: (a) student-related, (b) instructor-related and (c) institution-related. The access to higher education for a more diverse student population (Betts, 1998; Rockwell et al., 1999; Sloan Consortium, 2006), the interactions with students, (Fredericksen et al., 2000; Hartman et al., 2000; Sloan Consortium, 2006), are – for example – factors belonging to the first group. The second group of factors influencing faculty satisfaction include self-gratification (Rockwell et al., 1999), intellectual challenge, and an interest in using technology (Panda & Mishra, 2007). This environment provides faculty with professional development opportunities and research and collaboration opportunities with colleagues (Betts, 1998; Bower, 2001; Hartman et al., 2000; Palloff & Pratt, 2001; Panda & Mishra, 2007; Rockwell et al., 1999; Simonson et al., 2009; Sloan Consortium, 2006). In the last group, it is possible to include values and policies that support the faculty, workload issues, time for course development, compensation, a reward system for promotion and tenure (Bower, 2001; Hartman et al., 2000; Passmore, 2000; Simonson et al., 2009; Sloan Consortium, 2006) and, finally, policies that clarify intellectual property issues (Durette, 2000; Palloff & Pratt, 2001; Passmore, 2000; Simonson et al., 2009; Sloan Consortium, 2006).

A consideration of these factors helps to frame the questions to be answered in the Italian context, for which this first theoretical step is necessary. Specifically:

- What is the general level of faculty and students satisfaction with online teaching?
- What are the factors influencing faculty satisfaction in the online higher education?
- What affect do faculty satisfaction has on learning outcomes of online students? What is the nature of the relationship between any of the subscales of faculty satisfaction and students outcomes?
- What is the nature of the relationship between faculty satisfaction with online teaching and students' satisfaction?
- Can student satisfaction mediate the relationship between faculty satisfaction and students' outcomes? How?

The first two questions are descriptive in nature. The other questions, can be qualified by the development of appropriate hypotheses. According to the literature discuss above, the following hypotheses (figure 1) will be examined in the second step of this study.

Hypothesis 1: A significant correlation exists between the measured level of faculty satisfaction and students outcomes

Hypothesis 2: A significant correlation exists between the measured level of faculty satisfaction and students satisfaction

Hypothesis 3: Students satisfaction will mediate the relationship between faculty satisfaction and students' outcomes.

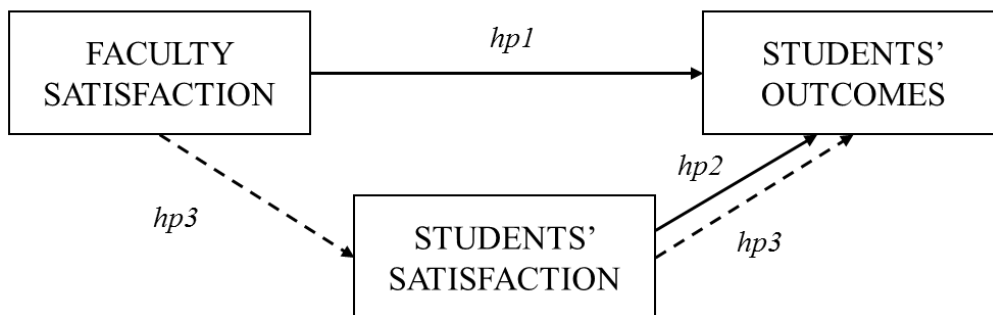


Figure 1 – The conceptual model

However, many factors play a role in student outcomes in both traditional and online courses; it is a complex issue. The conceptual model presented in figure 1 suggests that there are factors and characteristics of the students and of faculty that impact outcomes. This study focused specifically on satisfaction with online education and the role it play in students' outcomes. Further study may be called for that focuses on the role of institutional-related factors in the outcomes of students in online courses.

4. Study significance

Firstly, this study can provide more empirical insights on both the quality and the effectiveness of Italian online higher education fulfilling this gap in the existing literature. Moreover, the model proposed in this paper could be useful also for professional development efforts for online instructors. First, helping instructors understand the relationship between their satisfaction and their students' outcomes is important. Secondly, the study can produce some implications for institutional policy around online learning, in particular around areas of student readiness to be successful in their online learning efforts and in the consideration of requiring professional development for online faculty. Telematic Universities play today an increasing and very important role in Italian scenario of higher education due to their capacity to meet the changing demands of students (Garito, 2013, 2015; Parry, 2009). The traditional demographic of students will have changed considerably by the year 2020. The new demographic of students will be older

and perhaps married with children, more likely to be a member of a minority group, and work part or full-time. Successful institutions will be those that can offer coursework and degree programs in a variety of formats with a high degree of flexibility in order to meet fluctuating market needs (Van Der Werf & Sabatier, 2009).

In this frame, members of the faculty play a key role in the success of any institution of higher education. If it can be determined that faculty attitude towards and experience with online learning are correlated to student outcomes, then professional development programs can be developed for online faculty that help support the development of positive attitude towards online learning. Those responsible for hiring online faculty may be able to use the survey instrument to determine whether a specific instructor is a good fit for the assignment of online teaching. Finally, helping online faculty develop an awareness of how their attitudes can potentially impact student outcomes may encourage those teaching online to carefully consider their approach to online teaching and request the training and institutional support that is needed.

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Semantic technologies can help in learner-centred (re)design of study programmes

Achilles Kameas

Associate Professor, School of Science & Technology, Hellenic Open University, Greece

kameas@eap.gr

Abstract

Learning outcomes are used as the basis of occupational and educational standards, curricula, assessment criteria, qualifications descriptors, etc., whereas learning outcomes-centred competence-based education is considered to be adaptive, flexible and efficient. According to Cedefop, learning outcomes are defined as a statement of what a learner is expected to know, understand, or be able to do at the end of a learning process. But, given the abstract level of the definition of learning outcomes and the scale of a study programme, can a learning-outcome based approach be applied in practice? This paper contributes to the topic by describing a methodology to establish a holistic learner-centred continuum that includes learning subjects, learning outcomes and learning objects. The methodology is extended to include mapping of learning outcomes to job role descriptions and occupational standards (such as e-CF), so as to link education to the market. Online tools based on semantic technology have been realized in order to support the application of the methodology when (re)designing a study programme. The paper substantiates the proposed methodology and tools by describing the experience gained and lessons learned from their application in the redesign of study programmes of Hellenic Open University. HOU is the sole state University in Greece that offers study programmes from distance to more than 20.000 adult learners, more than two thirds of which are working professionals.

Keywords: Methodology, Ontology, Learning Outcomes, Learning Objects, Learning Activities, e-CF

1. Introduction

This paper introduces a methodology that can be used to design learner-centred learning programmes. The methodology results in a holistic learner-centred continuum that includes learning subjects, learning outcomes and learning objects, while it can be extended to include job role descriptions. The proposed methodology is based on Learning Outcomes and uses ontologies to achieve common representation of course related knowledge.

Learning Outcomes are used as the basis of occupational and educational standards, curricula, assessment criteria, qualifications descriptors, etc., whereas Learning Outcomes-centred competence-based education is considered to be adaptive, flexible and efficient. According to Cedefop, Learning Outcomes are defined as a statement of what a learner is expected to know, understand, or be able to do at the end of a learning process. Learning Outcomes enable educators to clarify educational intentions, to identify and sequence content, to decide on most appropriate teaching media, to select the most appropriate activities, to decide on suitable ways of assessing learning and to evaluate the effects and effectiveness of materials. On the other hand, they assist learners in acquiring new concepts and skills and enable their self-evaluation, so that they can achieve better performance in the educational process.

Ontologies, representing the knowledge and capturing a particular domain's semantics, constitute a formalism for perceiving and processing information, sharing knowledge, allowing its reuse and thus enabling communication between heterogeneous systems. Ontology constitutes an explicit specification of a shared conceptualization and is used as a means to represent a specific domain of knowledge or discourse in a formal way. The basic structural elements of an ontology are a) classes, representing the concepts related to a specific domain of knowledge, b) properties, expressing types of interactions among the domain concepts and further divided into object properties and datatype properties, c) instances, representing specific entities that are members of a class and d) axioms that express true facts about the ontology entities.

The development of an ontology requires significant effort and collaboration between ontology engineers and domain experts. We adopt a process composed of five phases, as shown in Figure 8 [3].

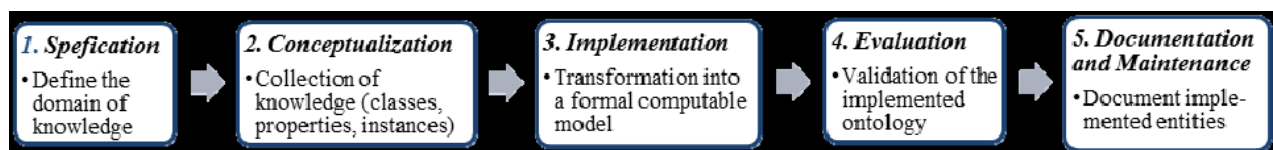


Figure 8. The Ontology Engineering methodology

In the rest of the paper, we describe the proposed methodology (section 2) and the particular activities required in order to model the teaching subject (section 3) and the expected Learning Outcomes (section 4), develop the Learning Objects (section 5) and Learning Activities (section 6). Then we describe ontology-based profiles for students (section 7) and jobs (section 8). An agent-based tool that integrates most of the above is described in section 9 and an example application of the methodology is presented in section 10.

2. Methodology

The proposed methodology aims at modelling all components of a study programme (teaching subjects, student profiles, expected outcomes, teaching material, teaching strategies), while it can be extended to include qualifications. The methodology consists of phases, each of them addressing measurable objectives by using specific inputs and producing distinct outcomes. Each phase can be further subdivided into steps, each of which addresses a partial objective.

2.1 Phase 1. Modelling the domain

The objective of this phase is to produce a comprehensive model of the teaching subjects of the study programme. Inputs to this phase can be the experience of the team or of experts, teaching material used or available, study programmes in similar domains, etc. The output is a set of Teaching Domain Ontologies (TDO). A stepwise process can be applied in order to engineer the final version of the TDO, starting from recording the main components of the domain and gradually refining them.

Step 1.1: Analysis of the educational problem. The Instructional Designer (ID) has to specify the subject of the teaching domain, its core concepts and the goals of the teaching process. To this end, the ID may survey existing study programmes in similar domains or sub-domains. The ID produces a network of interrelated concepts, which summarize his/her experience and goals, without paying much attention to details

Step 1.2: Overview of educational material (digital or non-digital). During this step, the ID is asked to summarize available educational material that can be used to serve the scope of the course. This material is going to be used as is or with some modifications in the design and development of Learning Objects during the following phases of the methodology.

Step 1.3: Development of teaching domain model. An essential requirement for writing precise Learning Outcomes and developing well-designed Learning Objects, is to have a complete view of the concepts of the teaching domain. The resulting ontology presents a hierarchy of the domain concepts using simple relationships, such as composition (has) and generalization-specialization (is-a), as well as more complex ones for the description of the correlations among them. During this step, the ID is asked to analyse each of the basic concepts that were defined in Step 1.1 into sub-concepts and define the necessary relations among them. It is important to produce a complete representation of the teaching domain in terms of concepts and relations, because they will form the basis for defining the Learning Outcomes of the course.

2.2 Phase 2. Modelling the students

In this phase, the ID analyses the profiles of learners, aiming to collect useful information about the characteristics of the audience (target group) to which the study programme is directed. These characteristics may include Demographics (age, sex, educational background, current competency level, any learning difficulties etc.), and Motives (interests, goals, reasons for training, educational experiences etc.). The collection and recording of these characteristics enables the adaptation of Learning Outcomes and Learning Objects, according to the needs and particular characteristics of learners. Input to this phase can come from questionnaires completed by the students, student models as they appear in the literature, or even student log files, if available. The outcome is a taxonomy of student profiles in XML notation.

2.3 Phase 3. Modelling the course outcomes

The objective of this phase is to produce a model of the outcomes that learners will achieve when finishing the course. In order to produce this model, the output of Phase 1 is used (and possibly refined). The output is a semantically rich network that combines TDO with Learning Outcome Ontology (LoutO). To realize this phase, a repetitive process is applied.

Step 3.1: Selection and ordering of core concepts. Each of the core concepts and their sub-concepts, as defined in Phase 1, are processed.

Step 3.2: Definition of Learning Outcomes. For each of the concepts sub-tree selected in Step 3.1, a set of Learning Outcomes is defined, in order to specify the knowledge, skills and competences that the learner will acquire for the concept. The Revised Bloom's Taxonomy (RBT) is used by the ID in order to define the Learning Outcomes. Then, the relations among the Learning Outcomes are defined, resulting into a LoutO.

Step 3.3. Updating the TDO. It is possible that some of the Learning Outcomes produced during Step 3.2 refer to concepts that have not been included in the TDO developed in Phase 1. The need to create Learning Outcomes for these concepts indicates that they are important in the learning process and thus should be included in the domain model. The ID, apart from updating the model by adding the missing concepts, needs to also correlate them with the already existing concepts.

2.4 Phase 4. Structuring the teaching material

The objective of this phase is to specify the teaching material that will be used to achieve the goals of the teaching domains of the study programme, as they have been recorded in the respective Learning Outcomes, tailored to the specific characteristics of course students, as they are recorded in the taxonomy of profiles. The outputs of the previous three phases are used as inputs to this phase, which produces a set of digital Learning Objects. This is the longest and more time consuming phase; a repetitive process is applied, based on Learning Outcomes.

Step 4.1: Selection and ordering of Learning Outcomes. Each of the Learning Outcomes, as defined in Phase 3, are processed. For each Learning Outcome, the ID has to provide some of its basic metadata elements, which and provide all the required information that is necessary for its development.

Step 4.2: Survey and analysis of educational material. This step builds on the outcome of Step 1.2. The aim is to identify possible sources of educational material, taking into account the specific Learning Outcomes and student profiles; additional material may have to be developed. This material should be OER - Open Educational Resources, meaning that it is freely offered in the educational community and that under concrete legal regime, it can be enriched, improved and redistributed for use in teaching, learning and research. The legal and technical framework for OER is provided by Creative Commons (<http://creativecommons.org/>). For example, it can be e-books, video lectures, academic journals, presentations, educational software and more.

Step 4.3: Develop the Learning Objects. All Learning Objects defined during the previous step have to be developed. They can be extracted from existing educational material of the course or the material that was identified during Phase 1, can be developed from scratch, or can be formed by combining existing educational material with new one. The development of Learning Objects can realized using a variety of authoring tools; the choice of the most suitable one depends on the technical type chosen for the particular Learning Object.

Step 4.4: Characterization of Learning Objects. In this step, each Learning Object is characterized with metadata according to a suitable educational metadata schema, preferably one that uses the TDO and LoutO. This step is necessary in order to make Learning Objects easily retrievable from the repository.

2.5 Phase 5. Encoding teaching strategies

The objective of this phase is to produce learning activities, which are based on Generic Learning Designs (GLD), each of which encodes elements of one or more teaching strategies. A four stage process is used in order to develop GLDs.

Step 5.1: Preparation. It aims to motivate learners to become involved in the whole process. The goal is to describe how the gained knowledge can be used and what the benefits of this activity are.

Step 5.2: Strategy development. According to each chosen instruction strategy, the successive phases are identified, through which the learners will be assisted to reach the desired learning outcome.

Step 5.3: Summary. The learners reflect on the learning process, in order to retain the main Learning Outcomes.

Step 5.4: Evaluation. In accordance with the chosen teaching strategy, various types of exercises and/or activities should take place, in order to evaluate the achievement of Learning Outcomes.

2.6 Phase 6. Modelling qualifications

The objective of this phase is to associate the learning process with market needs, as they are reflected in job profiles. To this end, job profiles are encoded in Job Profile Ontologies (JPO), which make use of the TDO concepts and the knowledge, skills and competences in LoutO.

In the following sections, the content of each phase will be described in more detail.

3. Domain modelling

The main outcome of domain modelling phase is the Teaching Domain Ontology (TDO). A generic staged process can be followed to achieve this result (Figure 9) [3, 5].

3.1 Specification

During the first step, the ontology and knowledge engineers discuss about the requirements of the new ontology that is going to be built with the domain experts. Ontology engineers will have to train domain experts into the basic ontology terminology and design the competency questions which will be used during the evaluation of the ontology model.

3.2 Conceptualization

In the second step, the domain experts have to design a representation of the teaching domain, i.e. define the basic concepts, and specify their hierarchy and basic relationships between them. Each expert involved designs a conceptual map of the domain by listing its basic concepts and all their sub-concepts in an exhaustive manner, until no further analysis is possible. The concepts listed will constitute the class hierarchy of the final ontology.

Moreover, each expert creates relationships among the concepts, which may express the notion of hierarchy (e.g. is-a, has-a) or could be even more complex (i.e. the relationship “used for” states that a concept is used in order to realize another concept). The set of relationships between concepts will be realized as the object properties of the final ontology.

3.3 Implementation

During this step, the ontology engineers, based on the domain representations provided by the experts, develop two or more ontologies, depending on the number of the experts participating in the process (i.e. one ontology per expert). Then ontologies are merged into one unified model. When performing ontology merging, a new ontology is created, which includes the knowledge of the previous individual models.

3.4 Evaluation

The final step includes the evaluation of the final merged ontology from the side of domain experts. For example, a questionnaire could be used to help the evaluator check if the ontology meets predefined criteria, such as (a) minimality, i.e. if the ontology contains the basic concepts of the domain and the

corresponding hierarchy relationships, (b) functional completeness, i.e. if the ontology could efficiently be used for a particular task, and (c) comprehensibility, i.e. if the ontology is easily understandable by the users. In addition, the ontology is checked against the competency questions defined during the Specification step.

4. Learning Outcomes

Learning Outcomes are statements of “what a learner is expected to know, understand and be able to demonstrate after completion of a process of learning, which could be a lecture, a module or an entire program”. In this section we shall describe the methodology used to produce the Learning Outcomes Ontology (LoutO) (Figure 10) [1].

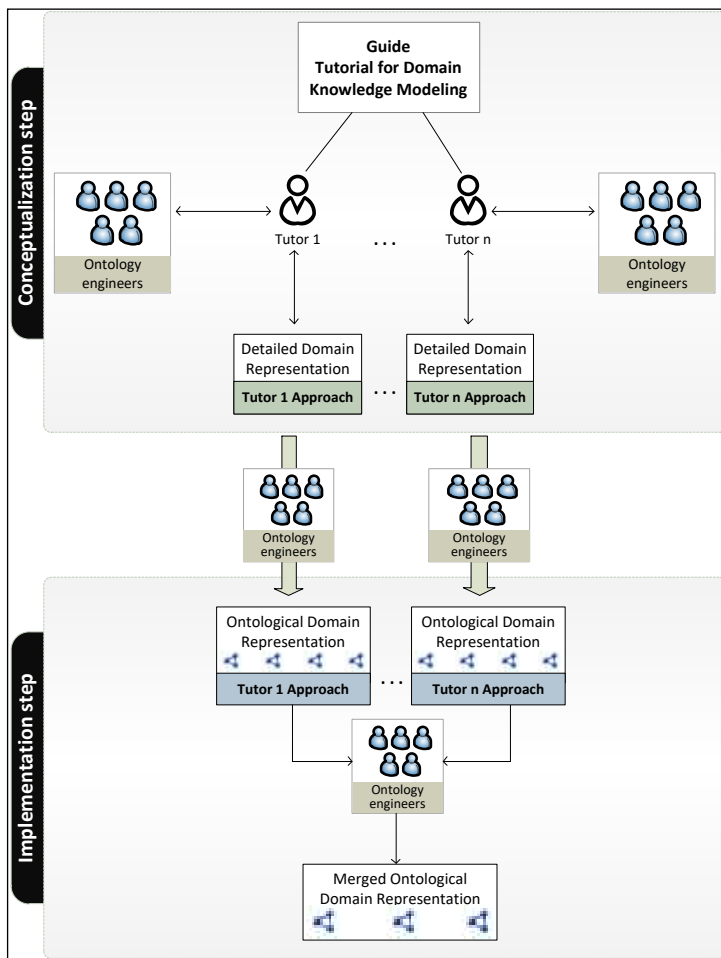


Figure 9. Main steps of collaborative methodology

A well-defined and effective Learning Outcome should be SMART, that is Specific (describing in detail what the learner should be able to demonstrate following exposure to a learning activity), Measurable (producing achievement that can be measured by any evaluation method during or after the learning session), Attainable (including an action verb that demonstrates change or acquisition of knowledge), Relevant (reflecting realistic expectations of knowledge acquisition given the conditions of learning activity), and Time-bound (specifying a time frame in which learners are expected to achieve it).

The ABCD model is a framework for developing Learning Outcomes, which structures Learning Outcomes in four main components: Audience (intended group of people who will be learning by the process), Behavior (indicating the learner's observable behaviour), Condition (determines the context of actual conditions under which the behavior is to be expressed) and Degree (describes the required level of quality for the observed behaviour).

Learning Outcomes are classified into different skill levels, which indicate the different degree to which the underlying skill or knowledge has been attained. To this end, the Bloom's Revised Taxonomy is used, which is composed of the Cognitive, Affective, and Psychomotor domain. Each is further divided in knowledge levels by order of difficulty. The cognitive domain is composed of six successive levels: Remember, Understand, Apply, Analyze, Evaluate and Create. Learning Outcomes that concern sentiments, attitudes and values fall into the affective domain, which includes concepts such as Receiving ideas, Responding to ideas, Valuing ideas, Organization of ideas, and Characterization by value set. The psychomotor domain is related to the physical skills and/or the performance of motor tasks according to a standard of accuracy, rapidity, or smoothness. For this domain, Learning Outcomes are classified in the following levels:

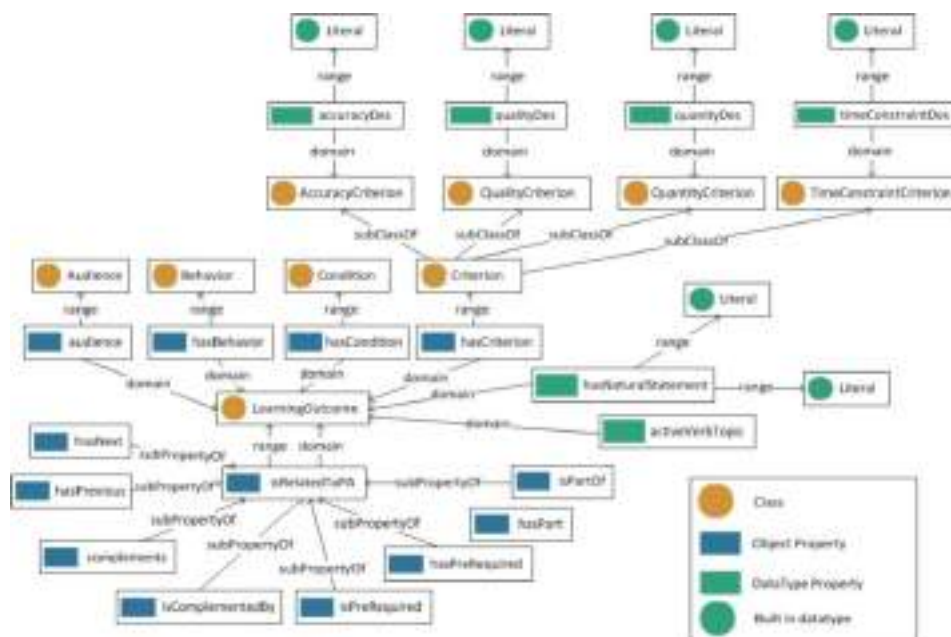


Figure 10. The Learning Outcomes Ontology

Perception, Set, Guided Response, Mechanism, Complex Response, Adaptation and Origination.

Another important aspect of learning outcomes is their sequencing, that is, the arrangement of learning outcomes into a teaching sequence. Several sequencing methods have been proposed, including job performance order, chronological order, critical sequence, simple to complex order, comparative sequence, relationships between objectives, and part to whole. The ID may use only one method or a combination of them.

5. Learning Objects

Learning Objects are a novel approach in organizing digital educational content. The main idea is to decompose it into smaller chunks and construct self-contained learning units, which can be combined in almost infinite ways in order to create collections and build sections, lessons, or courses. Learning Objects can be reused in different educational contexts whereas the order in which they are presented to the learner (i.e. the learning path), can vary depending on the learner's needs. A Learning Object is a self-contained and independent unit of digital educational content, which is associated with one or more Learning Outcomes and it has as primary aim the ability of reuse in different educational contexts. A Learning Outcome can be served by one or more Learning Objects and correspondingly a Learning Object may contribute in the achievement of one or more Learning Outcomes.

The smaller the size of the Learning Object, the greater the flexibility for reuse in different educational contexts. However, the determined-lower limit for the size of a Learning Object is posed by the fact that a Learning Object must be associated with at least one Learning Outcome. This ensures that Learning Objects don't lose their learning dimension and furthermore that the unity of educational process is maintained. On the other hand, the upper limit for the size of a Learning Object varies in each case and it is hard to be predetermined accurately. In this case the volume of educational information that a Learning Object includes, should be such so that it preserves its fundamental functional requirement of reuse.

Considering the above, as well as the fact that in distance learning a variety of instructional strategies can be used (e.g. experiential instruction and indirect instruction) in addition to the deductive one, we infer that there is a need of relatively small LOs which can be combined in several ways. This enables the implementation of multiple strategies during the learning process of a distance learning program that is being delivered via an e-learning system [5].

5.1 Metadata profile

Metadata are structured information used to describe the features of a resource (digital or not), thus making easier its management and retrieval. A set of metadata elements combined so as to serve a specific purpose, constitute a metadata schema. The great importance of metadata lies in the fact that the "meta"-information they convey is machine readable, therefore interoperability among applications can be achieved. In the case of educational recourses, the set of metadata used to describe their characteristics, needs to be able to capture their educational and pedagogical aspects.

There is no single metadata standard that meets the requirements and needs of every application. Some standards focus on technical metadata, other on educational metadata while some other on more specialized elements. That is why the use of application profiles is suggested; an application profile is an aggregation of metadata elements selected from one or more different schemas and combined into a new compound schema.

Our schema is actually an application profile of IEEE LOM, with a particular orientation in distance learning material and cataloguing standards. The IEEE LOM was chosen as a basis for creating the profile due to its wide acceptance in the academic environment and its extensive usage by institutional repositories. The profile adopts the majority of IEEE LOM's elements, some additional attributes in order to represent concepts commonly used in distance education, like learning outcomes. The proposed schema is rich

enough, so that it can effectively describe all aspects of a Learning Object (educational, technical, etc.), but not exceedingly analytic as to become difficult to use (Figure 11) [9].

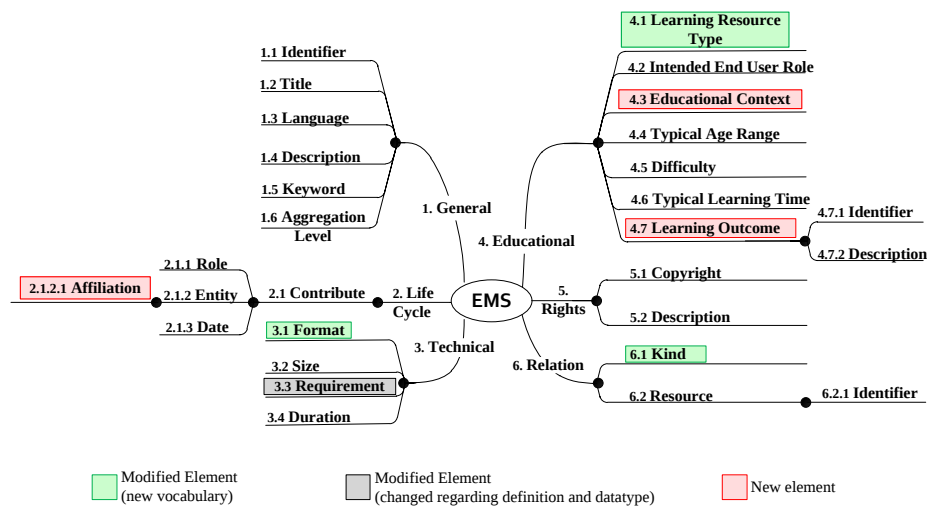


Figure 11. The metadata schema

5.2 Learning Object types

After considering the characteristics of the educational material that is already used by HOU, sets of Learning Object formats and types have been defined (Figure 13) [8].

Element	Value space
Text	document hypertext
Image	photo map graph image presentation
Streaming Media	audio recording animation self-running presentation webcast video
Application	interactive software hypermedia application wiki presentation

Learning resource type	
Guidelines	Self-Assessment
Presentation	Multiple Choice Questions
Demonstration	Open Type Question
Lecture	Problem Statement
Definition-Principle-Law	Experiment
Narrative Text	Serious Game
Analogy	Exercise
Example	Multiple Choice Questions
Activity	Open Type Question
Case Study	Problem Statement
Problem Solving	Project
Text Composition	
Question	
Simulation	
Interactive	
Non Interactive	

Figure 12. Learning Object formats and types

The application profile has been encoded into an ontology, which combines Learning Objects with the most popular file formats and resource types (Figure 13).

6. Learning Activities

Teaching or instructional strategies are used by the teachers to facilitate deeper understanding. They must be designed in a way that learners are encouraged to observe, analyse, express and opinion, create a hypothesis, look for a solution and discover knowledge by themselves. A learning activity is a theoretical construct that involves interaction between learners, the educational environment and educational content and represents the means by which the instructor causes learning of learners.

GLD templates realize comprehensive instruction strategies and provide the main building blocks that tutors can use to create new and potentially richer learning activities. More specifically, a tutor can use a template by filling in certain fields of the GLD template. The aim is to facilitate the self-learning of learners. For this reason, we adapt both learner-centred approaches (like Problem Solving) and teacher-directed approaches (like Presentation) in order to achieve a high quality and efficient learning experience. The instructional strategies supported are (a) Problem solving, (b) e-Role playing, (c) Presentation, (d) Case study, (e) WebQuest and (f) Project [1].

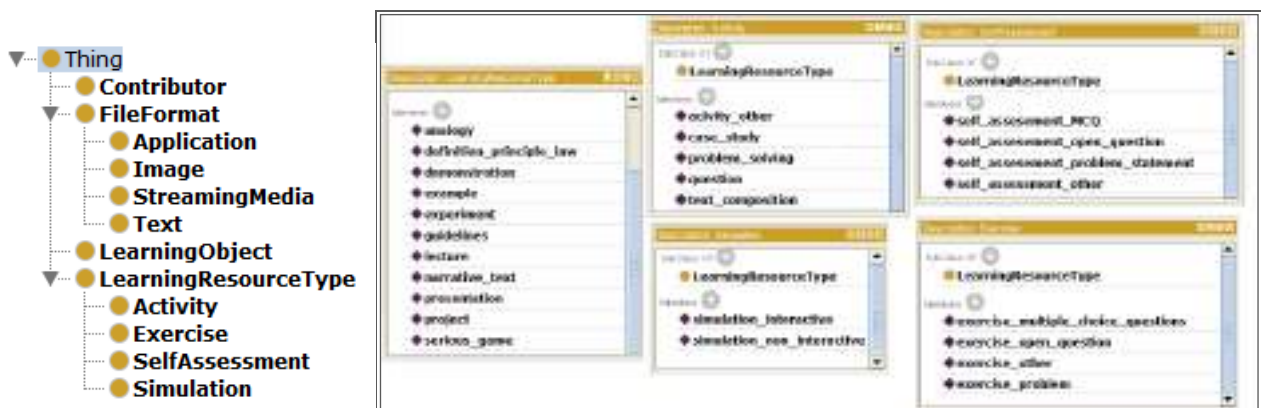


Figure 13. The metadata ontology

Figure 14 lays out the basic idea/framework on which the development of GLDs is based and presents the main components and principles that characterize them. Apart from the instructional strategies, a GLD is associated with the type of Learning Objects presented to the learner and the cognitive level (according to Bloom's taxonomy) of the desired Learning Outcomes. For example, a GLD based on Presentation or Case Study strategy is more likely to be used for the fulfilment of learning outcomes that belong to the lower cognitive levels of Knowledge and Understanding.



Figure 14. Generic Learning Designs

7. Student profiling

In this section, we describe the Student Model ontology that has been developed in order to capture the main attributes of students and enable adaptation. A combination of the stereotype and overlay techniques was adopted. The overlay model represents a learner's knowledge as a subset of the domain knowledge (expert's knowledge). Therefore, the system provides the learner with educational material until learner's knowledge coincides with the expert's knowledge. In stereotypes-based models, learners are classified into distinct categories and the system adjusts its performance based on the category assigned to

the learner. In our model, some attributes of the student profile (e.g. previous knowledge, experience in a specific knowledge domain) are initialized based on a stereotype. In addition, dynamic attributes related to the learning process are represented with an overlay model. After the initialization phase, the profile is dynamically modified, as the overlay model is updated with the information gathered by the interaction between learner and system.

In the proposed Student Model ontology (Figure 15), we define four upper level classes, namely Student, StudentCourseInformation, StudentCurrentActivity and StudentPersonalInformation. The class Student represents any student. The StudentCourseInformation class comprises information relevant to the student's performance during the overall educational process. In order to capture any detail in terms of student's activity for the current academic year, we define the class StudentCurrentActivity. The more compact class in the proposed ontology, StudentPersonalInformation, is used to represent mostly static and permanent student information, describing not only simple data, like demographic data, but more complex characteristics that concern student's interaction with the e-learning system [6, 8].

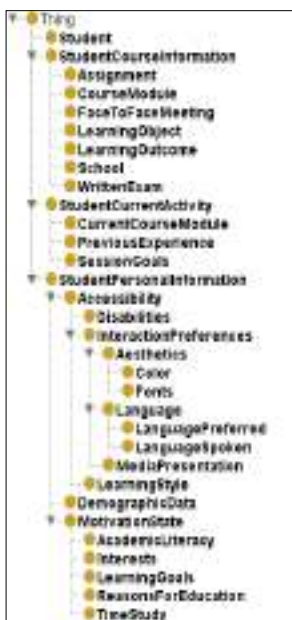


Figure 15. Student model ontology

8. Job profiling

A job profile is a description of a set of knowledge, skills, competences that a person should have in order to perform the respective job. A similar description can be used to characterize training courses and content. The use of XML-based meta-data decouples the job profile description from the course description, because the meta-data plays the role of a semantic mediator. The added-value of creating machine readable semantically rich descriptions of job profiles (for example, using an ontology) is that these files can be used by any software application in order to extract the information contained in the job profiles and thus can facilitate the process of developing training course descriptions.

The scope of the job profiling ontology (Figure 16) is related to the European e-Competence Framework (<http://www.ecompetences.eu/>) and is mainly focused in connecting the three (d1: e-Competence areas,

d2: e-Competences, d3: e-Competence Proficiency Levels) out of four dimensions of which e-CF consists (in the place of d4: knowledge and skills, the Learning Outcomes Ontology can be included) [3].

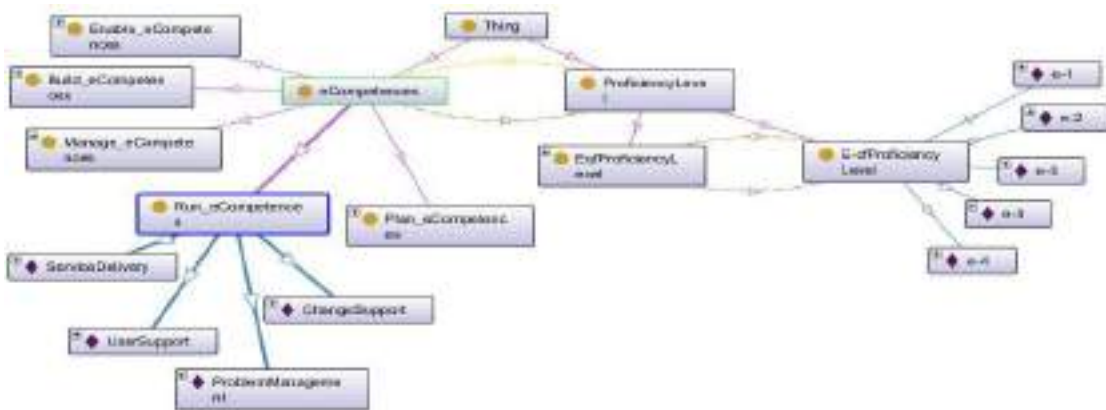


Figure 16. Job profiles ontology based on e-CF

9. Tools

In this section we introduce APLe (Agents for Personalized Learning) [11], a pilot educational system that enhances personalized learning of students in the context of selected courses (Figure 17). We have developed an agent-based intelligent tutoring system, able to adapt to student's characteristics by employing learning tactics based on the student's learning profile and progress. More specifically, our proposed multi-agent system architecture employs a set of homogenous student-dedicated tutor agents for each course. Each agent builds an internal learning model based on the domain and available resource semantic representation while during the educational process the agent updates the model based either on the student's learning profile and interaction or by accessing the student's progress. The tutoring system is not domain specific while the pedagogical module is versatile, allowing tutors to experiment on different learning tactics in order to engineer more domain-specific or student profile-oriented agents.

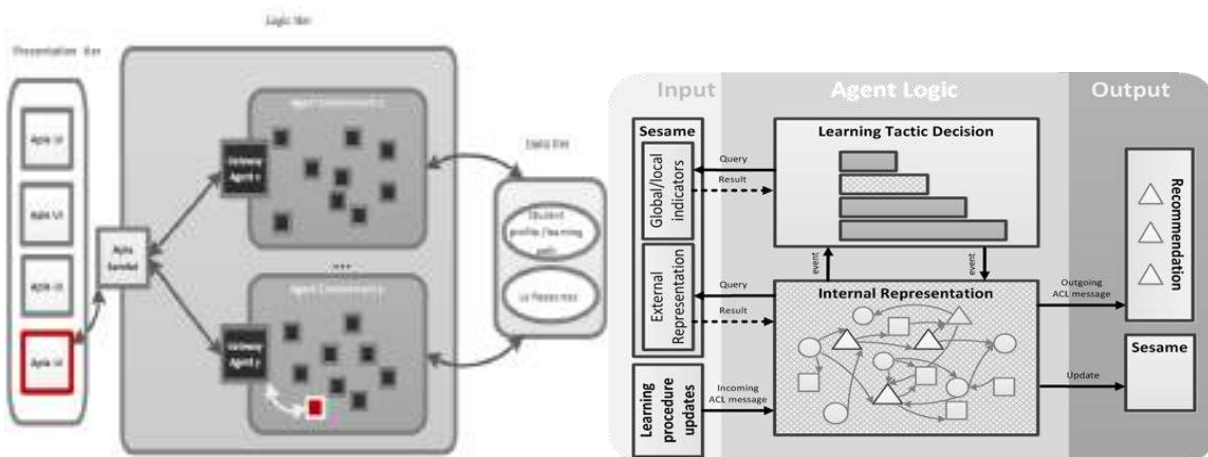


Figure 17. The APLe system

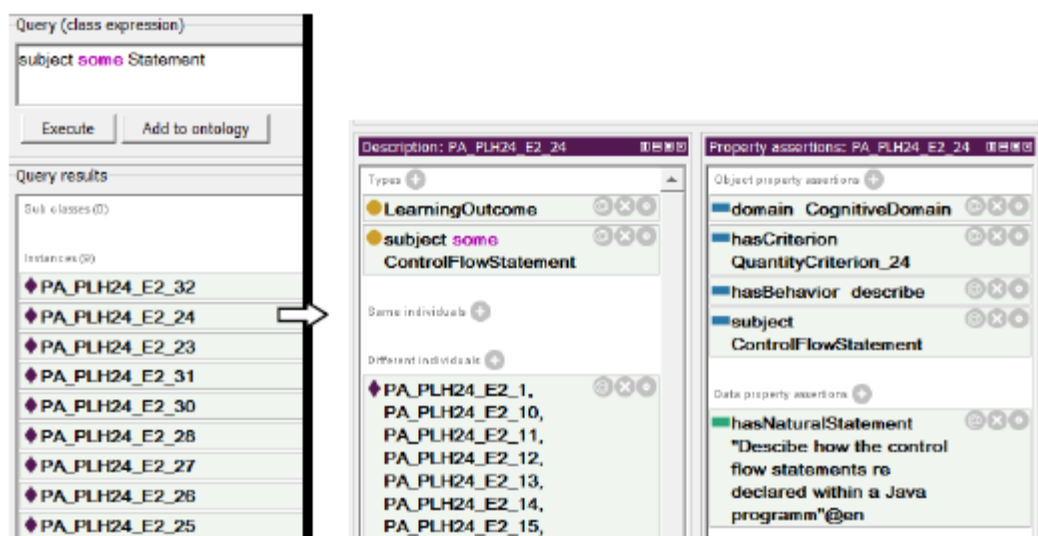


Figure 19. Learning Outcomes based on Java TDO

11. Conclusion

In this paper, we presented a methodology for designing learning programmes based on semantically rich representations of teaching domain, learning Outcomes and learning Objects. Learning Activities can be designed based on these, taking into account the student profiles. The methodology can be extended to include descriptions of job profiles. Example applications of the methodology, as well as the prototype of an online tool that uses its outcomes, were also presented.

In this way, the design of learning programmes becomes contextualized to the specific structure of the domain, the available material and the student profile. Moreover, a continuum from teaching domain to employment is created. At the heart of the approach lie the Learning Outcomes, a contemporary powerful approach that describes the learning process in a learner-centred way. The outcomes of the stages of the proposed methodology are semantically rich descriptions of learning programme components using ontologies. This powerful knowledge representation tool makes possible the ad-hoc combination of knowledge modules in the context of a specific course, thus combining robustness with flexibility.

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Library's Knowledge Resources for students and teaching staff in digital universities from EADTU¹¹⁵

Gema Santos-Hermosa

Learning Resources Support Service. UOC Virtual Library. Open University of Catalonia, Spain
Chair of the Knowledge Resources experts' group of EMPOWER-EADTU. <http://empower.eadtu.eu/msantoshe@uoc.edu>

Paul Bacsich

SERO Consulting, UK
paul.bacsich@sero.co.uk

Christos Rodosthenous

IT Officer. Open University of Cyprus (OUC), Nicosia, Cyprus
christos.rodosthenous@ouc.ac.cy

Evagelia Lappa

Phd, MScEcon, Health Information Scientist, Hellenic Open University (HOU)
evlappa@med.uoa.gr

Marlies Bitter-Rijkema

Assistant Professor, Welten Institute, Open Universiteit
marlies.bitter@ou.nl

Fred Truyen

ICT Services. KU Leuven, Belgium
fred.truyen@kuleuven.be

Abstract

Arising from work on a Vision and Strategy Appraisal of the UKOU Library Services, and with facilitation from EADTU, a comparative study was done of four distance teaching university library services functions in terms of support to students and teaching staff: FernUniversität; Open Universiteit Nederland (library services supplied by Maastricht University); Universitat Oberta de Catalunya; and Athabasca University. All participants agreed to share conclusions with each other, with the UK Open University, and with other members of EADTU.

The workshop presented at OOFHEC 2016 will begin with brief presentations on the comparative study process and overall conclusions. Other members of the Working Group who took part will give brief highlights of their institutional summary reports.

¹¹⁵ Related to the OOFHEC2016 workshop titled "Library benchmarking for student and teaching staff support in digital universities"

The majority of time at the workshop will be used for small-group working. Precise topics will depend on delegate types and numbers but the following are likely to be of interest:

1. Extending the comparative study to other institutions active in distance and blended learning
2. Integrating such studies with existing national/international review schemes for libraries, and how to update such schemes to cater for “digital libraries”
3. How to ensure that the library contributes to good results in benchmarking/review schemes at institution level, in particular E-xcellence and OpenUpEd.

Keywords: libraries, digital libraries, knowledge resources, benchmarking, review, appraisal

1. Introduction

Education is a key driver of economic and social progress, and governments around the world are looking to improve their education systems. The future of education in the twenty-first century should not be based just on increasing the number of students, but on improving the quality, diversity and relevance of the educational programmes offered. Universities are reconsidering their policies and institutional practices - and increasingly innovating teaching and learning in higher education.

The University libraries are a key part of all this change: specifically, they are "catalysts" of innovation in teaching and learning, in the sense that favours the transformation of higher education. Libraries are offering services to support teaching and learning in order to provide knowledge resources tailored to each educational need.

In the following sections, three views about this topic will be presented:

- **International reports about innovation in teaching and learning.**

Three recent reports will be analysed mainly from the libraries point of view; that is, about the important role that libraries can play in the change and innovation of universities.

- **Benchmarking report of Libraries Student Support Services.**

A comparative study of four distance teaching university library services (FernUniversität; Open Universiteit Nederland - Maastricht University; Universitat Oberta de Catalunya and Athabasca University) in terms of support to students and teaching staff.

- **Current experiences from libraries as for Knowledge Resources into learning.**

This last section includes some reports from the institution and libraries of the EMPOWER Knowledge Resources members. They provide the practice which is, currently, being carried out by some libraries from EADTU.

2. International Reports of Innovation in Higher Education and libraries

Some recent international reports about the key trends, challenges and technological developments in Higher Education have pointed out the important role of the knowledge resources and libraries to improve the learning environments.

The first report (Sursock, Adams, Alozie *et al.*, 2015) is from the European University Association (EUA) and collects how 451 universities from 46 countries of the European Higher Education Area (EHEA) perceive the

evolution of their teaching and learning through their responses to the survey Trends 2015. The study, seventh in a series of reports published by the EUA, takes as its starting point the results obtained in 2010. The objectives of this new edition are to know to what extent learning and teaching are an institutional priority and how widely spread is the model of student-centred learning in Europe. Regarding the changes identified, they include the wider ICT development, the growing strategic importance of internationalization and the attention to the institutional positioning in rankings.

The main value of this report is the overview on learning and teaching that it provides in Europe, also linked to various institutional developments. As for the libraries, the survey includes three questions related to them:

- Was the development of libraries one of the themes addressed in your institution? (Question 17).
- Does the institution obtain feedback from student or assessments of the learning environment (e.g. classrooms, libraries)? (Question 31).
- Which of the following information technologies, systems or tools - such as access to the online library - offers the institution to its students? (Question 42).

The main results regarding the role of libraries in teaching and learning in Europe are based on three key areas: information technology, finance and improving the learning environment.

ICTs are an important institutional priority that affects all aspects of universities, including teaching and learning, research, libraries and student support services. Technological advances also lead to changes in organizational structures and include how to link libraries (digital) with the centers for learning in relation to the monitoring of students and graduates, and the analysis of learning. Moreover, financing difficulties and the premise of "doing more with less" make it necessary to introduce efficiency measures such as sharing services like libraries. Finally, changes in the learning environment also involve the improvement of libraries and an infrastructure investment.

Before moving to the next report, it is worth mentioning how "universities in the next decade" will focus on 'lifelong learning', 'student-centered learning' and the development of management and data analysis. In this future scenario, libraries also play an important role, thus their learning support services are in line to help students to 'learn to learn' and to develop transferable skills; essential for independent learning, both within the university and throughout life. With respect to the management and analysis of data, libraries become increasingly an agent in this process.

The second report (Sharples, 2015), conducted by the Institute of Educational Technology at the Open University in the UK, explores new ways of teaching, learning and assessment for an interactive world; in order to guide the teachers and policymakers in productive innovation. It proposes ten areas of innovation that currently are being carried out and have a growing impact on education: crossover learning, learning through argumentation, incidental learning, context-based learning; computational thinking, embodying learning; learning by doing science with remote labs; adaptive teaching; and emotions of analytics or assessment stealth.

Although libraries are (sadly and not unusually) not explicitly mentioned in this report, there are matters directly related to their areas of expertise, such as specialized information search and management of knowledge resources. From the Innovation areas listed above, there would be several where the library can intervene and work with teachers, educational technologists and designers in order to strengthen them. For example, they can provide an "alternative" environment outside the classroom ("cross-learning"), suitable for students seeking information and that allows them to interact with other resources in order to create their own context of learning ("context-based learning"). The library also provides other knowledge resources, flexible and adaptable to different study routes and particularities of each student ("adaptive learning"). These learning resources can be basic (manuals, books, educational materials, etc.) or complementary (articles, video tutorials, simulations, etc.) and become a potential source of competitive advantage and value in teaching the subjects.

The third study (Orr, Rimini & Van Damme, 2015) published by the OECD Centre for Educational Research and Innovation (CERI) is about the impact of Open Educational Resources (OER) in educational systems and how they become a ubiquitous element of the education policy. This report aims to highlight the state of development of OER as well as demonstrate that they can be a relevant tool for innovation in teaching and learning.

Some support for OER initiatives mentioned in this study are Digital New Zealand, led by the National Library of New Zealand - where 160 partners collaborate- to facilitate access and visibility of digital contents (some in Creative Commons) and the UK Higher Education repository of educational resources [Jorum Higher](#) (now being migrated into other JISC services). In this latter, a survey among its users (teachers and librarians) revealed the role of libraries and support centers as disseminators of information and internal consultants in e-learning within their respective educational institutions in British higher education. Other previous surveys, such as *Open Resources: Influence on Learners and Educators (ORIOLE)*, also collected considerations about trusted repositories provided by libraries as a positive factor in the use, reuse and sharing of OER into the teaching (Santos-Hermosa, 2014).

Some brief conclusions obtained from these reports are that international libraries are seen as an opportunity to improve teaching and learning as well as important agents for promoting the use and adaptation of knowledge resources. They provide a wide range of learning resources (available in their collections or through open access) to teachers and students. Therefore, university libraries are 'catalysts' for innovation in teaching and learning, while favouring the transformation of universities in the universities of the future. Some recent international reports about the key trends, challenges and technological developments in Higher Education have pointed out the important role of the knowledge resources and libraries to improve the learning environments.

3. Benchmarking report¹¹⁶

In summer 2015 Paul Bacsich was commissioned by the UK Open University to carry out a Vision and Strategy Appraisal of Library Services and some associated student-related functions. This was a 9-month

¹¹⁶ Section under the responsibility of Paul Bacsich

task with several components including four days of hearings at the UK Open University central campus in December 2015 by a panel of four experts including Paul, two Directors of Library Services from UK universities, and a senior officer of the UK Open University Students Association.

A number of benchmarking/comparative studies were done in order to ensure that UK Open University Library Services could plan to remain “state of the art” and “best of breed” in terms of the services it offered to students and staff. These included a set of interviews with leading UK research libraries; a similar set of interviews with libraries of UK face-to-face universities active in distance teaching or flexible learning; extensive desk research studies on the UK and Irish distance learning context and policy/fees/funding framework; and this study: a comparative benchmarking study (codename Annex X4B) with Library Services functions of four well-known distance teaching universities: Open University of the Netherlands (whose library services are supplied by Maastricht University), FernUniversität Hagen, Open University of Catalonia and Athabasca University.

The study benefited greatly from support from EADTU and in particular we want to thank George Ubachs for his help and support and also to acknowledge other involved contributors (table 1). Although the majority of studies for the Vision and Strategy Appraisal were strictly confidential to UK OU, it was agreed with EADTU that the outputs of this study would be shared not only with the participants but with the wider EADTU membership.

Visits were made to the first OUNL and FU Hagen. There were telephone consultations with OUC, leading to a questionnaire being filled in, and a teleconference with a group of senior staff was the way that Athabasca University collaborated with the study.

There was an interesting discussion with senior management on how to approach the benchmarking. In the end it was agreed not to use a standard library benchmarking approach, of which there are several, but to use a more general review scheme oriented to change management and thus better suited to how libraries might evolve in the future. The review rubric was as follows:

- Institutional overview
- Students Support Services:
 - Content services (including OER) and search tools
 - Digital literacy including student search skills
 - Employability skills
 - Support to module/qualification teams developing distance learning courses
 - Fostering the Scholarship of Teaching and Learning among staff
 - Career advisory services
 - Research Support Services (more briefly), including Open Access and Research Data Management.

In addition to the four distance teaching institutions (the specific focus of this study), the benchmarking studies also interviewed and/or did desk research on 16 university libraries in the UK (including both public

and private institutions). We did not produce a specific report on the four DL institutions but these case studies were particularly valuable and some of the conclusions below reflect that.

Most of the libraries studied opened their own catalogue search tool to all users, perhaps as a way of advertising the richness of their content and services. None were “Google First”. More specifically, many libraries still seem reluctant to accept and work through the implications from recent research studies on the “primacy” of Google, both for students and academic staff.

Some libraries felt that they must become more proactive and less reactive in the way they are involved with university-level decisions on partnerships and out-of-country provision – which often end up with difficulties over content licenses. Interestingly, in the UK the private co-providers (Laureate, Kaplan, etc) now all offer the same library access to “their” students as from the base university. This situation has changed from the case a few years ago. We have no information on the situation in other countries - this is an interesting question.

Digital literacy is receiving a lot of attention from UK universities but the way it is worked into study programmes in the face to face situation may not always be transferable to distance education practice given differences in that. Likewise employability and careers advice is now getting a great deal of attention from universities with the bar for best practice raised very high, including self-employability, entrepreneurship and start-ups. However, services for distance learning students in face-to-face institutions mostly still seem to be in “deficit model” mode.

Open Access repositories are routine in and outside the UK (which has its rigorous Research Excellence Framework) – the discussions now focus more on the scale, the software and other tactical issues. In contrast, and no doubt of concern to EU and UNESCO, open educational resources are still a marginal aspect of business, especially so in face-to-face universities.

Their increasing inability to “curate everything relevant” in an increasingly open and “grey literature” world is of concern to libraries, and there are moves towards joint working. Progress is slow and may no longer come from country- or province-wide top-down initiatives but from regional or other bottom-up consortia.

Most libraries do accept the continuing relevance of books (including research monographs), including some distance learning libraries in this study. Those that do not find that there are difficulties in some subject areas – staff are creative in finding ways round the obstacles but in ways that management could not recommend or officially support. The research literature also supports the relevance of physical books to some modes of academic research.

It was towards the edge of the scope of our study but there do seem to be increasing similarities of approach in libraries across the distance teaching institutions we studied (despite large differences in scale) and increasing convergence also with the face-to-face institutions as they move to blended learning. However, an area where there still seems to be a wide range of approaches is in the area of librarian support for course development and research. Some DL providers operate with significantly less librarian support than other DL providers; interestingly at some face-to-face institutions libraries reported that they intended to put more focus on academic staff development and thus reduce “reactive” support.

In the UK and many other countries, university libraries have a strong civic mission especially when the institution is the sole/lead provider in a sizable town/city. Interestingly for some, but not all, distance

teaching universities, there is a significant civic mission also. Civic missions now do not seem to be just for face-to-face university providers.

4. Libraries and Knowledge resources into learning

4.1. EMPOWER project

[EMPOWER](#) is an EADTU (European Association of Distance Teaching) project which supports collaboration and sharing of expertise between European universities, and provides specialist advice and guidance for institutional leaders on the latest developments in online, open and flexible education.

EMPOWER has twelve [fields of expertise](#), amongst which there is one dedicated to the [Knowledge Resources](#). The use of knowledge resources (KR) and libraries is at the centre of the learning experience in traditional and online universities. In technology-enhanced learning methods prescriptors (professors, tutors, librarians and others) can easily link knowledge assets with every single learning unit, creating specific knowledge libraries bound to specific subject curriculums. To ensure the intensive use of e-knowledge and e-libraries by professors and students not only do we need to have expertise in knowledge and learning management, but we also need to design and embed complete information literacy skills actions into university programs.

Some of the activities carried out by the EMPOWER-KR experts team have been a series of [online events](#) about promoting KR into learning and how to apply learning technologies to create and use them, which can be checked in its website.

Hereafter, each [member of KR Experts Group](#) will present a brief highlight of his/her institutional report.

4.2. Experiences: Institutional summary reports

4.2.1. Open University of Catalonia (UOC)¹¹⁷

UOC is an online university founded in 1995 with the mission to provide our students with lifelong learning and educational opportunities and an educational model based on the personalization and accompanying of our students using online learning. Nowadays, it has 49.672 students, with more than 68.000 graduates, 21 bachelor's degrees and 36 university master's degrees in 7 faculties; and a teaching staff of 3.709 individuals, among coordinating professors (who guarantee the quality of the teaching of those subjects of which they are responsible) and course instructors (who act like external consultants -experts on the learning topics- and follow the students' development).

The UOC Virtual Library (www.biblioteca.uoc.edu), hereinafter VL, does not have a building accessible to its users, thus it was born completely online. Therefore, the website of the Library is the library itself and the main services are also offered throughout it. The Library can also be accessed from inside the classrooms (Cervera, 2010) and the UOC portal.

In the UOC's educational model (<http://www.uoc.edu/portal/en/universitat/model-educatiu/index.html>), students and their learning activity are at the centre of the teaching activity and they have three main elements with which to complete it: accompaniment, collaboration and knowledge resources (figure 1).

¹¹⁷ Section under the responsibility of Gema-Santos Hermosa

The VL librarians are involved in both of these main elements, as providers and managers of learning resources and also supporting teachers in their teaching action.

Providing and Managing Knowledge Resources for Learning

As mentioned above, one of the three main pillars in UOC students' learning activity are the learning resources, a range of different contents that UOC students have at their disposal. These resources are available in the virtual classrooms (for all degrees, master's degrees and postgraduate studies of the university) and the VL is the responsible of their supply and management. There are two main types of resources:

- The own resources, learning materials created and owned by the UOC: consist of a kind of handbook tailored to the needs of each subject, which are available in multiple format (html5, pdf, epub, audiobook, mobipocket, wiki, WordPress, videos, simulations, etc.) and languages. They are written by experts from each knowledge area, who transfer all of the rights to exploit the work at the UOC by signing a contract custom and transferring the exploitation rights.
- The external resources: all the contents owned by third parties, which the UOC uses to complement the teaching process. These learning resources can be of any type (books, book chapters, articles, databases, audiovisual, photography and also software) and their usage rights correspond to their holders. The external resources also include the Open Educational Resources (OER), which are stored in repositories but also can be used in university educational practice (Santos-Hermosa, Ferran-Ferrer & Abadal, 2012).

On the one hand, the VL takes care of all the creation and edition process of UOC learning materials: from the budget management for its authoring and editing (to create new content or updated it) and the editorial tracking to the publication of digital materials in the virtual classroom and also the dispatch of its printed version to students. In these sense, UOC librarians are aligned with one of the new roles in academic libraries (Johnson et al., 2015): the participation in learning materials creation and electronic edition. On the other hand, in order to use the external resources in the UOC's Virtual Campus, VL need to subscribe them (through the acquisition of databases' licenses) or to get the authorization of the exploitation rights holders.

- The VL centralizes the management of learning resources, working closely coordinated with other departments involved in the learning resources management; such as:

- Legal advisers specialized in intellectual property issues, from the UOC's legal department;
- Programme managers, who ensure the proper development of a program: economically, its recruitment, the provision of learning resources, etc.;
- Technologists, who control the proper functioning of learning resources inside the virtual classrooms;
- Oberta Publishing editors, a UOC group company which is responsible of the entire publishing process of the learning materials at the university.

Supporting teachers in their teaching action

There is a collaboration between coordinating professors and subject librarians that aims to improve learning and to demonstrate how to work together can improve the quality and relevance of educational resources in virtual classrooms of the UOC. Under this new approach, while the teachers change their role from instructors to facilitators of the learning process and expand its outreach to students, libraries acquire a significant presence in academic learning communities (Santos-Hermosa, 2012).

Therefore, subject librarians provide support to educators by personalizing the services delivered, and having into account the coordinating professor's needs. It takes place throughout the whole teaching process, also covering the previous approach of the course and its post evaluation (Camps-Pinós, 2016):

- Conceptualization and design of the course: librarians advise the coordinating professors with the search and association of previously edited UOC's learning material, in order to reuse the UOC knowledge, and also participate in creating new learning materials.
- Search and selection of the learning resources: *Learning Resource Search Service* supports teaching activity specially while preparing a new subject or the rollout of a new programme, or while redesign an existing one.
- Course teaching: bespoke training service and the monitoring of the teaching and the use of the UOC's teaching material
- Course assessment: coinciding with the end of the course, the VL gives advice in the assessment phase of the learning resources used for the teaching activity and provide guidance for the open access publication of final projects in the UOC's institutional repository, O2.

4.2.2. Open University of Cyprus¹¹⁸

The Open University of Cyprus (OUC) (<http://www.ouc.ac.cy/>) is one of the three public Universities in the Republic of Cyprus. It was founded in 2002 and its the country's only dedicated distance education University offering undergraduate, postgraduate (Master & PhD) degrees and training/vocational programs of short duration. Teaching methodology is based on a blended model where a number of online, hybrid & face-to-face group meetings take place between teachers & students. The only part of this methodology that actually requires students to be physically present is the final examination.

This methodology is supported by a state of the art eLearning Platform called eClass (Epiphaniou, Rodosthenous, Christoforou *et al.*, 2015). eClass eLearning Platform (<http://eclass.ouc.ac.cy>) is a modern Learning Management System based on Moodle open source system and offers a number of services to its users, like content delivery, activities, lecture capture and video on demand, assignment submission and plagiarism detection (Rodosthenous et al., 2015), mobile learning and virtual classrooms. These services are integrated under a single platform that hides the complexity of the various tools used and facilitates learning. The technology used is not static, new services are added (Christoforou, Rodosthenous, Epiphaniou *et al.*, 2015) to match the needs of the faculty and learners.

One of the crucial components in supporting this methodology is the delivery of Knowledge Resources to learners. These resources can be found in both the OUC Library and the eClass Learning Platform. The OUC

¹¹⁸ Section under the responsibility of Christos Rodosthenous

library (<http://library.ouc.ac.cy/>) is a hybrid library offering both conventional resources (books, journals, theses) and electronic resources (eBooks, subscription based journals, audio books etc.). As expected in a distance education University, the majority of resources are in electronic format, allowing learners to access them from any part of the world on their own devices. Furthermore, the OUC has an Institutional Repository (Rodosthenous, Themistocleous, Mavrotheris, & Christodoulides, 2016) that hosts a number of collections like the OUC theses collection, digital collections for preserving cultural heritage and the university publications collections. These collections are indexed and are searchable by other repositories using the Dublin Core metadata schema. Among the services offered to the OUC academic community is the Library Information System (LIS). Using this system, users have access to the union catalogue through the web Online Public Access Catalogue (OPAC). Moreover, this system allows unified searching for content in ebooks, journals and conventional material through a web interface.

For creating a course in the eClass eLearning Platform, a number of teams collaborate for finding knowledge resources, compiling them in the course and combining them with activities. More specifically, faculty members responsible for coordinating a course, discuss with librarians and identify possible knowledge resources. These resources can be part of the library collection, the in-house content materials or external resources that need to be acquired. Whatever the case is, these knowledge resources are selected and added to the course in the eClass eLearning Platform. A number of learning tools and components are used for seamlessly integrating available knowledge resources with activities and hence with the OUC learning methodology. The majority of tools used are the ones offered by Moodle, for adding content (files, web links, folders, books etc.) and activities (assignments, quizzes, surveys etc.). These tools are also combined for allowing conditional access to resources, i.e when students complete a quiz with a specific score, they are allowed to view the next course lecture. In each course, teachers can add primary or secondary bibliography by using the “Bibliography Tool” that allows them to directly search the OPAC, the journals and the institutional repository collections. Learners can access these resource by just clicking on them from their course page.

In-house production of content includes ebooks, online lectures and course content archived from previous years (lectures, presentations, notes). In each course, teachers create lectures using the video-lecture capture service. This service allows the recording of video, sound, presentation slides and screen capture from the teacher premises using their own equipment. These lectures are searchable by learners using optical character recognition (OCR) and speech recognition techniques.

Faculty members are trained for using the eLearning tools available and have continuous support while creating courses by the eLearning team. The support scheme utilizes the same services used for the learners, where teachers have access to a training course specifically designed to address their needs. This training course has a number of support content like electronic manuals, webcasts, video presentations and best practices.

4.2.3. Hellenic Open University Greece (HOU)¹¹⁹

The Distance Library and Information Center (D.L.I.C.) of the Hellenic Open University (HOU) operates in the framework of the Hellenic Open University (H.O.U.). The main purpose of the D.L.I.C. is to support all HOU distance learning and research programs and to organize and make available all kinds of material (printed, digital, legal access to network services etc.) and services, in such a way as to become a centre of collection and diffusion of information with modern technological means. It also collaborates with other Academic Libraries.

The D.L.I.C offers its services both from a distance and in situ (e.g. interloan service, article requests, etc.). D.L.I.C. users are kept up to date and trained not only from a distance but also by personal contact, through their participation in special programs: User Training Seminar, Encore Catalogue, HALUC – Hellenic Academic Libraries Union Catalog, National Archive of PhD Theses and Open Archives. The D.L.I.C. also provide access

to some important databases, such as: Health Management Information Consortium, JStor: Journals, Project Muse, Zentralblatt Maths, ISI Web of Science, , Journal Citation Report, Oxford Reference Online, etc.

Expanding the co-operation between the D.L.I.C and the Hellenic National Documentation Center (EKT) to the application of open access policies, some efforts for a better understanding of resources are done through the Knowledge repositories “Open Archives”. The openarchives.gr is the largest online search portal and navigation in reputable Greek digital science and culture content. The National Documentation Centre develops and maintains the openarchives.gr within the institutional role (e.g. the collection, organization, promotion and dissemination of scientific and cultural production in the country in a manner consistent with international standards and trends in the field as and with the modern needs of users). This content is distributed to individual digital libraries, institutional repositories and online collections and hardly detected by the established search engines. It is also dynamic and constantly updated.

It should be noted that the D.L.I.C and HOU teachers became involved in discipline based academic networks, innovating the students to participate to the service Educational virtual classrooms HOU. The teleconferencing service (virtual classrooms) gives teachers and students the ability to meetings and seminars wherever physical presence of the participants, through the organization and monitoring "online event"(centra.eap.gr). Finally, an example of KR management is the one offered by the medical Library and the Health programmes, which make efforts for the introduction of ICT and the standardization, documentation, analysis, and review of medical data. There is a need for well educated professionals prepared for advanced clinical applications and evidence-based management (Lappa & Giannakopoulos, 2013).

4.2.4. Open University of the Netherlands (OUNL)¹²⁰

The Open University of the Netherlands is an independent government-funded institute for distance learning at university level. The university is organized into 3 faculties with a network of 15 regional study

¹¹⁹ Section under the responsibility of Evagelia Lappa

¹²⁰ Section under the responsibility of Marlies Bitter

centers in the Netherlands and 6 in Belgium (Flanders). Since its fully accredited bachelor and master studies are primarily aimed at the Dutch speaking student population its course materials, registration, tutoring and examinations are in Dutch. However, from the international ambitions of the university to expand as an international frontrunner in e-learning and Open Educational Resources, more programmes and courses are developed in English (e.g. Euro*MBA, European Virtual Seminar, Free Technology Academy -IT).

The Welten Institute as the Research Centre for Learning, Teaching and Technology of the Open University of the Netherlands, focuses her research on 'Learning and teaching in technology enhanced learning environments'. Within its programme on Technology enhanced learning innovations (TELI) investigation takes place on academic (re)search competences on the internet and recommender development to support finding and using knowledge resources.

Originally the university had an own physical library at the central campus in Heerlen, which offered employees and students live and online access to knowledge resources. As an institute focused on distance learning and also triggered by the typical physical distribution of its student population the OUNL decided already ten years ago to make the transition to digital library services for students. In collaboration with the Maastricht University the OUNL offers access to online library services among which access to a wide variety of repositories. Both international repositories like EBSCO based Academic Search Elite, ACM Digital Library, Cambridge Journals, Directory of Open Access Journals, Emerald, ERIC, IEEE Digital Library, JSTOR, Oxford journals, PsycArticles, ScienceDirect, SpringerLink, Taylor & Francis Online, Web of Science, Wiley Online Library and WorldCat. At the same time national repositories can be accessed like Kluwer Navigator, LiteRom, the Gateway to the National Academic Research and Collaborations Information System and PiCarta (NCC+ OLC).

The idea is that use of knowledge resources has become more a matter of learning the student's competencies to access, process and evaluate needed resources and become self-organized 21st academics. Hence the use of online library facilities and tooling adequately for their study at the university is perceived as an integral part of their study, of their academic research and writing competences. Consequently, learning to find relevant resources, assessing them adequately, manage referencing etcetera are part of study, assignments and tutoring in regular courses.

Moreover, there are options for students to participate in generic workshops for example one on how to use Endnote or participate in introduction of online library facilities at the Maastricht University. The knowledge resources access and use is supported in the own online learning environments. Both the MOOC based and VLE type of learning environments developed based on learning design principles derived from own and EU project based research, include supportive affordance and tooling for resources search and access.

In the university's former OpenU and current [yOUlearn](#) VLE's provide bookmarking, tagging, annotate and recommend resources and persons functionalities. Relevant knowledge and tooling developed in various EU projects at the Welten Institute might provide more advanced options like social recommenders as developed in the Open Discovery Space (ODS) project to find relevant knowledge resources and people

across Europe based on the (social) activities of the participants' in the learning environment (Bitter-Rijkema *et al.* 2015).

The past trend has been from a physical library to access to online library resources. The characterisation of the current situation from the university's student perspective is a "snapshot" taken of a dynamic process. New tooling shared use of Mendeley, combining use of dedicated tooling in study communities and getting in touch with peers for recommendations emerge (Bitter-Rijkema & Verjans, 2010), new hybrid forms of networked learning and knowledge resources sharing and recommending come into existence and will shape next steps to structure academic knowledge resource access, content creation and sharing practices.

4.2.5. KULeuven¹²¹

KU Leuven is a traditional university serving mainly an on-campus learning population spread over campuses in the Flemish region. It holds 24 libraries spread over 12 locations in Flanders (<http://bib.kuleuven.be/>). It is developing a series of student learning centres, of which the largest, agora (<http://bib.kuleuven.be/agora>), is now in use for its third year. It is a place where students can study together with access to digital library resources and collaboration equipment such as large screens. They also can use a video montage room our book group work rooms. Agora is for us a key concept in the modernization of learning, as it is student-centered and "flips the classroom". Gradually, university teaching adapts to this new infrastructure and gives students more control over their learning process. A well organized, very rich and user-friendly digital library system is essential to this, together with the availability of online courses (Truyen, Verbeken, Forward *et al.*, 2014). A specific portal has been developed, LIMO (<http://limo.libis.be/>), which gives one-stop access to the very large collection of digital resources, including the library catalogues, digital databases such as JSTOR and the Web of Science, and web resources.

It must be said that the digital library has completely transformed scientific research as well as university education. The enormous - but very expensive - resources in the digital library mean that research can be performed with much better situational awareness. Databases like the Web of Science and JSTOR are essential for research, but the digital library also contains a large number of smaller, highly specialized resources. This means a huge effort has been undertaken to bring the knowledge of using the digital library in the study curriculum, with the help of the library staff.

A specific online course has been made, on the university Blackboard system, which learns students how to find information, and use it in scientific publications. This also addresses problems such as plagiarism (<http://www.kuleuven.be/english/education/plagiarism/index>). This is hosted by Toledo (<http://toledo.kuleuven.be>), the university Virtual Learning Environment, which is Blackboard based. It holds literally thousands of online courses and serves over 80.000 students. They are automatically registered to the courses they take. Today, also a MOOC portal has been setup (<https://www.edx.org/school/kuleuvenx>), where future developments in online learning are tested. After a pilot period with 4 MOOCs, now an effort to make larger scale offerings are in the works. An innovative example is the Europeana Space MOOC (<https://www.edx.org/course/europeana-space-creative-digital->

¹²¹ Section under the responsibility of Frederik Truyen

kuleuvenx-eurospacex) which is not based on an existing university lecture course, but directly on research projects (Truyen & Verbeke, 2015).

Through a proxy server (EZProxy) students can access the digital library from anywhere on the web, also off-campus. Besides this, an open source reference management tool, zotero (<http://www.zotero.org>), has been introduced at the Faculty level with all students, so that they learn how to manage the information they gather in a personal database. It is also very important that librarians inform the staff of new possibilities in the Digital Library. Besides a university reference repository, LIRIAS (<http://lirias.kuleuven.be>), some social networks for academic referencing (Academia.edu, Researchgate and Google Scholar) and other resources (such as the online bookshelf [The Library Thing](http://TheLibraryThing)) are also promoted. This way students can have a better view on the biotope of the publications that are mentioned in the courses.

Finally, Open Access (<http://bib.kuleuven.be/english/ub/target-group-research/open-access>) and Open Data are very important for the university: research about it (<https://www.law.kuleuven.be/citip/blog/category/intellectual-property-open-data/>), published Open Journals - such as Image & Narrative (<http://www.imageandnarrative.be>)- and thesis research by students published in the university library portal LIMO (<http://bib.kuleuven.be/>).

- **5. Tables and figures**

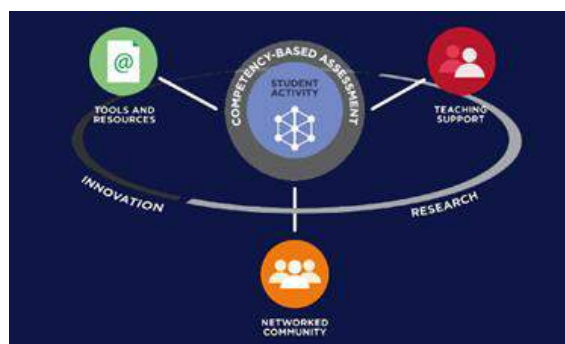


Figure 1: UOC's educational model



Fig 2. Open University of cyprus eClass eLearning Platform services

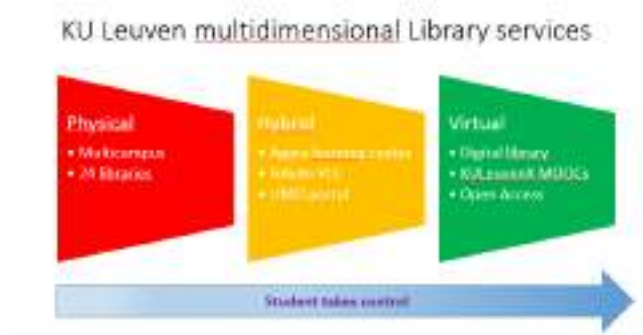


Fig 3. KU Leuven multidimensional Library services

• EADTU	• George Ubachs, Managing Director, EADTU • Darco Jansen, Programme Manager, EADTU
• Athabasca University	• Cindy Ives, Vice-President Academic Services (interim) • Alain May, Associate Vice-President Student and Academic Services • Elaine Fabbro, Director Library & Scholarly Resources • Facilitation: Professor Rory McGreal
• FernUniversität in Hagen	• Karin Michalke, Director of Library Services • Dr Jeanine Tuschling, Support Librarian for Arts • Brigitte Kreplin, Senior eLearning Consultant, Centre of Media and IT • Markus Deimann, Professor of Media Didactics, Institute of Educational Science and Media Research (IfBM) • Facilitation: Ingrid Thaler, International Office
• Open University of the Netherlands	• Christian M. Stracke, Associate Professor for Open Education and Innovation, Welten Institute • Peter Sloep, Professor of Technology Enhanced Learning, Welten Institute • Marco Kalz, Professor of Open Education, Welten Institute • Fred de Vries, Academic Affairs Office • Paquita Perez Salgado, UNESCO Chair in Knowledge Transfer for Sustainable Development Supported by ICTs at OUNL, Chair of the OUNL Library Committee
• Maastricht University	• Charles Bollen, Economics, Business, and Technology Librarian, Maastricht University Library; also Project manager for the collaboration between the Open Universiteit and the University Library of Maastricht 2007-10 • Fredericke Vernimmen, Manager Education and Research Support, Maastricht University Library.
• Open University of Catalonia	• Ciro Llueca, Director of OUC Library • Gema Santos-Hermosa, OUC Library, in charge of the Knowledge Resources expert group in the EMPOWER EADTU project • Facilitation: John Zvereff, Director, International Relations.
• Others	Anja Oskamp (Rector, Open University of the Netherlands) and Helmut Hoyer (at the time, Rector, FernUniversität in Hagen) for conversations on this study during the EADTU 2015 conference in Hagen in October 2015.

• Table 1. Acknowledges (Benchmarking report)

6. Conclusion

As it has been shown throughout this paper (some international reports about innovation in Higher Education, a benchmarking report of Libraries Student Support Services and a series of experiences from libraries members of EADTU) the influence of libraries is increasing into the teaching and learning. Their role as providers, managers and advisors of knowledge resources tailored to the different needs of teachers and students is gaining force within universities.

The NMC Horizon Report had already indicated the key trends, significant challenges, and important technological developments that were very likely to impact changes in libraries across the world over the next five years from 2015. In this sense, libraries have been involved in learning resources acquisition but now they are also participating in their creation (Johnson *et al.*, 2015). However, different levels of achievement have identified amongst the libraries Support Learning Services. Some educational institutions allow their libraries to be involved in the design of knowledge resources for the different programmes and courses. Librarians collaborate with teachers and technologists in a common framework. Some other libraries are on the way or have just started.

In short, libraries have a chance to improve the learning environment. In a sea of great opportunities but great risks, they must return to one of their basic mission: searching, selecting, managing and providing customised knowledge resources for each need and user.

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The modernisation agenda for European universities: education for innovation and entrepreneurship/intrapreneurship

Digital Education and Open Innovation: UNINETTUNO "Be Digital" case

Alessandro Caforio

Università Telematica Internazionale Uninettuno, Italy

The Role of ICT and web-based training in the Banking Sector: an analysis of an Italian Banking Group's experience

Illa Sabbatelli, Maria Menshikova, Alberto Romolini, Marco De Marco

Università Telematica Internazionale Uninettuno, Italy

Digital Education and Open Innovation: UNINETTUNO "Be Digital" case

Alessandro Caforio

Head of Research Office, Contract Professor of "Education and New Media"

Università Telematica Internazionale Uninettuno, Italy

a.caforio@uninettuno.it

Abstract

One of the pillars of UNINETTUNO strategy is to build and maintain a strong network with enterprises non-academic organization, in order both to design its didactic offer as an answer to real labor market needs, and to provide to its students real world scenarios to apply the theoretical knowledge acquired through their didactic activities. CONSEL ELIS Consortium is an Italian consortium of Universities (Uninettuno among others) and large enterprises (communication, media, IT, utilities, manufacturing, HR) aiming at promoting the integration between the academic and the business world.

In the ENEL presidency semester, ELIS launched an Open Innovation Challenged, called the "Be Digital" initiative; more than 20 different enterprises launched innovation challenges to be addressed by experts and students involved in the "idea generation", in five main clusters: Smart Home, Smart Manufacturing, Employee Engagement, Smart Cities, and Digital Education.

This paper describes UNINETTUNO students involvement, the role of UNINETTUNO ambassadors, the mix of technologies (Wiki, multi-videoconference, desktop sharing, forum, virtual classroom) and the didactic approach adopted in coordinating this experience in the context of the Psycho-technologies course, the ideas generated by the students, how the "idea marketplace" reacted, the final evaluation of UNINETTUNO products by the large enterprises which launched the challenges, and the added value of such a experiential, problem-based learning approach from a didactic and an organizational perspective.

Keywords: open innovation, digital education, collaborative learning, idea generation, innovation challenge

1. Introduction

Open Innovation (OI) as a concept and a process is an important new tool for education, underlining the knowledge interaction and dissemination between, education, research and industry (Oliveira Santos, 2011). One of the pillars of International Telematic University UNINETTUNO development strategy is to build and maintain a strong network with enterprises non-academic organization, in order both to design its didactic offer as an answer to real labor market needs, and to provide to its students real world scenarios to apply the theoretical knowledge acquired through their didactic activities.

CONSEL ELIS Consortium is an Italian consortium of Universities (UNINETTUNO among others) and large enterprises (communication, media, IT, utilities, manufacturing, HR122) aiming at promoting the integration between the academic and the business world. In the ENEL presidency semester, ELIS launched an Open Innovation Challenged, called the "Be Digital" initiative; more than 20 different enterprises launched innovation challenges to be addressed by experts and students involved in the "idea generation", in five main clusters: Smart Home, Smart Manufacturing, Employee Engagement, Smart Cities, and Digital Education.

For the "Psychotechnologies and Learning processes" course, delivered in the Faculties of Psychology and of Communication Sciences, chaired by UNINETTUNO Rector Prof. Maria Amata Garito, we decided to accept the Be Digital challenge and to create an online open innovation lab as part of the course activity for the January 2016 - April 2016 course delivery phase.

2. Be Digital Open Innovation Challenge

As stated above, Be Digital was (and still is) an Open Innovation initiative, firstly promoted by ENEL in its presidency semester of CONSEL ELIS Consortium. The roadmap designed for this initiative was:

- a. A first phase of "call for proposals", addressed to the members of CONSEL, for the definition of the main topics to be the focus of the Open Innovation challenges;
- b. An internal "pitch and vote" meeting, in which representatives from all the enterprises submitting a proposals presented in a 5 minutes speech their idea for an innovative challenge, and other participants voted for the best ideas;
- c. A clustering phase, in which the 22 ideas were grouped in 5 main clusters: mart Home, Smart Manufacturing, Employee Engagement, Smart Cities, and Digital Education and the submitted to all the participant organizations for approval;

¹²² Full members list available at <http://www.elis.org/consel>

Macro Challenge	Challenge	Sponsor Challenge	Aziende interessate a partecipare alla Challenge
Smart Home	"Through the Digital HOME"	INDRA Italia	ALIA, ACQUINTA, AURA, ADS, ASF, ASSIEMER, AUTOMA Italia, AVAYA, Cisco, Credito Varesse, ET, Fondazione Ericsson, General Electric, GSE, IAS Italia, IBM, Italia Italia, IREN, Mediaset, NTT DATA, Oracle, Sky Italia, Telecom Italia, Terra, Vodafone
	Data Intelligence in una Smart Home	IREN	
	Il contatore come hub di servizi di domotica	ACEA	
	IoT Services	MEDIASET	
	La TV nella famiglia di domani	SKY Italia	
	SMART GATEWAY: Casa, negozio e ufficio: protezione delle persone e delle cose, intrattenimento, energia, ambiente in unica piattaforma di gestione e monitoraggio	BT Italia	
	Smart Home: Come generare valore per il cliente migliorando l'esperienza quotidiana nelle case attraverso il Digital	YODAPONE	
Smart Manufacturing	Smart Home: come la casa può diventare innovativa e intelligente	ALIA	ACEA, AVAYA, Barilla, Cisco, EY, Galata, General Electric, IBM, Indra Italia, IREN, NTT Data, Terra
	Maintenance Prediction: riconoscere i guasti che precedono il manifestarsi di problemi in una rete complessa	IREN	
	Preventive Maintenance: Predictive Maintenance Solutions for Turbine Compressor For Smarter Operations	GALATA	
Digital Education	Smart Manufacturing: le soluzioni IoT per trasformare l'industria smartechnology e efficienza e competitività	TELECOM ITALIA	ALIA, Acquinta, ADS, Barilla, BT, CISCIO, EY, Fondazione Ericsson, GSE, IBM, IREN, Merco, Vodafone Italia
	Digital Education	CINEVAL	
Employee Engagement	VR @ Work: Addestrarsi «realmente» con la realtà virtuale	ENEL	Acquinta, AVAYA, BT, Credito Varesse, ET, IAS Italia, IREN, Mediaset, Merco, NTT Data
	VR @ Work: Addestrarsi «realmente» con la realtà virtuale	ENEL	
Smart City	Come passare da forme di comunicazione «one way» a modelli di coinvolgimento attraverso mobilità «multicanale»	BARILLA	ALIA, ASF, Acquinta, Ariva Italia, Indra Italia, IREN, Mediaset, Telecom Italia, Terra
	Li-Fi per uno smart Airport in una Smart City per Smart Citizen	SEA	
	Revolutionary Smart City: il potere ai dati	EY	

Fig.1 - Be Digital Clusters

- d. **The opening and launch of the initiative.** Each of the 22 Challenges, clustered in 5 groups, were summarized in a challenge profile, outlining the context (which kind of industry - i.e., manufacturing - or of environment - i.e., TV broadcasting), the scope (which kind innovation is needed) and the expected outcomes (i.e.: a business plan, or a prototype, etc.);
- e. From January, 11th 2016 o March, 21st 2016 employees and students from the partner enterprises and universities were invited to access to an online open innovation platform (Be Digital Community¹²³) for the **idea generation phase**. The platform is built as an "Idea marketplace", where users can post **Insights** (brief comments about a specific challenge) or **Ideas** (proposals submitted as answers to a specific challenge in a specific challenge). Ideas got to be submitted using a specific template for a slideshow and an online form for ideas attribution (authors) and description. Their work was facilitated by Institutional "Be Digital Ambassadors", who acted as bridge between Be Digital and the final users.
- f. During and after the **Idea submission phase**, in the Community could **vote for** a specific idea. During and after the idea submission phase, users can also **bid on or against** ideas, using a virtual wallet with 2 thousands "points", playing on the market (users with the richest wallets won some real prizes offered by the Be Digital organization). Experts and ambassadors provided advice and suggestion during the idea generation phase. Enterprises' responsible for each challenge gave immediate feedback on insights and idea posted on the marketplace.

¹²³ <http://bedigital.exago.com/>

- g. From March 21st, 2016 to April, 4th 2016 an expert team nominated by Be Digital selected the **best ideas for each challenge**;
- h. An **Hackaton** from April, 6th to April, 7th 2016 lead to the Final Pitch where best ideas were developed in the form of prototypes and presented in the form of **Pitch to the CEOs Panel** composed by the CEOs of each of the "challenger" enterprises.

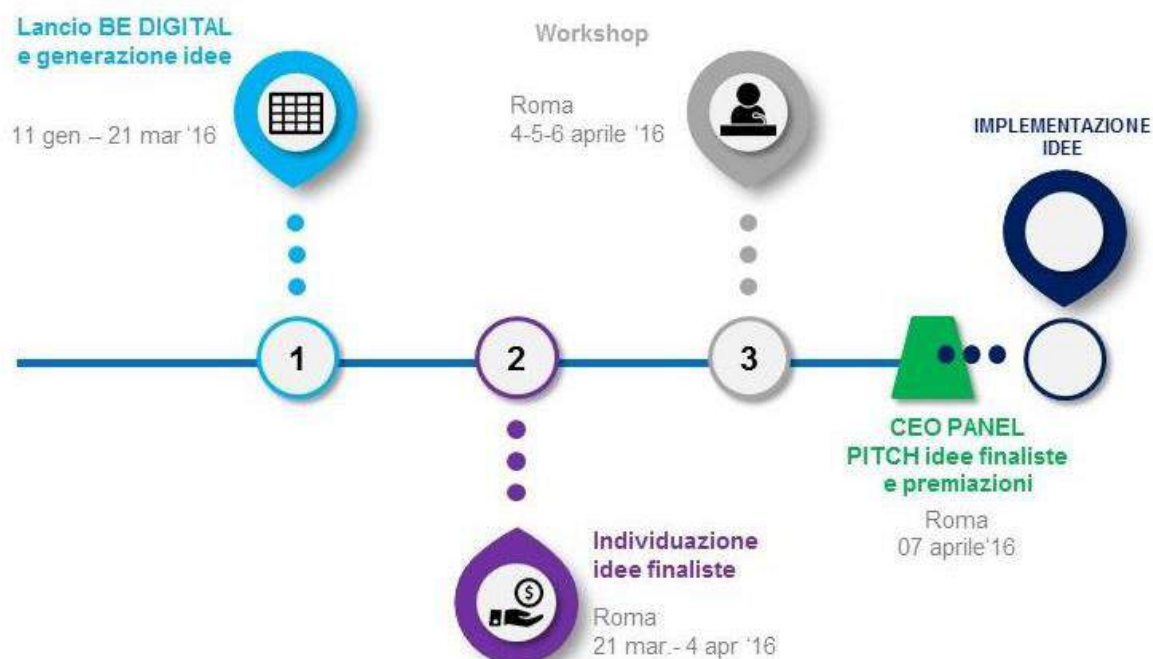


Fig.2 - Be Digital Roadmap

3. Setting up the activity

Participating at the Be Digital Open Innovation Challenge was promoted, in the context of the Psychotechnologies and learning processes course delivery phase of January-April 2016, as an optional activity. Psychotechnologies and learning processes is a course in the Faculties of Psychology and of Communication sciences, about technologies applied to cognitive processes, specifically but not exclusively to teaching and learning processes, delivered online by UNINETTUNO University. In order to be admitted to the (in presence) final exam, students have to comply with the course admission criteria:

- a. they have to watch all the videolectures at least twice (students' activity on Uninettuno platform is tracked by the platform itself);
- b. they have to participate to at least 2 of the online activities proposed during the course delivery phase: Virtual Classrooms, Forum Discussion, Individual Exercise, a brief Essay, Flipped Classroom activities on Second Life, and a Collaborative project work.

While usually this last activity consist in a collaborative paper on a theme assigned by the professor at the beginning of the course, to be developed on the course Wiki site, in this case this activity was replaced by the participation to Be Digital Open Innovation Challenge.

The challenge was presented during the first Virtual Classroom session (in the first week of the course). In this first virtual classroom I presented:

- a. the topic of each of of the Cluster;

- b. The challenges and where to find the full document for each of them;
- c. how the idea generation activity is set up for the course.

The idea generation was organized as a collaborative project work. Students can freely choose the challenge they wanted to work on, although I strongly recommended to focus on Digital Education and Smart Home challenges, more fitting with the course contents and their competences. Once each of the participating students selected its challenge, groups were automatically formed.

The didactic approach was the "scaffolding and fading" (Lowyck, 2001) tutoring approach; in the initial phase of the activity I supported the students with advises, insights, sources and references; then the participation of the tutor "faded out", becoming a silent supervisor of students activity.

Main tools used for the activity were:

- A Wiki, setup for the collaborative project work on Wikispaces;
- Skype 4 Business, a cross-device, multi-video-conference Microsoft tool, provided for free for educational purposes

Students worked directly on the Wiki and "reviewing sessions" were organized every 2 weeks.

The last two weeks were focused on idea "closing" and proposal finalization and submission.

4. Results

27 students participated to the Collaborative project work, on a total of 97 students attending the course in the January-April 2016 delivery phase (28% of the active students).

The two best ideas, elaborated by 15 students, were submitted to Be Digital Open Innovation Platform:

1. **Domesticus**, for the "Smart Home" challenge. The challenge, proposed by several utilities enterprises, asked to find innovation for the data-oriented exploitation of counters and devices commonly installed in a standard house. Domesticus was the idea of a tool (an hub plus a mobile app) able to transform each house as home automated. Household appliances, even if not designed to be connected and managed by an app or external module, thanks to transmitters placed at electrical outlets, can become smart and connected. The app, which allows the management of the houseplant, can be customized by the user to make it as close to reality as possible: a map of the house will show the various rooms, the outdoor areas and all facilities and equipment connected to the powerline and consequently, to the app.

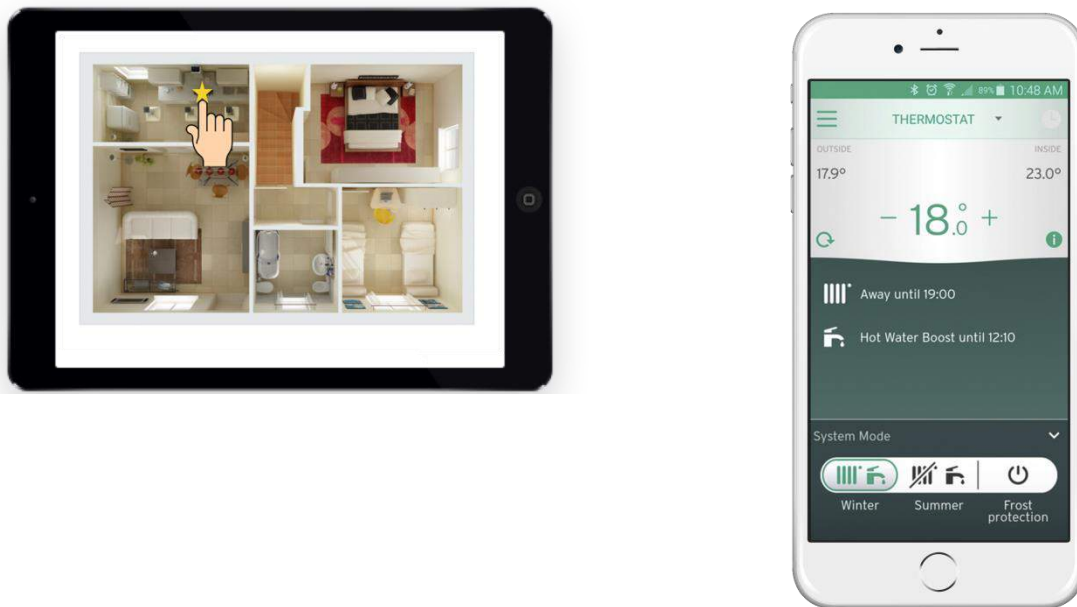


Fig. 3 - Snapshots from the Domesticus Presentation

2. **UNIDEE**, for the "Digital Education" challenge. The challenged, launched by ENEL (electricity provider) and Credito Valtellinese (a bank) asked about ICT and didactic models innovation in employees training. UNIDEE proposed a a training model to create cost and learning effective paths of transmedia self-learning. The idea concerns the self and is addressed to the following professional categories under ENEL:

- Office workers
- On-field technicians
- Back office technical personnel

The innovative aspects of this training solution was the transmedial design approach:

- Assessment of previous skills level through an assessment portal integrated with an Intelligent Tutoring Systems
- Short video lectures
- Transmedia learning by doing: VR, serious games and Augmented Reality applications
- Virtual classroom for knowledge transfer, contributions on technical and administrative issues

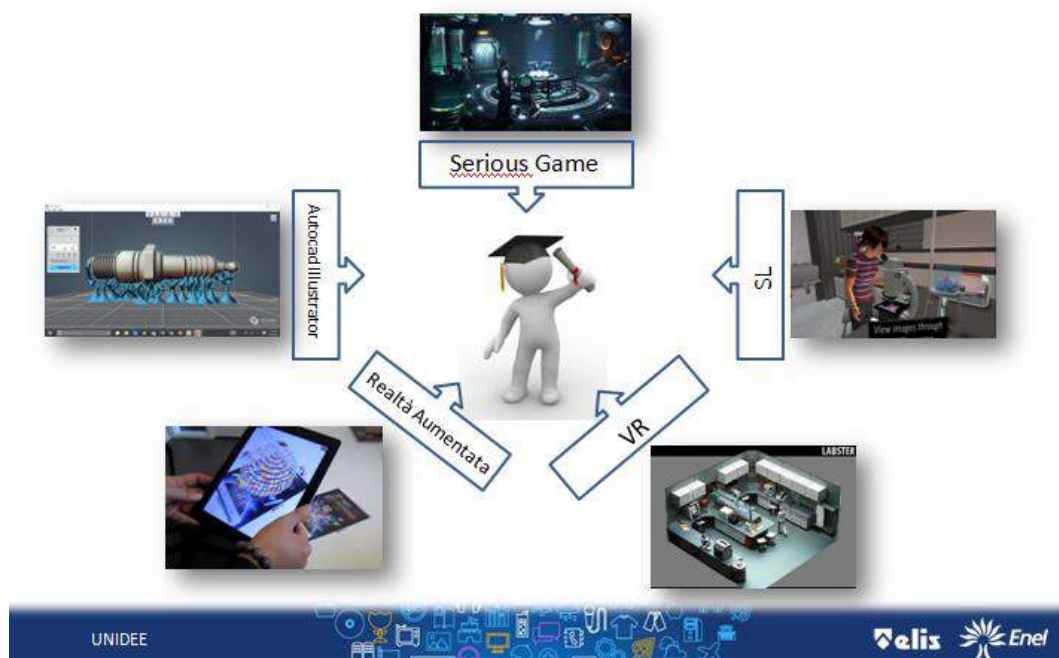


Fig.4 - Snapshot from UNIDEE Presentation

Both of the ideas were the **most voted** for their entire cluster. UNIDEE ended up as best idea in the market for Digital Education cluster, with a 81.20% score. Domesticus ended as best idea in the market for the Smart Home cluster, with a 81.47% score.

Only UNIDEE was selected by the experts committee for the Hackaton.

During the Hackaton, a smart prototype - web-based, fully working - for the Intelligent Tutoring System was built. Uninettuno students teamed up with ELIS School students under the supervision of UNINETTUNO ambassador and of an IBM expert, providing technologies and advices for the artificial intelligence component of the ITS (in the prototype, based on IBM Watson systems).

After the final pitch to the CEOs, UNIDEE was awarded both from ENEL and from Credito Valtellinese as Best Idea for the Digital Education cluster.

5. Conclusion

Besides being something satisfying for the participating students, both in terms of having the chance to put in practice the theoretical knowledge acquired during the course, and for the possibility to interact with expert from the enterprise world about real cases and problems, the Be Digital experience presented to UNINETTUNO two ways of following up the results.

From a didactical/technological point of view, using a new system for synchronous and asynchronous interaction with and among students led to the decision of integrating both a Wiki technology and Skype 4 Business in the "standard equipment" provided to each professor for each of the courses delivered by UNINETTUNO. UNINETTUNO learning environment is being developed and, starting from the next course delivery phase, each professor and all the tutors will have at their disposal both a Wiki and an effective multi-conference, cross-device system. Despite the fact that UNINETTUNO has already these technologies available, we are elaborating a standard didactic model to be presented to and used by the teaching staff,

considering a key factor the provision of a didactic model supported by technologies, and not the provision of technologies by themselves.

Furthermore, the "innovation" experience is leading to the creation of an internal innovation challenge, focused on innovation in teaching. Following the suggestion of Prof. Eusebio Scornavacca (Associate Professor of Management Information Systems, Dean Clifford C. James Chair for Distinguished Teaching), collaborating with UNINETTUNO for the Economics and Psychology Faculties, UNINETTUNO is setting up and ready to launch a Teaching Innovation Incubator (TII).

The TII is a research-led teaching initiative that aims to foster faculty projects focused on the development of state of the art learning opportunities to our students. The TII also aims to create mechanisms of cooperation into knowledge creation and dissemination - producing a meaningful impact on students' learning experience and the community. The goal with the proposal is to support development of a Teaching Innovation Incubator program focused on engagement, impact and innovation. This will incorporate experimentation with both innovate technologies and tools but also methodologies and pedagogical techniques (Scornavacca, 2014). Lessons learned in a collaborative application and analysis of those initiatives will result in a more engaged teaching and learning community, and in the creation of the UNINETTUNO Teaching Innovation Research Center.

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The Role of ICT and web-based training in the Banking Sector: an analysis of an Italian Banking Group's experience

Illa Sabbatelli

Associate Professor, International Telematic University Uninettuno, Rome, Italy
Email: illa.sabbatelli@uninettunouniversity.net

Maria Menshikova

Research Fellow, International Telematic University Uninettuno, Rome, Italy
Email: m.menshikova@uninettunouniversity.net

Alberto Romolini

Associate Professor, International Telematic University Uninettuno, Rome, Italy
Email: a.romolini@uninettunouniversity.net

Marco De Marco

Full Professor, Dean of the Faculty of Economics, International Telematic University Uninettuno, Rome, Italy
Email: marco.demarco@uninettunouniversity.net

Abstract

E-learning technologies represent important innovative instruments for teaching in universities, enterprises and institutions. New technologies play also a big role in general financial education and employees training activities. This is especially true in the banking sector where Learning Management Systems and MOOCs for financial education programs are available in growing numbers. In particular, open education in the banking and financial sector is fundamental and will have an increasing role in the next years. In fact, after the recent economic crisis, many banks have offered not only online training to their employees, but also free e-learning courses to their clients. The aim of this approach is to help banks' customers (citizens and enterprises) to understand some fundamental financial concepts, i.e. the BRRD directive 2014/59/UE and the new banking resolution instruments such as the "bail in" and the risks that they take when involved in financial operations.

Given this framework, the aim of this paper is to provide an exploratory research of the on-line training courses and initiatives developed by the bank sector institutions and addressed to both their employees and their real and potential clients. The paper provides a preliminary analysis of the new e-learning, ICT and web-based training programs based on a case study of a big Italian Bank.

Keywords: ICT and web-based training, online education, e-learning, financial education, banks, clients, employees

1. Introduction

Financial education is an emerging issue where, after the recent financial crisis that has involved many countries, the lack of financial knowledge has been seen as one the main reason for the wrong allocation of individual investments. After then, many international institutions have defined principles for financial education in order to strengthen the knowledge of stakeholders' financial issues. The need for financial education affects also companies where e-learning technologies are seen as fundamental modernization instruments for the on-going training of employees and for business development and sustainability. The e-learning technologies are ultimately a strong instrument to develop financial education for external users, real and potential clients for first, but also a powerful tool to increase skills of internal users. This approach is particular relevant for banks which are using Learning Management Systems more and more.

Given this approach, the aim of this paper is to provide an exploratory research of the on-line training courses and actions dedicated to internal and external users and developed by the banking sector. The focus is based on the Italian experience where it can be observed emerging needs for general financial education.

The paper provides an analysis of the new e-learning, web-based and ICT initiative for training in the banking sector addressed to internal and external users, following the case of a big Italian Bank, Unicredit. Due to the need of financial education in the Italian context, Unicredit has developed a specific approach to new e-learning technologies exploring new tools and perspectives.

The paper is organized as follows. Section 2 describes the need for a new financial education in the european and global context starting from the assumption that financial education can be described as a way to ensure stability of the financial markets. Section 3 analyzes the use of e-learning and web-based technologies for training in the banking sector. Section 4 explores the initiatives in the field of ICT and web-based training through the presentation of the case of an Italian Bank Institution. The analysis is based on the case study approach (Eisenhardt, 1989; Ryan, Scapens, & Theobald, 2002; Yin, 2003) taking into consideration a bank as Unicredit, one of the mayor European player in the financial market. Finally, section 5 presents the conclusion of the paper.

2. The need for a new financial education

After the crisis that occurred in the financial markets the very big challenge is “financial education”, an instrument of providing effective consumer protection, which can impact on macroeconomic situations (Mishkin, 2008). In the recent years, the governments and the institutions of many countries have understood the importance of financial literacy: the lack of financial literacy is one of the main causes of wrong investments (Lusardi-Mitchell, 2014) as is overconfidence in financial literacy (D’alessio & Iezzi, 2016; Gentile, Lucarelli, Linciano & Soccorso, 2016).

The population ages and the new generation “wants it now” and “thinks buy now, pay later”. For these reasons, financial education is considered a “pillar to ensure the stability of the financial markets” (OCSE, 2005) and an “essential component to enjoy the benefits of the European Single Market” (European Commission, 2007). The European Commission thinks that governments could help by developing a national strategy that integrates a methodology for evaluating the level of financial literacy and promotes educational programs. Low financial literacy and lack of transparency affect SME s’ access to finance.

In the context of solving these problems, INFE, International Network on Financial Education created by OCSE, adopted the “High-level Principles on National Strategies for Financial Education” in 2012 (OECD/INFE, 2012).

Similar principles were also approved by G20 in the prior year (G20, 2011). Financial literacy levels are low across the world and the summit pushed for new policies to support general financial literacy through the development of new models.

OECD in April 2016 published a report that explains that this requirement is particularly pertinent to Europe, given the sophistication of retail financial markets, the impact of ageing population (much more than other countries), and the reforms of public pension systems. European citizens lack the financial awareness and skills to face these changes. According to OECD, 21 of the 48 European economies covered in the report - using the OECD/INFE Principles - are planning, developing, implementing or revising national strategies for financial education.

Five countries have revised or are revising their first national strategy; twelve are implementing their first one; four are in the process of designing/developing their first national strategy. Some countries have not yet developed a national strategy.

Regarding Italy, financial education is very low and little has been done until the last year to develop a national strategy and to promote financial education programs.

According to data from Global Financial Literacy Excellence Center (GFLEC), Italy is the country with the lowest level of financial education amongst major advanced economies. Only 37% of Italian people know the main financial principles. In BRICS countries as Brasil the level is 35% and in South Africa 42% .

The scenario changes depending on the age, and the data (PISA 2012) explains that Italian teenagers are the least prepared in the OCSE countries.

Moreover, in Italy the government has only this year planned to implement a law (DDL 1196) that will be approved in a few months on financial education and “economic citizenship”.

All the financial institutions have been involved in this project: the Bank of Italy (VISCO 2015), the Italian Securities and Exchange Commission, the Federation of cooperative banks and the Ministry of Education. Schools also have undertaken programs to improve financial literacy according to the document of the Ministry of Education signed on 10 June 2015. For these reasons, Italy is an interesting case to conduct an exploratory research to understand the ways and the effects of technological innovation in financial education in the banking sector.

The use of MOOCs for financial education program is very interesting too. The Bank of Italy, in particular, offers an e-learning course “the knowledge of euros”. Open education in banking and finance is fundamental and will have an increasing role in the next years. Many banks after the recent crisis offer free e-learning courses to their clients.

The e-learning platform gives consumers the possibility to understand the new system and, in particular, the risks that they take.

The e-learning technologies are fundamental not only for a general financial education but also for the training of employees operating in a company or in a specific business unit. This is especially true in the banking sector where Learning Management Systems and MOOCs for financial education programs are available in growing numbers.

3. E-learning and web-based technologies for training in the banking sector

E-learning technologies are not only fundamental modernization instruments for European universities, but also for enterprises and institutions. New technologies have a big role in the on-going training of employees and in business development and sustainability.

In particular, banks use Learning Management Systems more and more. The Interbanking Convention For Problems of Automation (CIPA) in collaboration with the Italian Banking Association (ABI) provide every year an updated report on the use of Information and Communication Technology (ICT) in the Italian banking systems.

In general, when studying the adoption and use of new forms of training/learning, it is important to consider some specific features of the banking industry.

The banking industry, which a few years ago was highly protected, recently faced significant changes relating to the competitive environment, technological innovation, as well as the institutional changes that have driven companies to a high rate of strategic and organizational transformation. The new competitive scenario requires highly educated professionals within the banking institutions, especially those who have direct contact with customers.

According to Zimková (2006) the success of any bank in today's environment depends upon the satisfaction of its customers, and that is why employees are expected above all to be able to provide quality services. The technological changes (including discussion forums, chat, e-mail, multimedia and Internet-based applications) push the banking institutions to constantly update the service delivery process, as well as a greater diversification of the business (Andreu & Jáuregui, 2005). The institutional changes, however, lead to a reconsideration of corporate strategies related to the organizational structure and professional composition of a bank, as well as pressure on the recovery of efficiency and productivity (Comacchio & Scapolan, 2003).

One of the transformations, which occurred in recent time, is undoubtedly related to the ways of carrying out training courses aimed at skills development, professional improvement of bank employees, as well as knowledge management within a banking institution or network.

In fact, based on the speech of Giuseppe Zadra - the former General Director of ABI at the European Bank Training Network (EBTN) Conference, we can define e-learning systems in the banking system not only as a tool aimed at delivering training courses, but also and especially as a management tool of the company's knowledge and an access tool to informations.

According to Comacchio & Scapolan (2003) the decision-making process related to the adoption of e-learning among the banks can be impacted by various factors. Some of them are as follows:

- Rationalization and optimization that consists of the fact that online courses and modules are more flexible in delivery and use (anytime and anywhere) and lead to sustainability of training related to economies of scale, and subsequently to cost reduction (Andreu & Jáuregui, 2005; Karaaslan, 2013)
- Limitative thrusts (Comacchio & Scapolan, 2003);
- Cultural and institutional factors (Comacchio & Scapolan, 2003; Andreu & Jáuregui, 2005);
- Connectivity, i.e. the ability to facilitate communication and dissemination of knowledge in a company (Comacchio & Scapolan, 2003).

In a recent article on e-front portal, Andriotis argues that e-learning in a fast-paced, knowledge-driven industry like finance is very important for various reasons: cost factor; privacy and control; staying up to date; new employees onboard (training for newly hired personnel); training insight (statistics about a single course's progress and a single employee performance).

Moreover, Comacchio & Scapolan (2003) claim that e-learning can bring added value to both the banking institutions and their employees. According to the authors, in the former case, it derives from the improvement of the learning processes, from the quality of training integrated with work or networking, as well as from the saving of training costs (travel costs, accommodation costs, training, rent, instructor costs,

opportunity costs, etc). The added value for employees, however, comes from factors such as “self-service” of training courses or personalization of training program in accordance with individual learning models. The study of Karaaslan (2013) supports this statement, defining web-based training as a new opportunity to create a harmonious labor force with new technology and to increase the efficiency of business productivity.

With regard to the level of e-learning adoption, some authors (Comacchio & Scapolan, 2003) verified different types of pressure that can have a significant impact on the decisions for introduction and development of an e-learning strategy in banking institutions. In this regard, the authors highlight the following types of isomorphism that may emerge:

- Coercive isomorphism (e.g. policies of ABI, which, through ABIFormazione, promotes the dissemination of e-learning culture within the banking industry, as well as indications from public institutions dealing with training and education);
- Mimetic isomorphism (e.g. suggestions from colleagues working in the Human Resources Management area of other banks);
- Regulatory isomorphism (e.g. pressure exerted by legislation in the field of training developed by ABI).

From 2015, Federcasse (the Italian Federation of Rural and Artisan Co-operative Credit Banks) started to extend the training activities provided to the banking workers also thanks to the integration of traditional lectures with online education (Table n. 1):

Table. 1 Training activities realized by Federcasse

	2015			2016		
	Face-to-face learning	E-learning	% E-learning out of Total	Face-to-Face learning	E-learning	% E-learning out of Total
N° REGISTRATION / ATTENDANCE	1628	481	22,8	1394	701	33,5
N° COURSES	72	13	15,3	59	19	24,4
N° BANKS	26	18	-	26	14	-
N° PARTICIPANTS	1105	384	25,8	791	346	30,4
N° HOURS	16200	15201	48,4	11977	10425	46,5

Source: Our elaboration of Federcasse (2016)

The subjects of the courses delivered by the Federation in e-learning are those related to the mandatory training envisaged by the IVASS regulations, and those related to the anti-money laundering, transparency and the cash treatment.

According to a recent research conducted by ABI (<https://www.abi.it/>), in addition to the associations' initiatives the majority of banks in Italy has also started to introduce and implement e-learning experiences inside the organizations. The findings of the study highlight that the main target groups studying in banks through online courses are employees of the sales departments, bank operators, bank consultants, and in some cases, branch managers and staff of the Head office.

With regard to the content of the didactic modules for bank employees, we can claim that, according to the EBTN conference proceedings, an extensive training process is focused on the practical and operational aspects with a very strong commercial value. This type of content allows credit companies to meet the

specific needs of their clients, obtaining personnel that are more qualified and strengthening their relationship with customers. Some authors (Comacchio & Scapolan, 2003; Andreu & Jáuregui, 2005; Karadimas & Rigopoulos, 2006) argue that the content of the training modules in banks are mainly aimed at the following areas:

- Introducing new products, and new banking services;
- Creating basic knowledge, as well as specialist (technical and operational) skills (e.g. legal aspects of the Stock Market, Banking Quality, Civil Law, Distrain);
- Training on the internal systems and business processes (e.g. Customer Service and Customer Relationship Management);
- Training on informatics and new technologies (e.g. Microsoft Office, Business-related Internet service, Basic Internet, Advanced Internet);
- Language and communication skills training.

4. Case Study Description: Use of web-based learning by UniCredit

The aim of this part of the paper is to explore the initiatives of an Italian Bank Institution developed in the field of ICT and web-based training. The Bank described in this study is UniCredit.

UniCredit Group is an Italian global banking and financial services company. Its network spanning 50 markets in 17 countries, with more than 8,500 branches and over 147,000 employees. Its strategic position in Western and Eastern Europe gives the group one of the region's highest market shares (Corporate website, 2016).

As discussed in the previous sections, all the initiatives realized by the Banking Group have been divided in the 2 particular areas:

- Internal training dedicated to the personnel and delivered through the most innovative learning modes (ICT and web-based); and
- Educational programs designed by the UniCredit Banking Group in the area of financial education and addressed to the external stakeholders (citizens, customers, enterprises).

In order to analyze the above-mentioned training activities delivered by UniCredit, the data from the secondary sources has been collected (corporate website, official documentation of the Banking Group, information published in third party sources) and analyzed by means of the content analysis technique.

4.1 Internal education - Staff training at UniCredit

The strategy of the Human Resources Management (HRM) in UniCredit is structured in such a way that it can allow the organization to adapt to the current regulatory and economic environment, increased competition and technological innovation that have a significant impact on the activities of the Banking Group.

Recently, UniCredit has seen the implementation of several initiatives aimed at improving competitiveness and efficiency of the company. These initiatives have strengthen significantly the Banking Group in the current market context, contributing to the organization sustainability.

One of the key areas in the process of adapting the company to new external conditions is definitely related to the development of HRM initiatives, including employee development. According to the official data of the UniCredit Banking Group the initiatives in this area are divided in 3 directions: 1) Talent attraction and

development; 2) Increase of professional skills and competencies; 3) Investments in communication and dialogue.

In the last 3 years, the UniCredit Banking Group has continued to invest in training and development with the aim of increasing the responsibilities of managers regarding the development of their subordinates and promote essential behaviors for the achievement of business objectives, with a special attention to the cooperation, synergy and risk management.

In this part of the paper, in fact, we are analyzing the training initiatives for the organization staff related to some of the areas mentioned above, but carried out only through the modalities based on new technologies, digital platforms, and the Internet.

With regard to the development of professional skills, the priority of the Group over the last few years has been to ensure the necessary balance between costs and quality in defining the training approach. The attention to cost containment has led to an overall decrease in training hours, providing, however, a mix of excellent and effective training solutions, among which the key role is played by e-learning.

According to a recent agreement between the Banking Group and the Organization of Trade Unions (2015), the on-line training at UNICREDIT represents a large part of the training provided by the company; including all mandatory training courses for the personnel of the organization.

In the Integrated Report (UniCredit, 2015), there are references to more than 76.800 hours of online training carried out from October 2014 to December 2015 for the employees of the Group in the retail and corporate areas.

According to the Sustainability Report (Unicredit, 2013), the courses provided to the staff of the Bank are represented by three main macro-areas – technical training, management skills training, and language training (Figure 3):

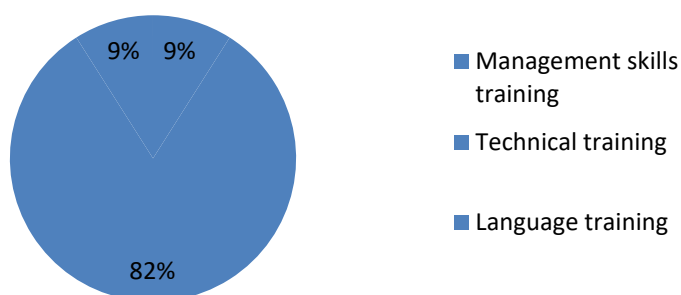


Figure 1: Distribution of training hours by training type, % (Source: Sustainability Report 2013, UniCredit)

According to the official documents of the Banking Group (Sustainability reports, Integrated Reports), one of the important areas of the technical training is to develop the skills of the personnel to give necessary support to the customers, improving the knowledge on the products, understanding the customers' needs and strengthening sales and relationship building skills.

Another area of the technical training aims to improve risk management skills. Thanks to the UniCredit Risk Academy and UniCredit Business Integrated Solutions, an online training course aimed at providing all employees with basic knowledge on concepts, goals and tools of operational risk management has been launched by means of new methods of distance education.

In addition, in the context of specific technical skills development, starting from 2012 the Banking Group created several workshops addressed to the workers from different competence lines where they can learn also through new technologies and digital tools.

In view of the growing importance of social media and their potential influence on the business activities and reputation, in 2015, some of the employees have participated in specialized workshops in order to tell the company's managers about their use of social media. Based on their considerations, from 2016 an online mandatory training program should be designed to help the bank staff to understand how to use social media, when it comes to UniCredit (Integrated Report 2015).

As regards managerial training, the Sustainability Report (UniCredit, 2013) states that in accordance with the company's commitment to increase the accountability of its managers and encourage them to use feedback in order to benefit their performance and their personal development, UniCredit has invested heavily in programs aimed at improving essential skills for managers.

In 2015, a special attention was paid to the implementation of the Leadership Programs for the development of key competencies associated with each banding for current and future managers (Integrated report, 2015).

In addition to these global initiatives, the Group also invests to specific training in the different geographical areas in correspondence to the activation of specific programs. In recent years, in fact, training courses for the managers of the different countries have been started:

- In Croatia, when a performance management process was launched, special programs for managers have been created. Training courses for managers through e-learning in this area are aimed at improving the ability of assessment of teams in order to promote professional development, as well as the strengthening of individual responsibility in the phase of development needs definition.
- In Hungary, a program of transformation for managers of the retail network has provided them with guidance on how to manage the employees' development in the best way. A particular emphasis has been given to the building of a culture of feedback and promotion of collaboration among different divisions.

With regard to the development of knowledge and skills through internal communication and dialogue, the Unicredit Group can boast of its new Intranet "OneGate" in seven languages that allow all employees to access all the necessary internal information. This tool is considered a key element for improving the effectiveness of internal communication, facilitating access to information and managing knowledge within the organization. This digital platform is a centralized access point online to all the information of the Group. The Intranet offers different easy-to-use content, tools and widgets in order to support the employees in their daily work. Some examples can be as follows:

- Sharing of the Strategic Plan content with the staff in order to ensure the commitment and involvement;
- Publication of informative articles, video messages realized by the CEO, as well as internal presentations aimed at illustrating the updates related to the Strategic Plan 2015-2018;
- Creation of a fruitful social dialogue between the bank and the employees;
- Description of the examples and best practices to outline the best attitudes to adopt in different situations.

4.2 External education - Financial education delivered by UniCredit

In addition to investments in internal training programs addressed to the staff, UniCredit has been investing for several years in training for enterprises individuals (actual and potential customers). These initiatives are aimed at supporting the competitiveness of enterprises and the ability of citizens to make economic choices sustainable over time, which ultimately will have a positive impact on the sustainability of the Banking Group itself.

In order to strengthen the financial inclusion of individuals (young people, families, elderly and immigrants), UniCredit is implementing the training courses in different modes (traditional, e-learning, blended), also thanks to the collaboration with different national and international stakeholders (Consumer Associations, schools, Universities, and trade Associations). The aim of this training is to create courses on topics related to banking and finance, designed for specific needs of participants, and delivered by highly qualified staff of the Bank.

With regard to the enterprises, UniCredit is engaged in development of particular programs on various issues, including export, digitization, or specific topics regarding the hospitality sector, realized and taught by both recognized external partners and highly qualified staff of the Banking Group. These training activities addressed to the external environment are provided, at least partially, through the internet and/or by means of digital technologies.

The first initiative has been designed in collaboration with ADOC, Federconsumatori and the National Union of Consumers for the project "La Banca è anche per me". In the framework of this initiative the educational video pills on various topics such as Multichannel Bank, Current Account, Payment Cards, Money Remittance etc. have been realized and subsequently distributed through the official channels of the partners.

The video, structured through info-graphics and text, and commented in five languages (Italian, English, French, Romanian and Chinese) aim to provide information on some precautions to be taken in consideration for a conscious and sustainable choice, as well as promote access to the bank for citizens and immigrants and contribute to their financial education.

Another initiative, developed by UniCredit and addressed to both citizens and enterprises, is called "Informati". This initiative represents a financial education program that offers free courses to customers and non-customers overall Italian territory. The programme is aimed at those who want to increase their knowledge on the topics of banking and finance to make their financial activities more conscious and responsible.

In particular, the educational offer of this program is aimed at the three specific target groups:

- Individuals (young people, families, elderly, immigrants);
- Small and medium enterprises;
- Non-profit associations.

The trainers involved are the specialists of UniCredit who have decided to participate in the program as volunteers, "donating" to the Community in which they live and work part of their own free time, knowledge, desire of research and innovation, as well as their own professional experience. The internal training school of the Group supports about 1200 trainers through providing of an adequate training and a constant update on the topics covered by the program. Even if the training courses mainly take place in the traditional classrooms, the trainers in collaboration with the Oil Project - the largest MOOC (Massive Online Open Courses) in Italy - have realized the educational videos on the main topics of the course. These videos

are freely available on the Internet for anyone who wants to acquire the basic knowledge in the field of banking and finance (Catalog In-formati - Unicredit, 2015).

Another interesting project to be considered in this paper is Go International! This project is the educational offer of UniCredit developed to allow companies that have started or intend to start a process of opening up towards foreign markets to deepen knowledge about international trade systematically. The training in the framework of this initiative has been developed by the internal training school of UniCredit in synergy with the structures of international business of the Banking Group, and with the best professionals in the industry, to help the participants trigger the two important levers (Catalog Go International! - Unicredit, 2015):

- Knowledge - a clear and complete framework regarding a specific international context (standards, techniques, tools) to face the process of opening to foreign markets in a better way, and to assess in advance the potential risks to be addressed;
- Action - analysis of operational and practical issues on the context and tools necessary to achieve the growth objectives.

The idea of UniCredit is to make available for SMEs the experience and know-how of the whole Banking Group in order to help the companies to adequately face the opportunities offered by international markets in a context that requires an in-depth and updated knowledge of some aspects, points, critical issues and risks (Corporate website of UniCredit, 2016).

The training courses Go International! can be used by enterprises through 5 different formats. This allows participants to access that format, which is the closest to their own learning needs and available time. One of the most popular format is that related to the distance education, in this case called "Video Seminar". The Video Seminar is a format delivered throughout Italy that offers the possibility to follow live video seminars at a bank's headquarters or at one of the offices of local stakeholders. Moreover, during the live broadcast participants will be able to interact with the speakers through their own devices - smartphones or tablets by means of an online platform for instant messaging (Catalog Go International! - UniCredit, 2015).

#Cashlessgeneration is the last initiative of financial education that we are describing in this study. This initiative has been developed by UniCredit, which involves 9000 students from 130 High schools and 5 Universities. The information on the corporate website of the Banking Group shows that this initiative is part of the path traced by the Law on the Reform of the national education system that has, among others, the aim of enhancement of knowledge regarding legal, economic and financial issues, as well as of education aimed at entrepreneurship development. According to the PISA 2012 (Programme for International Student Assessment) survey, Italian students at the end of the Rating among OSCE Countries that assesses the level of financial knowledge and expertise. To overcome this gap UniCredit regularly organizes events aimed at dissemination of information about certain topics. Among these - #Cashlessgeneration – a project dedicated to the new non-cash payment instruments (Corporate website of UniCredit).

After the 2015 edition of #Cashlessgeneration, realized by Unicredit in collaboration with the Association of Consumer Protection and Orientation (Adoc - Associazione Difesa Orientamento Consumatori), it was decided to extend the 2016 Edition through cooperation with WeSchool (the Italian MOOC platform) in order to improve the educational proposal, and reach a wider audience of participants by using the digital platform of the new partner (EconomyUp, 2016).

5. Conclusion

After the recent financial crisis, financial education has become a challenge for the next years, essential for the stability of the European financial market. In order to follow this challenge, the European Commission and G20 has recently approved principles for financial education able to increase the level of financial knowledge in the society. The need for a new financial education is indeed particularly pertinent in the advanced economies and in the European market where Italy has the lowest level of financial knowledge amongst advanced economies and industrialized countries.

More in general, e-learning technologies play a crucial role for the modernization of training in universities, enterprises and institutions. This opportunity affects the training for internal and external users, especially in the banking sector where the institutions are using Learning Management Systems. Indeed, banks are experiencing a new competitive scenario where it is crucial the availability of highly educated professionals especially for the institution who have direct contact with customers.

The transformation in the training of banks is related to the ways of carrying out training courses through e-learning systems. The e-learning systems in the banking sector are not simply a tool aimed at delivering training courses, but also a management tool of the company's knowledge and an access tool to informations.

Italian banks are particularly involved in providing e-learning experiences for employees, from the sales department to head offices, and for external users. The case of Unicredit takes into consideration one of the mayor European player in the financial market. The banking group has defined two different areas for e-learning: the internal training dedicated to employees and the educational programs in the area of financial education addressed to external stakeholders.

The development of human resources and employees is becoming a strategic line for the future of the banking group. In the last 3 years, Unicredit has continued to invest in training and development with the most part of training hours offered with e-learning technologies. The solution of the web-based approach is due also to the need of cost containment in the training activities. The main areas of course providing are currently technical training, management skills training and language training with a centralized access point from the digital intranet "OneGate".

Regarding external education, Unicredit has been investing in training for individuals (young people, families, elderly, immigrants), SMEs, Non profit-entities. The aim is to support the competitiveness of companies and the knowledge of stakeholders to make the economic choices sustainable over time. Unicredit is involved in different initiatives ("La banca è anche per me", "Go international") using more and more e-learning technologies to disseminate financial knowledge across the stakeholders and the society.

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Blended degree education on campus

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UiT The Arctic University of Norway, Norway

Blended learning for non-traditional learners. Seven years of experience and future challenges at a dual mode university

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Bring Your Own Device – Utilising students' own Laptops in Higher Education

Harri Kuusela

Lahti University of Applied Sciences, Finland

harri.kuusela@lamk.fi

Abstract

The concept of learning environment has widened from the traditional physical aspect (buildings, classrooms etc.) to also include virtual and social aspects. A modern learning environment can be seen as a seamlessly integrated unity of these elements. In order for a student - as well as the learning community as a whole - to take full advantage of available possibilities, a stand has to be taken towards the status and utilisation of students' own personal devices.

In Lahti University of Applied Sciences, a Bring Your Own Device (BYOD) policy was adopted from the beginning of academic year 2015-16. In short, the policy states that all students should have their own device to be used in studies. At the same time, we have dramatically decreased the amount of square metres and modified the nature of physical learning spaces.

In this paper I will address the background and outcomes of our decision, as well present various aspects an organisation should consider and decide upon when planning and executing a BYOD policy. The range of issues extend from technological, financial, social and everyday practical considerations up to the core of the issue, that is, the pedagogical philosophy and operational practices that define how learning is meant to be delivered and ensured in modern digital educational settings.

Keywords: BYOD, laptop, tablet, computer, learning, classroom, technology, policy

1. Introduction

When you walk around school premises, you probably find a computer class sooner or later. They are usually equipped with standardised table top computers set in fixed rows. Now, if you compare that setup with today's perception of a flexible, 24/7, ubiquitous learning environment where learning takes place everywhere, every time, in connection with various networks and actors - you have a dilemma. Not to mention the demands for modifiable physical learning spaces that serve a range of pedagogical trends, or the changing role of the teacher, or the overall pressure on educational organisations to adopt new approaches in delivering learning.

Yes, I admit: I exaggerate and simplify the contrast, but I think this dilemma offers one practical example of the challenges of cultural change especially in higher education; old structures clash with new expectations. And the more you drill into it, the deeper variables you find, many of which have little to do with computers and technology *per se*, but rather with organisational processes and preferences, human interaction, and even the underlying philosophical and ideological approaches.

My basic argument in this paper is as follows: sometimes you cannot tackle a change process with an all-in frontal attack, but you have to go round. In this case the challenge is a multi-faceted, deeply-rooted organisational and sectoral culture that is in some aspects clinging to old habits and accumulated benefits – so to speak – that takes too long to change in the face of external pressure that comes from the funder (the government), customers, and other stakeholders. Sometimes we are better in reacting and adapting to the concrete changes in the operational environment and thus in fact creating a cultural change, than trying to adjust the culture directly.

The Bring Your Own Device concept means that the users – in this case students – use their own rather than school-provided devices in studies. In this paper I argue that schools should take a clear stand on the BYOD issue one way or the other, being it policy that requires a student-provided device at all times and all occasions, or a policy that is based solely on school-provided devices, or a hybrid model combining these approaches. I will provide several aspects that can be utilised in defining an organisation's own BYOD policy, and discuss the relation between a BYOD policy and the broader framework of educational cultural change.

2. Background and the rationale behind the policy

Lahti University of Applied Sciences adopted a Bring Your Own Device (BYOD) policy from the beginning of semester 2015-16 in August 2015. In short, the policy states that all students should have their own device to be used in studies, both in and out of school premises. Usually the device is a laptop, but in some cases a tablet with physical keyboard will suffice. Also smart phones and any other devices that are connected to the internet and can be used in studies are included in the BYOD concept.

In our school, we see our learning environment as an integrated combination of physical spaces, virtual services and social community. The BYOD policy is to bridge these three aspects; students are connected to their school even when they are not physically present. The student's own personal device is the necessary hub that connects him or her to various services and networks.

Of course, there are practical considerations behind the policy. Financial pressure leads to a number of challenges. For example, more learning results should be produced with the same or lesser resources. Also, for financial reasons, the amount of physical school spaces is cut down and the nature of remaining spaces is shifting from a set of traditional classrooms towards multi-purpose spaces. Cultural wise, there is an underlying trend that the nature of teaching no longer should stem solely from schedule- and classroom-based models, but should broaden to a more ubiquitous and all-round approach.

Still, economics is only a triggering factor, not the underlying motivation. The change in circumstances can be taken positively as a 'Trojan Horse' to smuggle new culture and methods; all actors have to come up with new means to deliver and ensure learning when there are less classrooms and students connect with their own devices to the learning environment from anywhere, at any time.

We have also mapped and evaluated the situation before the implementing the BYOD policy: even though students do have devices and internet connectivity, still we have not utilised this systematically. E.g. less than 9% of students do not have a smart phone with internet connection, and 90% already had a personal device around the time we adopted our BYOD policy (student survey, autumn 2015).

Furthermore, based on the same survey last year, students would like to have more studies that are arranged utilising digital tools (43%). Yet, only 30% would increase the ratio of virtual studies as compared to traditional arrangements in school premises. This could be an indication that the operationalisation of virtual studies has not fully met the expectations of the students. Still, I believe that these results speak for a hybrid model, where learning environment is seen as a flexible mixture of various methods and tools. This would be an interesting topic for further investigation, but unfortunately I have no room to analyse it deeper in this paper.

3. Policy scopes

At one end, a policy concerning the usage and utilisation of students' own devices can outline that students can bring their own devices to school, but they are not systematically used. Actually, this kind of policy is not usually clearly articulated, but a *de facto* situation; students are uncertain when they can or should bring their own devices, and how they are used. There are probably differences across faculties and teachers in the approach to students' own devices; others may welcome them; others may even deny them. This creates confusion and leads to inefficiency.

The next level is where students are allowed to bring their devices and they are systematically utilised, based on a clear concept. In this situation the learning sessions can be fruitful, but also undemocratic; students that do not have their own devices may experience that they are not at the same level as the others, or vice versa. This situation may also result in double work for the teacher because of separate yet parallel processes for differently equipped students.

Third option is to require students to bring their own devices, but not exactly plan, execute and monitor the overall usage and role of the devices in learning. This is probably the worst scenario, especially if it prolongs. It leads to frustration and motivational problems both on the side of students and teachers. I have to admit we knew we would face this and we are currently experiencing a lot of these kind of features, and we are addressing them every day, but still we wanted to implement the requirement side of the policy. The logic is that it would put a pressure on ourselves to extend the BYOD concept all the way to everyday operational pedagogics.



Image 1: Students at the Lahti University of Applied Sciences using their own devices.

Fourth situation – and this is what we are aiming for – is where students are required to bring a device and the devices are systematically utilised based on pedagogical strategies and practices. In many strategic papers of Higher Education Institutions, technology-enhanced learning, virtual studies, eLearning or digital learning (the prodigal child has many names) is well brought forward and stressed. The necessary technological infra and support mechanisms also exist, but at least in our organisation the weakest link is the still too thin beef in the middle of those two slices. It is the everyday pedagogical and didactic operational practice, the learning experience that the student faces and the learning encounters that count. In order to make the whole equation work, many questions have to be asked and answered. Let us next take a closer look at the various aspects what a Bring Your Own Device policy brings about.

4. BYOD approaches

The usage of students' own devices opens up several questions. Below is a set of questions an organisation can (or, as I believe, should) go through when considering or implementing a BYOD policy. There are no ready-made answers that would solve the challenges of all organisations under any circumstances, but some general guidelines can be defined by taking a stand on the questions.

5. Technical and practical issues

To start with: where do the students use the devices? Is it enough to provide wireless network (WLAN) at school premises or are also mobile connections needed outside school area? These questions arise especially if students are required – or they get the feeling they are required - to do assignments during a time frame or in a place where the school network is not accessible, for example during the night from home. There are also arguments against the 24/7 concept stating that students also in higher education (not to mention elementary and secondary level) need rest, sleep, and off-line time, and that it would be irresponsible from a school to even imply a 24/7 studying mode. So, in fact, this turns to be a sociological or social policy issue, too, which only restates what I mentioned earlier about the complexity of the BYOD policy.

A very practical issue which (hopefully) has no hidden sociological agenda is the charging of the devices. Although modern devices have nowadays better batteries, electricity is still needed, so how is it provided? Where do students charge their devices and when? Not all school premises are designed or built taking this into account; classrooms may only have sockets near the teacher's table, and hallways and other spaces have limited number of power sources. It is probably a not a small investment to add enough suitable power sources to old buildings, and the lack of such sources hinders the flexibility of teaching and studying arrangements.

Students will inevitably ask what kind of device would they need. So, how to define device recommendations for different degree programmes? Are device recommendations explicit and precise or loose and undetailed? When and how are these recommendations communicated? We have defined a general 3-level recommendation set (see <https://wiki.lamk.fi/display/it/Device+recommendations>) based on which different degree programmes can fine-tune their recommendations. Our basic message to students, both new and continuing ones, is that do not panic buying a new device before you check with your programme staff whether your current device suffices or when exactly you would need a new one, and with what specific features. With our vendor partner, we also arranged a web shop where students could purchase devices that meet the recommended features, but it turned out that students rather buy their devices from other sources, where they get the best price of the day. For example, big retail shops have campaigns where one can get a good bargain on a decent device.

Studying needs software. What licences for basic and special software are students required to purchase themselves and what are provided by the school? Could some license issues be solved by virtualisation (remote use of software) and how? This, of course, depends on the degree programme: students in our Faculty of Technology or Institute of Design need special and sometimes expensive software, whereas students in e.g. Social and Health Care can manage with MS Office package, which is provided by the school. Special software licences vary, and not all have

educational licences, or the option to use the software remotely (through virtualisation), or install the school-licensed software on the student's own personal device. I would recommend to map all software needs across faculties and programmes in good time, and when necessary, discuss with software providers about different options. So far we have not experienced any major obstacles in this aspect.

Not all parts of studies can be completed with own devices. Sometimes a powerful computer is needed or the software licence requires installation on school device. Also, if a student for some reason does not have a device, does the school provide one? So, the question is: what kind of computers (laptops, desktops, displays, other equipment) targeted for student use does the school own in the future and by what kind of arrangement? We have systematically cut down the number of traditional computer classrooms, as the lease time of the computers have expired. Still, we have outlined that certain computer rooms will remain, and that they will be equipped with state-of-the-art devices. Thus, part of the money we have saved on the 'bulk' computer classes has been invested in 'high-end computer rooms.

As for devices to be loaned, we have only a very limited number of them. This is a conscious choice: we do not want to provide devices by the school too easily and this way we encourage students to bring their own ones. Of course there are situations when a student needs a loan device, for example when his or her own device gets broken, and for that kind of situations we have arranged devices to be loaned from the Campus Library.

Living with a computer is not always dancing on roses. Sometimes there's trouble, with hardware, operating system, user accounts, software, connectivity etc. Is a support service provided for students? What is it like? Or do students take care of the devices solely by themselves? According to our survey (see figures at the end of the paper) and based on our experience, a school-provided BYOD support service can be rather limited, and it is best organised as a part of an existing support service, not a separate one. Technical and non-technical problems are usually interconnected and support should be provided accordingly.



Image 2: Lahti University of Applied Sciences BYOD Aid support service.

A last point of view when it comes to technology: the school digital services have to be 'BYOD-ready', that is to say that the crucial services must work properly on all possible devices and operating systems that the students are using. In this aspect, our approach is to start from the smallest device: smart phone. If a service functions on a smart phone, it works on other devices, too. The migration from old legacy and table top optimised systems to modern smart phone apps and services is not a fast, easy nor a cheap one, but step by step it can be done and I think it is necessary and inevitable.

6. Pedagogical considerations

As I suggested above, a BYOD policy has many faces and also a deeper rationale behind it. I will not philosophise here thoroughly, but I will provide some open and suggestive questions that hopefully reveal the connections that a BYOD policy has to strategic and operational pedagogics.

The thousand-dollar question is: Does a BYOD policy result in better learning? More specifically, what is the desired outcome of a BYOD policy in terms of learning results? As arguer above, financial considerations are and should not be starting point nor the aim in planning and adopting a BYOD policy. There should be something more, or the policy is just another superimposed trick that has no

long-lasting effects. Or it can have, but then those effects are limited to a narrow financial sector and on a larger scale may even turn out to be opposite than expected.

Hence, what kind of changes does the adoption of a BYOD model bring about? My basic argument is that with a thought-out BYOD policy a higher education institution can change the concept and operational practices of learning. In this regard, the policy is a tool not to tighten a loose bolt in the machine, but to induce a change in the way the machine works. When all the students in the school have their own devices, in which they have invested hard cash, which they admin themselves, and which they carry with them all the time back and forth, no teacher can for very long run cling to old habits. I am not saying that our teachers do that, but I am saying that development-oriented, student-centred and digitally aided pedagogical approach would and should be a given and shared starting point, not just talk and the mission of some pioneers.

How does a BYOD policy adoption affect the work of the teachers? There is definitely a big change, when there are less classrooms and other spaces, some of the classroom-based learning has to be arranged somehow differently, and teacher-student or student-student face-to-face presence and interaction is considered rare quality time rather than a norm. Thus, it is imperative to encourage and motivate teachers to adapt to the new setting and also to take full advantage of students' own devices. What kind of training and coaching is needed? For example, we have started a large internal teacher training & support programme, which addresses also the BYOD issue in connection to digitalisation and the change in the nature and role of teaching in general. The whole organisation has to be behind the policy, in every detail it encompasses.

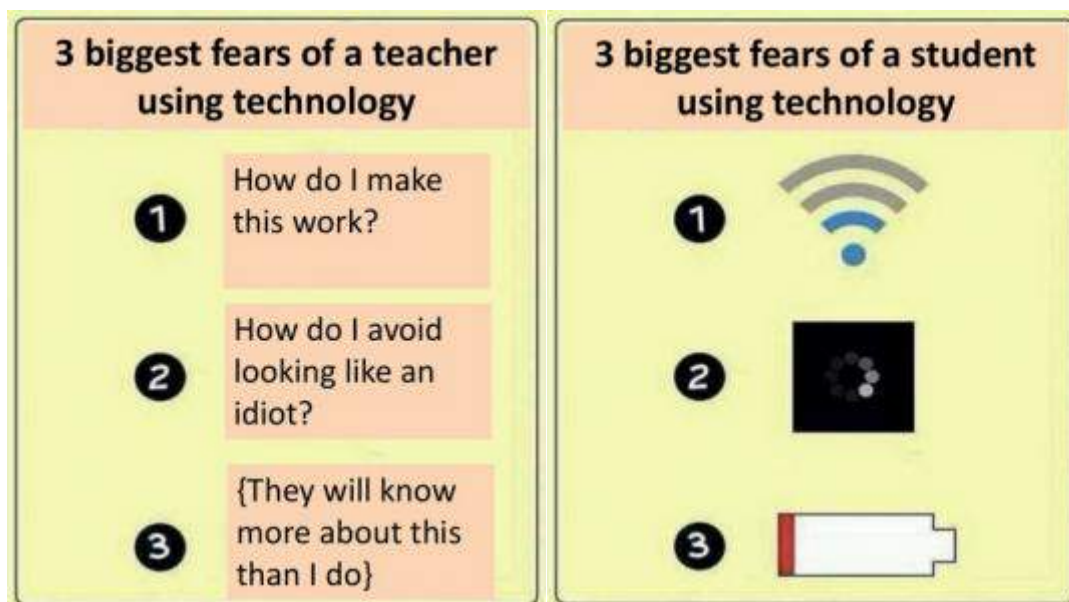


Figure 1: Three biggest fears in using technology? (S. Wheeler 2014. Digital Learning Futures)

Another interesting point of view is the connection of BYOD policy to architecture. How will the wide-spread use of own devices affect the design and usage of school spaces? What kind of classrooms and other spaces are needed? Does the adoption of a BYOD policy decrease the amount of total square meters needed, in short and long term? To this last question I would answer yes: it does decrease the total amount of square meters, but the financial figures do not walk hand in hand; the remaining spaces are probably more expensive to build, modify and maintain. To the previous questions I would say that flexibility and multi-purpose are good keywords: do not think that the purpose and set-up of a certain space is fixed for a long time, and prepare to changes that you cannot yet expect.

And, last but not least: how do we reach a situation where an organisation fully utilises students' own devices in a pedagogically meaningful way? Dear reader, I know I now disappoint you by leaving the final answer to you: I think the answer is in the combination of the answers the organisation provides to the above-mentioned questions, and also the to the questions below.

7. Administration and decision-making

The issues below are 'necessary evils', but I argue that they have to be decided upon, otherwise the adoption of a BYOD policy will not be successful and potential benefits are not realised.

In order to succeed, an organisation has to know clearly who owns the BYOD process. Furthermore, it has to be defined how the ownership is manifested in strategy, operational plans, organisation chart and in responsibilities. One decision that is good to take early on is how to proceed: official decisions first, or just proceed by doing. We did it the first way, by deciding top-down on the framework policy first. Of course, this depends on the organisational culture and situation. A top-down decision has to be complemented with a bottom-up process, at least in the implementation phase, but preferably on the preparatory phase, too, but I think that in the BYOD issue not for too long or too thoroughly.

Also, it has to be clear who decides and what. The BYOD issue might be so novel to many organisations that there is no clear slot in the organisational chart where it belongs. Cooperation and coordination is needed, and also courage to step into an area which cannot be very well predicted, as the issue has so many interconnected factors. A central challenge to the management is how to engage all necessary actors in the process. In a higher education institution which is full of highly-educated and independent academics and specialists, a top-down approach is probably not the best choice, even though I just mentioned one aspect where we have used it. The same 'Trojan Horse' tactics can be used here, though; take the policy as given and engage and empower actors to adjust to it.

Another important factor is the communication of the BYOD policy to the students and other stakeholders. Actually, it is rather easy to find the positive points the policy brings about, and based on our experience, after some minor initial criticism, BYOD is soon taken as a natural state of affairs, which would be difficult to abandon in the future.

8. Student feedback

A survey was conducted at the end of 2015 to map the status of students' hardware equipment and to get feedback on our policy implementation. Over 400 of our students answered the survey, and here are some central findings.

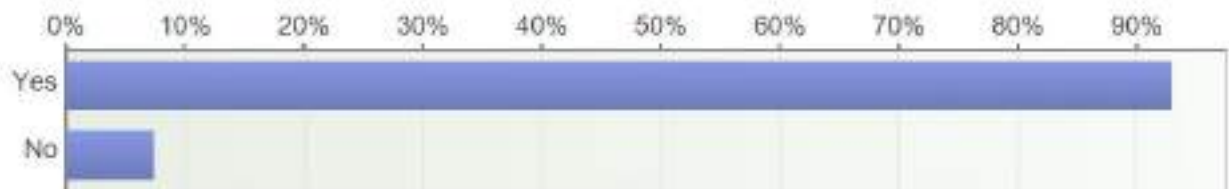


Figure 2: Do you have a personal device that you use in studying?

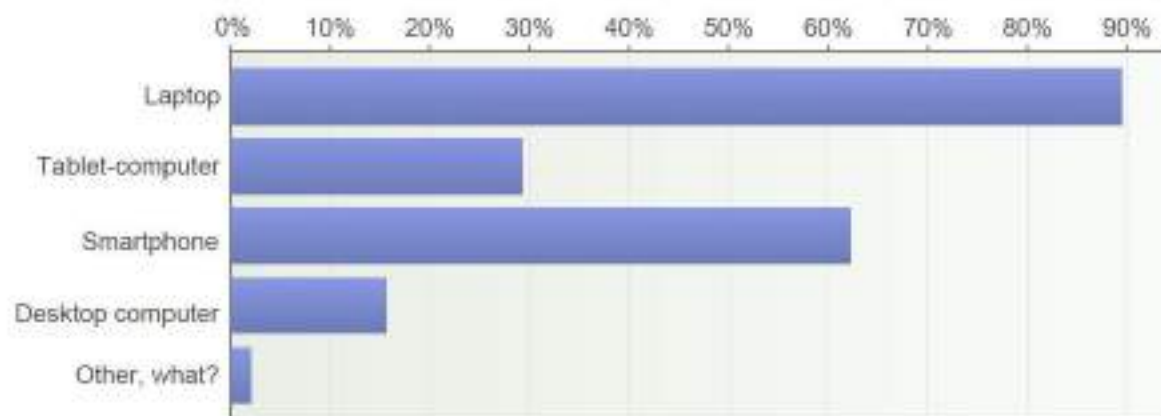


Figure 3: What kind of personal device do you have?

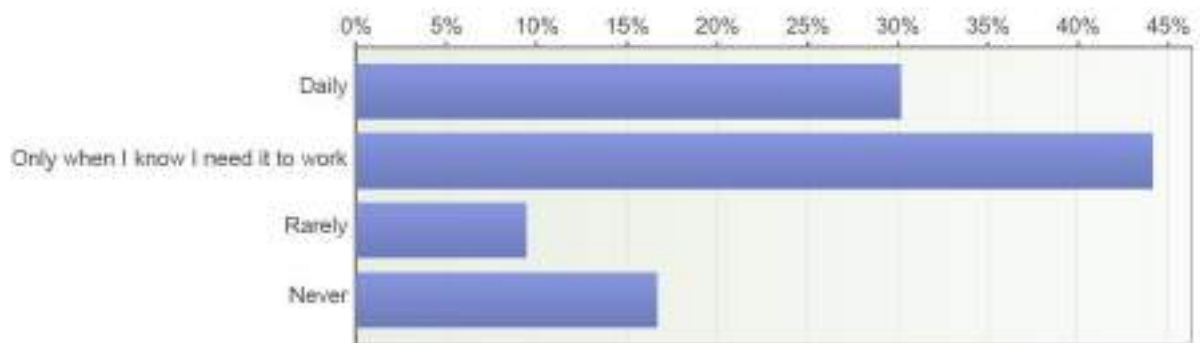


Figure 4: When do you take your device with you to school?

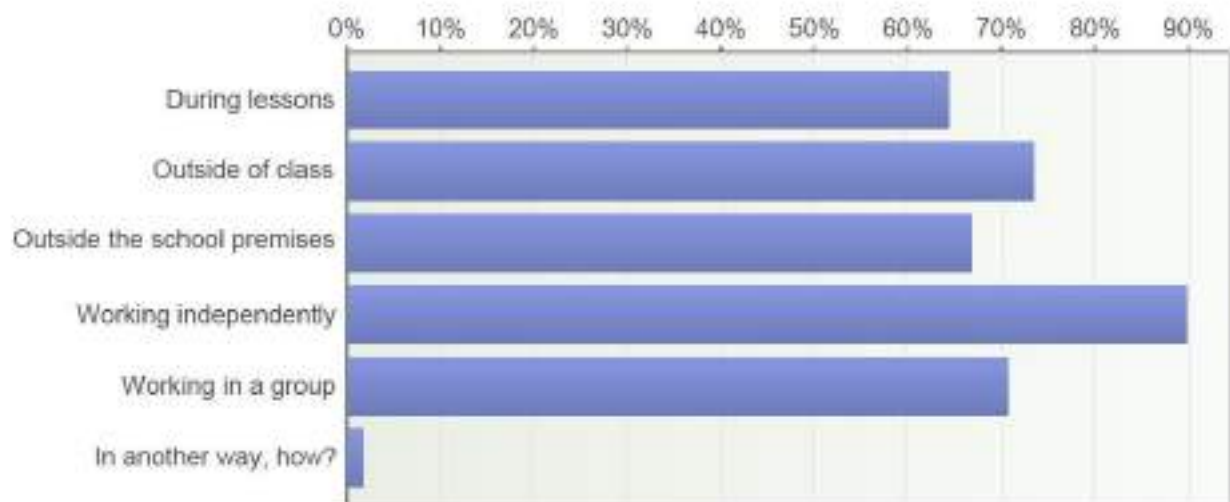


Figure 5: How do you utilise your device in everyday studies?

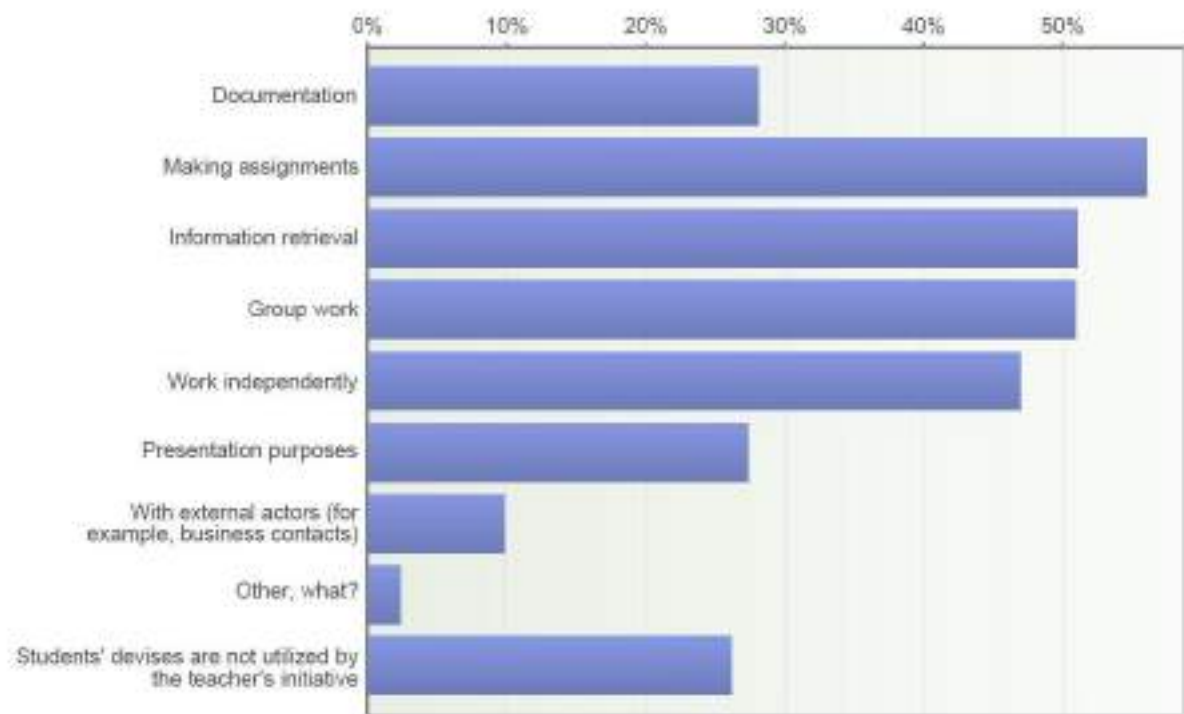


Figure 6: How are own personal devices utilised based by the teacher's initiative?



Figure 7: Do you see that it is beneficial for you to bring your own device to school?

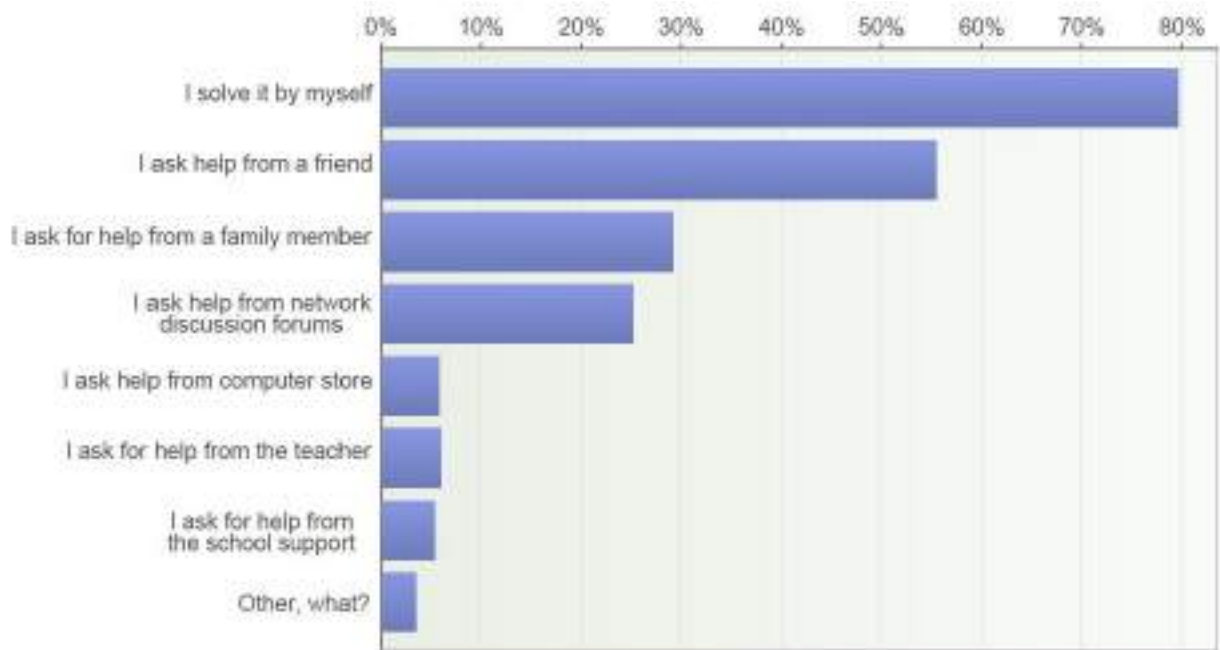


Figure 8: How do you solve possible problems with your own device?

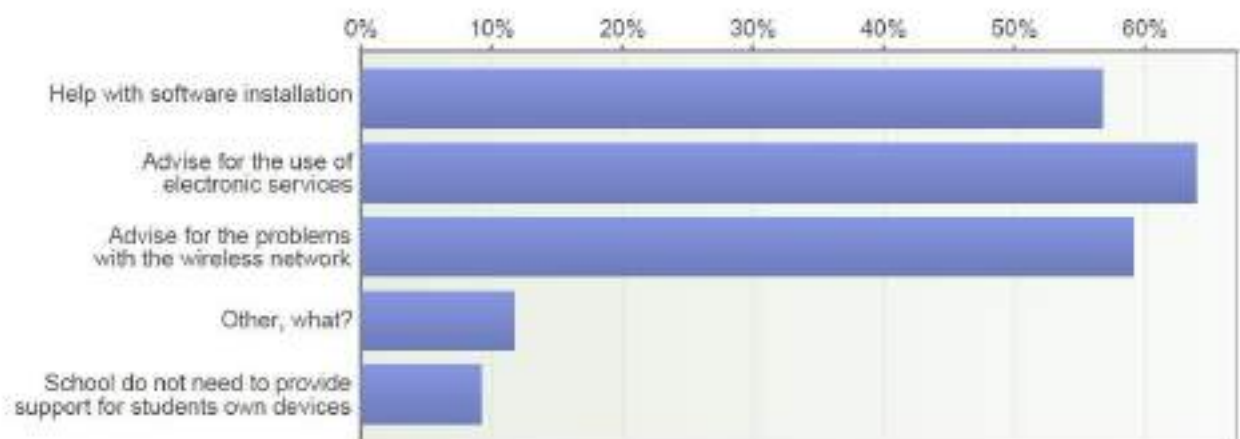


Figure 9: What kind of help and support should the school provide with your device?

9. Conclusions

After the decision to adopt a BYOD policy in Lahti University of Applied Sciences, we have informed and instructed students, provided recommendations of suitable devices, increased the number and powered-up the wireless routers, and launched a support service for students. For the time being, it looks like students are very comfortable with their own equipment; they can manage, admin, use, update, maintain and personalise their devices.

Our BYOD Aid support service has received enquiries mostly about software installations and network connectivity. Software support is not needed so much, but the use of our student admin systems (course enrolment, schedules, lost passwords, evaluations) needs occasional guidance. Only a few students have informed that they did not have a device of their own in the beginning of the

studies. As for the internet connections, a high number of students have their own connection, and free wireless network has been updated to meet the growing demand in school premises.

To wrap up, I would like to suggest that two things are crucial to the success of a BYOD policy.

First, teachers have to be willing and capable of adopting a pedagogical approach that utilises students' own devices. To do that, they need resources: technical and methodological support, time, and support from management. As a necessary condition, organisational structures and processes have to facilitate new ways of delivering learning.

Second, school enterprise architecture has to be in a shape that enables the full utilisation of school services through any end device. In other words, we have to 'Go Mobile' – if a service can be reached by a mobile phone, it works on other devices too, and most likely the service is functioning well in all aspects.

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A Programmatic Blended Learning Approach through the use of Digital Technologies

Dr. Norman D. Vaughan

Mount Royal University, Canada
nvaughan@mtroyal.ca

Abstract

The purpose of this student-faculty partnership research study was to evaluate the effectiveness of a blended four year Bachelor of Education Elementary Program at a Canadian university using the National Survey of Student Engagement (NSSE) framework. Data was collected from the first graduating cohort of students from the B.Ed. program in partnership with four Undergraduate Student Research Assistants (USRA). The students in this study completed online surveys and participated in focus groups at the end of their first and fourth years in the program. The study participants provided recommendations for improving the quality of the program based on the five NSSE benchmarks and the use of digital technologies. For example, student and faculty interactions, outside of the classroom, could be enhanced through the use of web-based conferencing tools to support “virtual” office hours. Course assignments that incorporate peer mentoring activities through the use of social media applications could provide richer opportunities for active and collaborative learning. Creating more intentional connections between academic coursework and field placements through the use of *Google* applications could help to strengthen the relationship between theory and practice in the program. Enriching educational experiences could be expanded through the use of social media applications to promote and communicate student led academic and social events. A supportive campus environment could be improved by the development of a digital “road map” and co-curricular record for the program.

Keywords: blended learning, student engagement, digital technologies, action research

1. Introduction

The idea of blending different learning experiences has been in existence since humans started thinking about teaching (Williams, 2003). The growing infusion of web-based technologies into the learning and teaching process brings this term into current consideration (Allen & Seaman, 2016). These technologies have created new opportunities for students to interact with their peers, teachers, and content.

Blended learning is often defined as the combination of face-to-face and online learning (Sharpe et al., 2006). Ron Bleed, the former Vice Chancellor of Information Technologies at Maricopa College, argues that this is not a sufficient definition for blended learning as it simply implies “bolting” technology onto a traditional course, using technology as an add-on to teach a difficult concept, or adding supplemental information. He suggests that blended learning should be viewed as an opportunity to redesign how courses are developed, scheduled, and delivered through a combination of physical and virtual instruction: “bricks and clicks” (Bleed, 2001). Joining the best features of in-class teaching with the best features of online learning that promote active, self-directed learning opportunities with added flexibility should be the goal of this redesigned approach

(Littlejohn & Pegler, 2007). Garrison and Vaughan (2008) echo this sentiment when they state that “blended learning is the organic integration of thoughtfully selected and complementary face-to-face and online approaches and technologies” (p.148). A survey of e-learning activity by Arabasz, Boggs, and Baker (2003) found that 80 percent of all higher education institutions and 93 percent of doctoral institutions offer hybrid or blended learning courses.

Most of the recent definitions for blended courses indicate that this approach to learning offers potential for improving how we deal with content, social interaction, reflection, higher order thinking and problem solving, collaborative learning, and more authentic assessment in higher education potentially leading to a greater sense of student engagement (Norberg, Dziuban, & Moskal, 2011). Dziuban and Moskal (2013) further suggest that “blended learning has become an evolving, responsive, and dynamic process that in many respects is organic, defying all attempts at universal definition” (p.16). In this research study, the authors define blended learning as the intentional integration of theory into practice of classroom and field-based learning experiences through the use of digital technologies (Figure 1).

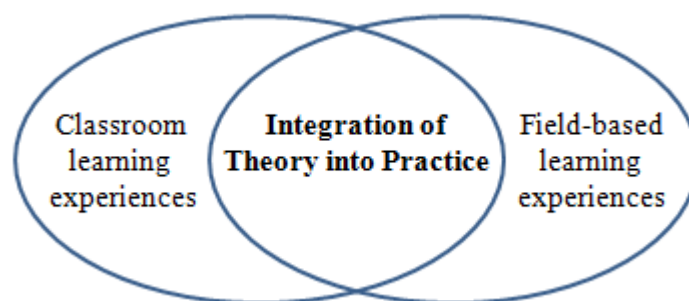


Figure 1. Bachelor of Education approach to blended learning

2. Study Context

Mount Royal University is a four- year undergraduate institution located in Calgary, Alberta, Canada (<http://www.mtroyal.ca/>). In the fall of 2011, the University launched a new Bachelor of Education (B.Ed.) program, a four- year direct entry B.Ed. degree, with an emphasis on connecting theory with practice through early, consistent, and on-going field experiences (<http://www.mtroyal.ca/bed/>). In the first two years of the program, students have a core education course each semester that meets once a week with a twenty- or thirty- hour field-placement. In the third and fourth years of the program, the students have extended field placements connected to program of studies courses and a capstone experience designed to integrate theory (of the coursework) and practice (of the field experiences).

To facilitate opportunities for communication and reflection between the classroom and field-based learning experiences, the institution has adopted the use of Google Applications (<http://google.mtroyal.ca/>): Gmail for communication; Google Docs (<http://tinyurl.com/bedjournal>) for reflective journaling; and Google Sites (<http://tinyurl.com/bedportfolio>) to construct a learning portfolio throughout the program.

This student-faculty research partnership study evaluates the effectiveness of the integration between the classroom and field-based learning experiences in this B.Ed. program from a student perspective, using the National Survey of Student Engagement (NSSE) framework (2011).

3. Theoretical Framework

The concept of student engagement has been discussed extensively in the educational research literature (Kuh et al., 2005). In 1998, the National Survey of Student Engagement (NSSE) was developed as a “lens to probe the quality of the student learning experience at American colleges and universities” (NSSE 2011, p.3). The NSSE defines student engagement as the amount of time and effort that students put into their classroom studies that lead to experiences and outcomes that constitute student success, and the ways the institution allocates resources and organizes learning opportunities and services to induce students to participate in and benefit from such activities.

These conceptions of student engagement in higher education are grounded in several decades of prior research, and particularly in four key antecedents: Pace’s (1980) ‘quality of effort’ concept, Astin’s (1984) theory of student involvement, Chickering and Gamson’s (1999) principles of good practice in undergraduate education, and Pascarella and Terenzini’s (2005) causal model of learning and cognitive development. Based on this research and a meta-analysis of the literature related to student engagement, the NSSE has identified five clusters of effective educational practice. These benchmarks are (NSSE, 2011):

1. Student interactions with faculty members
2. Active and collaborative learning
3. Level of academic challenge
4. Enriching educational experiences
5. Supportive campus environment

These five clusters of effective educational practice have been used to guide this action research study.

4. Methods of Investigation

An action research approach was used to direct this study. Stringer (2013) indicates that action research is a reflective process of progressive problem solving led by individuals working with others in teams or as a part of a ‘community of inquiry’ to improve the way they address issues and solve problems. This research approach should result in some practical outcome related to the lives or work of the participants, which in this case is the ongoing redesign of an effective blended B.Ed. program through the use of Kuh and Associates’ (2015) assessment cycle (Figure 2).

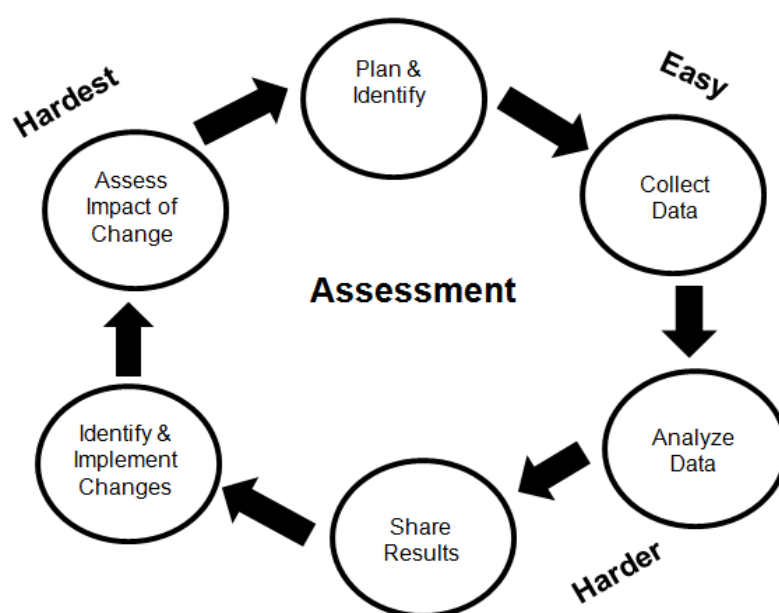


Figure 2. Assessment cycle (Kuh & Associates, 2015).

4.1 Data Collection

Data was collected from the first graduating cohort of students from the B.Ed. program in partnership with four Undergraduate Student Research Assistants (USRA). The students in this study completed online surveys and participated in focus groups at the end of their first and fourth years in the program. The questions were derived from the National Survey of Student Engagement (NSSE, 2011) and *SurveyMonkey* was used to facilitate the online survey process. The student participation rate in these online surveys is summarized in Table 1.

Table 1. *Online survey response rates*

End of first year	End of fourth year
March 2012 85% (77 of 91)	April 2015 88% (57 of 65)

4.2 Data analysis

A constant comparative approach was used to identify patterns, themes, and categories of analysis that “emerge out of the data rather than being imposed on them prior to data collection and analysis” (Patton, 1990, p. 390). Descriptive statistics (e.g., frequencies, means, and standard deviations) were calculated for the online survey items using *MS Excel*. The additional comments and recommendations from the students were categorized in alignment with the five NSSE benchmarks in the *Google Document*.

5. Findings and Recommendations

The research findings and recommendations are summarized in relationship to each of the five NSSE benchmarks.

5.1 Student Interactions with Faculty Members

Students learn firsthand how experts think about and solve problems by interacting with faculty members inside and outside of the classroom. As a result, their teachers become role models, mentors, and guides for continuous, lifelong learning (Chickering & Gamson, 1999). One of the student participants commented in the fourth year online survey about the importance of “Having professors that were previously classroom teachers. I loved hearing their stories and experiences. I learned so much through personal stories” (Fourth year survey participant 17) and another student indicated “our Education professors modeled the qualities of exemplary teachers and responded to student need, tailoring the program to our feedback was amazing!” (Fourth year survey participant 33). Light (2001) highlights the importance of these previous sentiments, indicating that a close working relationship with at least one faculty member is the single most important factor in student success. A comparison of the first and fourth year online survey results suggest that students increased their frequency of communication with their teachers via email, as well as discussing grades or assignments, and working with faculty members on activities other than course work, outside of class time (Table 2).

Table 2. *Student interactions with faculty members*

Question	Student Response March 2012 Often/Very Often	Student Response April 2015 Often/Very Often
Used e-mail to communicate with an instructor	92%	96%
Discussed grades or assignments with an instructor	49%	54%
Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)	11%	21%
Discussed ideas from your readings or classes with faculty members outside of class	25%	25%
Received prompt feedback from faculty on your academic performance (written or oral)	78%	48%
Talked about career plans with a faculty member or advisor	38%	25%
Worked on a research project with a faculty member outside of course or program requirements	24% (plan to do in the future)	19%

Unfortunately, the graduating students perceived in their fourth year that they were not as frequently receiving prompt feedback from their teachers, talking about career plans with a faculty member or advisor, or working on research projects with faculty members outside of class time. For example, there were several comments about the lack of timely assessment feedback and clarity of assignments. “Assessment feedback for many classes was not timely. I often waited over a month

for grades” (Fourth year survey participant 41). “Sometimes I think there were unrealistic expectations of assignments with little clarity of instruction. We often didn’t receive marks and feedback until the very end of the semester” (Fourth year survey participant 27).

The study participants provided several recommendations for increasing the opportunities for education students to communicate and work with faculty members, outside of the classroom, on activities other than coursework. Students suggested that faculty and field placement mentors use web-based synchronous conferencing tools (e.g., Skype) to establish ‘virtual’ office hours. Many of the students reside a great distance from campus and their field placements and they indicated that the use of these conferencing tools would allow them to have ‘real-time’ conversations from their homes.

5. 2. Active and Collaborative Learning

Students learn more when they are intensely involved in their education and are asked to think about and apply what they are learning in different settings (Chickering & Ehrmann, 1996). Collaborating with others in solving problems or mastering difficult material prepares students to deal with the messy, unscripted problems they will encounter daily, both during and after university. In the April 2015 survey a number of participants identified how the institutional emphasis on small class sizes helped foster and promote an active and collaborative learning environment, “I enjoyed the small class sizes. I was able to collaboratively work with my peers and professors, which I believe enriched my learning experiences” (Fourth year survey participant 26). In addition, “I liked having small classes and the opportunity to do different types of projects instead of being limited to papers and exams” (Fourth year survey participant 14).

Both the first and fourth year survey results demonstrate a very high level of active and collaborative learning behaviours including an increase in frequency of class presentations, asking questions in class, as well as working with other students on projects during and outside of class time (Table 3).

Table 3. *Active and collaborative learning*

Question	Student Response March 2012 Often/Very Often	Student Response April 2015 Often/Very Often
Make a class presentation	72%	91%
Work with other students on projects DURING class	70%	75%
Ask questions in class or contribute to class discussions	64%	84%
Work with classmates OUTSIDE of class to prepare class assignments	57%	70%
Tutor or teach other students (paid or voluntary)	22%	27%
Discuss ideas from your readings or classes with others outside of	60%	38%

class (students, family members, coworkers, etc.)		
Participate in a community-based project as part of a regular course	53%	20%

Conversely, Table 3 indicates that less than one-quarter of the students were involved in tutoring or peer mentoring activities, which are critical for the development of future teachers (Collings, Swanson, & Watkins, 2015). A formal course assignment was recently designed, which provides all second year Education students the opportunity to learn how to mentor first year students. This assignment was embedded in a second year educational technology course and focused on providing opportunities for second year students to learn how to design, facilitate, and assess peer mentoring support using digital technologies.

This peer mentoring assignment was implemented in the fall 2014 semester and it commenced with the second year teacher candidates providing support to the first year students through the initial creation of their program portfolios in *Google Sites* and journals in *Google Docs*. The plan is to create intentional peer mentoring opportunities through the use of social media applications for students in all four years of the program in order to create a peer teaching and learning circle (Figure 3).



Figure 3. B.Ed. program peer teaching and learning circle.

The circular nature of peer teaching and learning is illustrated by the arrows pointing in both directions in Figure 3. This idea of reciprocal teaching and learning is grounded in the Māori concept of *ako*, which means both to teach and to learn. It recognizes the knowledge that both teachers and students bring to learning interactions, and it acknowledges the way that new knowledge and understandings can grow out of shared learning experiences (Alton-Lee, 2003).

5. 3. Level of Academic Challenge

Challenging intellectual and creative work is central to student learning and collegiate quality. Universities promote high levels of student achievement by setting high expectations for student performance (Graham et al., 2001). The graduating students commented that they found the curriculum program of studies and their general education and elective courses to be of particular academic value: “I loved the practical skills, strategies, and tools I experienced in the curriculum studies courses because I could easily apply them to my practicum placements and keep them in a bank of resources to use in the future” (Fourth year survey participant 45) and “Integrating our minors and general education classes allowed me to explore different areas of

interest more deeply” (Fourth year survey participant 8). A comparison of the first and fourth year survey results indicates that students were increasingly working harder than they thought they could to meet teachers’ standards and expectations and that the institution emphasized spending significant amounts of time studying and on academic work (Table 4).

Table 4. *Level of academic challenge*

Question	Student Response March 2012 Quite a bit/ Very much	Student Response April 2015 Quite a bit/ Very much
Worked harder than you thought you could to meet a teacher’s standards or expectation	70%	82%
Institutional emphasis: Spending significant amounts of time studying and on academic work	85%	79%
Prepared two or more drafts of a paper or assignment before turning it in	43%	40%
Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)	20% (More than 20 hours)	16% (More than 20 hours)
Working for pay off-campus	75% (More than 10 hours)	72% (More than 10 hours)

The higher education literature related to student engagement advises that students should be investing at least two hours of preparation time for every hour of in-class time (McCormick, 2011). Table 4 suggests that the Education students perceive they are actually spending less time on course preparation as they progress through the program. This can partially be attributed to the fact that the majority of graduating students (72% as illustrated in Table 4) also had part-time off-campus jobs while completing their studies.

Several recommendations were provided to overcome this deficiency in class preparation time. One recommendation was to make the homework assignments more practical in nature, requiring the students to be more engaged with inquiry-based learning projects in partnership with local schools, rather than on just reading and responding to textbook questions. The other suggestion was to increase the program focus on “teaching students on how to create long range unit plans” (Fourth year survey participant 29), “giving more attention to formative assessment strategies and resources” (Fourth year survey participant 11), “including more information about careers and the teaching systems throughout the 4 years of the program” (Fourth year survey participant 23), and “an increased focus on inclusive classrooms, we need to be comfortable with special needs” (Fourth year survey participant 51).

5.4 Enriching Educational Experiences

Educational research has demonstrated that complementary learning opportunities inside and outside of the classroom augment the academic program (Kuh, 2008). Experiencing diversity teaches students valuable things about themselves and other cultures. Internships, community service, and senior capstone courses provide students with opportunities to synthesize, integrate, and apply their knowledge. Such experiences make learning more meaningful and, ultimately, more useful because what students know becomes a part of who they are (e.g., developing their professional identity as teachers).

In terms of enriching education experiences, the graduating students emphasized the first year volunteer placements, school tours, in-school seminars, and practicum placements were their highlights. “I enjoyed that we were able to get into the classroom right from year one, I think that this gave everyone a good idea of whether this was the right career path for them or not” and “I also enjoyed touring different schools in my first year” (Fourth year survey participant 36). “I really enjoyed the in-school seminars during my practicums as they provided us with a time each week for us to meet with our peers and discuss ideas and get support from each other” (Fourth year survey participant 29). They also indicated how important the *Google Doc* journal and *Google Site* portfolio were for “integrating my Mount Royal class and volunteer placement experiences and establishing a philosophy of education that I truly believe in” (Student Focus Group Participant 9).

Table 5 demonstrates a substantial level of participation in many high impact practices such as teaching practicums, the capstone course, and community service or volunteer work (Kuh, 2008).

Table 5. *High impact practices*

Which of the following do you plan to do and have done before you graduate from Mount Royal University?	Student Response March 2012 Plan to do	Student Response April 2015 Done
Volunteer school placement, teaching practicum	58%	100%
Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.)	23%	100%
Community service or volunteer work	38%	82%
Participate in a learning community or some other formal program where groups of students take two or more classes together	41%	67%
Coursework in a foreign or additional language	25%	26%
Work on a research project with a faculty member outside of course or program requirements	21%	19%
Independent study or self-designed major	12%	18%

Study abroad	35%	4%
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Two areas of concern that are highlighted in Table 5 are related to student research and study abroad opportunities. The plan is to work with the Office of Research to develop an institutional undergraduate student research initiative, which has proved to be a challenge given the increasing emphasis on faculty research funding at the expense of student research support. In terms of increasing study abroad opportunities for the Education students', discussions have begun with our International Education Office to identify spring semester general education courses and alternative field placement experiences that are offered in other countries through international partnerships. In addition, the potential of developing an alternative spring break program is being investigated where students would be involved with community service projects in developing countries during the February reading week (e.g., University of Western Ontario, 2016a).

5.5 Supportive Campus Environment

Students perform better and are more satisfied at universities that are committed to their success and cultivate positive working and social relations among different groups on campus (Chickering & Gamson, 1987). This NSSE benchmark asks students to rate the quality of their relationships with their peers, faculty members, and administrative personnel and offices. Table 7 illustrates that students perceive reasonably high quality relationships with their peers, but that relationships with faculty members and administrative personnel and offices have declined over the four years of the B.Ed. program.

Table 7. *Quality of campus relationships*

Quality: Your relationships with:	Student Response March 2012 (6 & 7 out of a 7 point scale)	Student Response April 2015 (6 & 7 out of a 7 point scale)
Other students	61% Friendly, supportive, sense of belonging	60% Friendly, supportive, sense of belonging
Faculty members	50% Available, helpful, sympathetic	35% Available, helpful, sympathetic
Administrative personnel and offices	25% Helpful, considerate, flexible	21% Helpful, considerate, flexible

In terms of peer relationships, the graduating students indicated again that “because the program is so small I was able to make a number of positive and professional relationships throughout the 4 years which will contribute to my career” (Fourth year survey participant 16) and “I really enjoyed the group of students we worked with over the four years. I felt like we were a

community that focused on the relationships that we built. I see this transfer at my practicum school I'm at every day. How important strong relationships are" (Fourth year survey participant 21).

With regards to faculty relationships, the fourth year students again had a number of positive comments such as "the relationships I've built with the professors and faculty have been so meaningful and had a really positive impact on my experience" (Fourth year survey participant 44). However, the graduating students expressed several concerns regarding program organization "I did not really enjoy being the "newbies" in the program as things at times were rather unorganized, I also didn't feel at times that the classes and faculty members were consistent with offering the same opportunities for us and also instructing the same content" (Fourth year survey participant 25). Comments like these had also been made by the students in their first year "as this is a new program I understand that it is all not mapped out yet and at times my questions were not as clearly answered as I would have liked" (First year focus group participant 7).

In order to overcome these challenges, the graduating students recommended asking "for student input when designing and creating changes in the program!!!" (Fourth year survey participant 16). They also emphasized the importance of developing a student "road map" for the program similar to what Queen's University (2016) has done for their concurrent B.Ed. degree.

Table 7 also indicates that the graduating students perceive a declining quality in their relationships with administrative personnel and offices at the university. This could partially be attributed to the fact that over the past four years, the institution has undergone a series of budget cuts, which has led to a reduction in support staff and services. One student commented that she "was very fortunate to have an amazing academic strategist who helped me survive the education program in one piece" (Fourth year survey participant 3). Recently, the B.Ed. program has hired a dedicated part-time academic advisor and a new full-time field experience coordinator, which will improve the quality of administrative support for students in the B.Ed. program.

In addition, the university acknowledges "that support staffing levels in academic departments and faculties have not kept pace with recent growth in size and complexity" and thus we are "investigating ways to make procedures and practices more efficient" (Mount Royal University, 2012, p.15). Recently, the institution has implemented a web-based application entitled *mruGradU8* (<http://www.mtroyal.ca/mruGradU8/>), which allows students to track their program progress by reviewing their academic history and identifying course requirements that they still need to complete to graduate.

6. Conclusion

Over the past decade, there has been an increased focus on student engagement in higher education because of rising tuition costs and concerns about student success and retention rates (Kuh et al., 2005). This student-faculty research participant study has demonstrated how digital technologies can be used to increase student engagement and success in a blended Bachelor of Education program through the use of the NSSE evaluation framework. For example, student and faculty interactions, outside of the classroom, can be enhanced through the use of web-based conferencing tools to support 'virtual' office hours. Course assignments that incorporate peer mentoring activities through the use of social media applications can provide richer opportunities for active and collaborative learning. More intentional theory into practice connections between academic coursework and field placements can be created through the use of *Google* applications. Enriching educational experiences can be expanded through the use of social media applications to

promote and communicate student led academic and social events. In addition, a supportive campus environment can be improved by the development of a digital 'road map' and co-curricular record for the program.

This research study has also illustrated the importance of student and faculty collaboration in the evaluation process for an undergraduate degree program. As the African proverb suggests "it takes a village to raise a child" to which Saint-Jacques (2013) adds "that a shift toward a 'we-learning' conceptualization of education" will benefit us all' (p.34).

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Can asynchronous discussions enhance supervision quality of nursing students in clinical placements?

Catrine Buck Jensen

UiT The Arctic University of Norway, Norway
catrine.b.jensen@uit.no

Abstract

There are continuously developments related to the use of digital tools in teaching in higher education as the pedagogical landscape is changing. This study was completed in conjunction with the author's master's degree in Pedagogy. The intention was to examine nursing student's experience of clinical placement supervision in an asynchronous discussion board. This was done through a qualitative analysis of the discussion board and focus group interviews with participating students. Findings showed that students experienced the discussion board as positive and innovative. Flexibility and availability gave possibilities for further reflection on the events of practice. However, the students wanted clearer, more defined tasks. Insecurity and lack of trust in fellow students created some uncertainty, which led to the absence of dialogue in the discussion forum. However, the supervisor's feedback motivated students for further participation, even if the feedback was not always conducive to a continuation of the current discussions. The conclusion is that discussions should be structured in a manner that supports learning with a "brick-by-brick"-thinking. Building relations is important in the introductory part and must be emphasized to create trusting relationships that can also support further dialogue. Authentic and relevant tasks can create interest and motivation and increase learning outcomes in clinical placements. If this is taken in to consideration discussion boards can serve as a positive extension of clinical placement and provide students with a learning community with access to diverse perspectives.

Key Words: supervision, asynchronous discussion, nursing education, clinical placements, reflection, critical thinking,

1. Introduction

The following paper is representing one part of my master thesis in pedagogy that was conducted during the spring of 2016. The main themes are nursing education and the use of discussion boards as a way of supervising nursing students in their clinical placements. The purpose of the study was to explore student's experiences of supervision and learning through a discussion board, how they experienced their own and supervisor's participation as well as the impact this had on their learning outcome.

In the following, I will introduce you to the field of nursing and nursing education, I will take you on a journey through the theoretical perspectives that has been important in the study and present findings from this part of the study. In the conclusion, there will be some thoughts regarding my findings and of what importance they can be for the future education of both nursing students as well as students in other professional educations.

Lifelong learning and 21st century skills

One of the focuses of the Bologna-process was lifelong learning in higher education in Europe and flexible learning pathways as one way of providing lifelong learning (De Lel et al., 2015). It is stated in the Norwegian national qualification framework, developed from the Bologna-process, that critical thinking and reflection are two main purposes of educating students. Being able to assess and

initiate action is expected of students that have conducted a bachelor degree program (Kunnskapsdepartementet, 2011). This is also supported by Binkley et al. (2014) who has defined a set of what is denoted as 21st century skills which includes ways of thinking, ways of working and ways of living. Skills such as critical thinking, problem solving, metacognition, communication and collaboration are all considered skills that are crucial for being a part of a 21st century community.

All these skills are central in nursing educations and have been for decades. The nurse's ability to consider several options in care for a patient, to reflect upon its own capability and competency is crucial for good quality nursing (Holter & Mekki, 2011). With new technology in patient care these skills has become even more crucial to restrain.

Being a (nursing) student in Norway

Norway is a country where both educational resources, the economic situation and quality of living is highly rated (The Social Progress Imperative, 2016). Access to digital technology is also great. Amongst the nursing student group where the selection for this study belonged, 252 out of 313 students were between the age 19 and 25. In an annual survey conducted by Statistics Norway, 71% of youths between the age 20 to 24 had access to a tablet and as many as 99 percent had access to a smartphone (Statistisk sentralbyrå, 2015). Youths in the age groups presented above are also considered digital natives, surrounded by technology and acknowledging technology in different manners than ever before (Prensky, 2001). This serves as a great opportunity to utilize technological gadgets for an educational purpose, not only in nursing education but also in a broader perspective. Students are surrounded by what Lund, Bakken, and Engelién (2014) denotes as *technology-rich learning environments*, and this should engage educators to differentiate their teaching and the students learning activities.

Nursing as a profession has strong traditions regarding professional competency as well as education. These traditions are being challenged by new use of technology in both areas. New technology has driven the patient care forward and in my opinion, this should be the present situation in nursing education as well. However a rough review of the curricula of 38 Norwegian nursing education programs, points in the direction that very few of these have (or at least say they have) ICT as an integrated part of their way of educating and engaging students.

Organization of clinical placements in nursing and systematic reflection

The students that participated in this study were all first year students of a Norwegian bachelor's degree program in nursing. After approximately 6 months in theoretical studies, they were starting their clinical placements in primary care with elderly patients in institutions (e.g. nursing homes). The clinical placement had a duration of 8 weeks, with an average of 30 placement hours per week.

In clinical placements, there is a stated expectation from supervisors that nursing students write a daily (activity) log where they reflect upon their experiences from the clinical placement, mainly with focus on one particular incident. The purpose of the discussion board was to supplement this log with a weekly online post. However, students also had face-to-face meetings with the supervisor and each other, both for evaluating and supervising purposes.

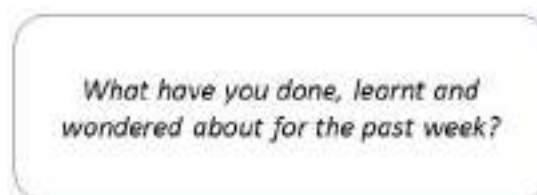


Figure 1: Discussion board task (inspired by Tiller, 1999)

The students were introduced to a weekly task and were expected to write a post where they reflected upon the following: *What have you done, learnt and wondered about for the past week?* (Tiller, 1999). It was clarified during the first week of the clinical placement that they were supposed to base their post mainly on *one* event. The discussion board was organized as an asynchronous discussion where the different discussion threads were organized chronologically. However, both professional content (answering the task) and practical questions were posted in the same forum.

2. Theoretical perspectives

What do we know about discussion boards as learning activities?

The use of discussion boards in educating students is not at all new, but it has been deficient research on the use of discussion boards in clinical settings in nursing educations.

Former empiric research on the use of discussion boards in nursing education mainly focuses on discussion boards as a part of theory units, both off-campus and on-campus (Bingen & Aasbrenn, 2012; Buckley, Beyna, & Dudley-Brown, 2005; Leppa, 2004; Norbye & Tøllefsen, 2012). These articles shows that use of discussion boards as part of theory units enhances student activity, gives more time for reflection and develops students' critical thinking skills. A review article by Thomas (2013) shows an overview of how discussion boards have been used in health education programs, however only three of the studies included in the article had focus on clinical placements, and none of these were nursing education programs. The use of discussion boards as a part of reflection over clinical experience in nursing should therefore be both explored and documented.

Sociocultural perspectives on learning

In this study, sociocultural perspective on learning has been a basis. Both Lev Vygotskijs focus on the importance of language in human development and learning, as well as his theory regarding scaffolding (Lyngsnes & Rismark, 2007), has been of significance.

In addition to Vygotskijs theory, the term intersubjectivity (Mead, 1934) has been of importance due to the focus on individuals ability to create meaning through participation and communication on their experiences (Dysthe, 2001). Through linguistic interaction, the individuals will access a variety of perspectives and in that way have the opportunity of perspective taking on other individuals' experience (Dysthe, 2001).

Developing knowledge in nursing

As a graduate nurse, one must be able to *apply* different forms of knowledge to identify a patients' need for health care (Holter & Mekki, 2011). Both practical knowledge, theoretical knowledge and personal characteristics are mutually bound to each other in professional nursing (Skau, 2011). Situational awareness is also an important part of knowledge in nursing, to be able to customize care to each individual patient (Holter & Mekki, 2011).

Developing knowledge through clinical placements

Almost 50 percent of the Norwegian nursing programs are conducted in clinical placements (Kunnskapsdepartementet, 2008) e.g. in nursing homes, hospitals and home care. In these areas, nursing students gets hands-on experience in interacting with patients and their dependents, as well as future colleagues. The students' focus on developing professional skills as well as integrating these with theoretical knowledge. Processing experience from clinical placements is a great part of professional learning in nursing education and this is activities can be done with fellow students, the clinical supervisor as well as with the university supervisor (Bjerknes & Christiansen, 2015).

Processing experience, what Schön (1987) calls reflection-on-action, can be done e.g. by writing logs where the student reflects by him-/herself and receive feedback from its supervisor. It can also participate in individual supervision sessions face-to-face with its supervisor or a group where the student meets fellow students to share and reflect systematically. The purpose of systematic reflection on experiences is to synthesize the theoretical knowledge with the experiential knowledge and create holistic learning (Bjørk, 2003).

Blended learning and organizing learning activities in digital environments

Blended learning is considered an expedient way of organizing teaching and supervising nursing students (Bingen & Aasbrenn, 2012; Leppa, 2004; Norbye & Tøllefsen, 2012; Reynolds & Fell, 2011). Blended learning is here understood as a combination of traditional teaching (e.g. lecturing) through face-to-face meetings and online activities, e.g. discussion boards (Leppa, 2004). This organization seems to be beneficial in terms of reflection, activity and flexibility both when used in clinical practice (Reynolds & Fell, 2011) and in theory-based teaching to be further reacted in clinical practice (Bingen & Aasbrenn, 2012; Leppa, 2004; Norbye & Tøllefsen, 2012).

How a discussion board is organized is also of importance when the purpose is learning and development for students. Gilly Salmons five-stage model is reoccurring in literature related to online learning, both as normative for developing online activities (Fossland, 2015) as well as a theoretical framework for research (Bingen & Aasbrenn, 2012; Thomas, 2013). The model also applies as a tool for analyzing findings in online discussions (Mettiäinen & Vähämaa, 2013). The model clearly shows Salmons assumptions that learning to work online happens along with engaging in the topic in focus (Salmon, 2011). The five-stage model is a scaffold, aligned with Vygotskij's theories as mentioned earlier, where brick-by-brick thinking is central.

Every stage of the model has different focus, and one stages builds on the stage before. Whilst the stages 1 and 2 are focusing on accessibility and motivational factors as well as getting to know fellow participants, stages 3 and 4 has more focus on topical interaction and exchanging information that relates to the professional discussion. Stage 5 has a retrospective and metacognitive purpose where the participants focus on the process they have been through and how this has led to development (Salmon, 2011).

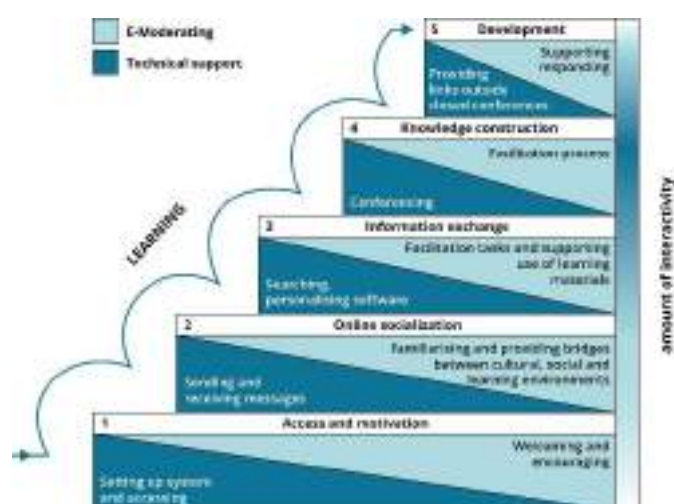


Figure 2: Five-stage model (Salmon, 2011)

The theoretical perspectives presented has been of importance to understand the findings from this study and to see them in a critical way. I will come back to this later in the paper.

3. Methodology

As the main purpose of the study was to investigate students experience with participating in the discussion board, and trying to understand this from the participants' point of view, the design for the study had a qualitative approach (Kvale & Brinkmann, 2009). The data material for this part of the study was transcriptions from two focus group interviews. These were small focus groups with only three participants in each group. Focus groups is especially suitable for explorative interviews where the participants' spontaneous and emotional point of view reveals (Brandth, 1996; Kvale & Brinkmann, 2009). Both interviews had a funnel structure where the interviews started broad and open, and were constricted by me as a moderator¹²⁴ throughout the interviews. Both interviews were recorded and then transcribed into text.

The transcriptions were analyzed with inspiration from Grounded Theory (Charmaz, 2006), content analysis (Kvale & Brinkmann, 2009) and Thematic analysis (Braun & Clarke, 2006). The latter were of most importance to the analysis. The analysis had no theoretic anchor.

4. Findings

In this part of the paper, I will focus on the findings related to the students' experiences of participating in a discussion board whilst in their clinical placement. I will focus on three main parts of the interviews: Students experience of their own participation, experience of the supervisor's participation and the experience of organizational aspects and technology.

Students experience of own participation

Experience of own participation both relates to the individual students perception of participation as well as the perception of fellow students participation or lack thereof.

A continuous finding in the study is the students' insecurity and nervousness of their fellow students' thoughts and feedback when posting in the discussion board. Several of the students developed what I've called "comment anxiety" where they were afraid that other students might think what they wrote were irrelevant or boring. This was a feeling that permeated the student group as a whole through the first phase of the discussion board and it was high threshold for writing their first post. Some of the students also stated that they were afraid to step on someone's toes, in case they were to comment on a fellow students post, which resulted in absence of comments instead.

This was clearly related to the experience of lack of confidence in fellow students and there were a consensus that there was an unfulfilled need to build relationships and trust amongst the students' themselves.

As written earlier in the paper, the discussion board was a supplement to face-to-face meetings with the students and the supervisor. And the participants in the interviews experienced that these meetings could have had positive impact on the participation in the discussion board, as face-to-face meetings made it easier to speak (write) with each other. Informal meetings among the students (e.g. if they were located in the same department in their clinical placement) also contributed to building relationships and trust, even though it did not affect the activity in the discussion board.

¹²⁴ I must mention that I did have a double role in the research process as I had already functioned in the discussion board as a supervisor for the students. The issue was addressed to the participants in the conclusion of both interviews, and none of the participants expressed any thoughts regarding this.

Although the students experienced lack of confidence amongst themselves, they did experience the discussion board as a social community where they had the opportunity to see diverse perspectives on clinical events that had made impression on themselves and their fellow students. In the interviews they also highlighted the discussion board as a tool to become aware of potential learning situations at their own department. Not to mention the opportunity to pair up with fellow students to learn from each other both through the discussion board and by participating as an observer together with fellow students in other departments.

Also getting to know the discussion board as a learning activity took time, and some of the students pinpointed that they had to spend time for trials and errors, to find out what potential the discussion board could have.

Students experience of the supervisors participation, role and function

Experience of the supervisors participation in the discussion board relates to both the content of the participation and to the role of the supervisor in a digital environment. The main interaction in the discussion board happened between the students and the supervisor and the focus groups stated a perception of the supervisor as significant in an online discussion.

Good quality feedback was highlighted as a main criteria of the interaction between students and supervisor, and the students experienced the supervisors feedback as a motivation for continued participation. They experienced that open questions had an impact on reflecting further on different scenarios, however the students also sometimes experienced the supervisors participation as a closure for potential discussions.

A main finding related to the experience of the supervisors role, was the wish for the supervisor to function as an “engine” for the discussion board. The students pointed that the supervisor should be connect the dots between the students and also between students postings and theoretical perspectives.

Also the design of the task in the discussion board was related to the supervisors role. Both focus groups perceived the task as significant for both the content and the participation in the discussion board. The students interpreted the task they were given in different ways, but in general they experienced the task as *too* open and broad. They wanted more boosters to help trigger reflection, e.g. a specific theme, keywords, an article and so on.

The focus groups revealed that students' freedom to decide what would a post would contain, how it should be written and at what time it should be posted was perceived as challenging. The experience of too little requirements for participation might have had an impact on the participation. This was based on a perception of too much flexibility and too little pressure on each individual student to participate. Students wanted clearer requirements to participate and that these requirements would come from the supervisor.

Students experience of organization and technology

Students experience of the organizational aspects and the technological aspects of the discussion board can be considered inconsistent.

The students experienced flexibility and accessibility, on one side as positive but on the other hand as a disadvantage. They experienced a freedom to write whenever they had the opportunity, but this was also considered as a disadvantage as it felt like a never-ending obligation. They felt they didn't get a closure of their placement shift.

As written earlier it was the institutions LMS that was used as a base for the discussion board. And a contradictory and paradoxical finding to the latter above, showed that the students wanted *more* flexibility and accessibility. They wanted easier access to the LMS and functions that can be closely related to social medias as Facebook, Instagram and Twitter. They wanted notifications on their mobile phones, the opportunity to tag others in the discussion etc. The students also mentioned that with these kinds of functions the supervisors role and function as an “engine” for the discussion could be catered in a better way.

As mentioned initially, students were expected to write a post once a week, where they extracted one event from the past week. In the focus group students drew parallels between the frequency of posting and the quality of the post. One student stated that she felt she learnt more from focusing on one occurrence during the week than writing daily activity logs.

Also the organizational aspect of the discussions were brought up as an aspect for development. The experience of “messyness” in the discussion board due to the blend of both professional and practical posts, was addressed.

Table 1: Findings

STUDENTS EXPERIENCE OF PARTICIPATION IN THE DISCUSSION BOARD
<i>Students experience of own participation</i> - Insecurity and lack of confidence with eachother - Need for trust - Face-to-face meetings can effect participation - Took time to become familiar with the learning activity - Opportunity for social community with diverse perspectives
<i>Students experience of the supervisors participation, role and function</i> - Supervisor as an “engine” for the discussion - Feedback important – motivation for continued participation - Felt seen by the supervisor - Some postings from supervisor gave closure to potential discussion - The discussion board task was too open – wanted more boosters - Wanted more requirements for participation
<i>Students experience of organization and technology</i> - Flexible and accessible – but wants better functions and more accessibility - More time and room for reflection - Messy organization of the postings

5. Conclusion

The findings from the study shows that the participating students experienced untapped potential in using the discussion board. Their overall perception of being a part of and being supervised in the discussion board was positive. The opportunity to get diverse persepctive on events in their own and fellow students’ clincial placements was considered as important. They also had the feeling of writing both for their own learning as well as a contribution to others. Reading fellow students posts gave an awareness of own academic and clinical weaknesses and motivated some of the students to consult new situations in their clinical placement. However, students also experienced lack of confidence in fellow students as well as insecurity. They stated that face-to-face meetings could strengthen the online interaction between the students if they were arranged more regularly.

If one try to see the findings in relation to the theoretical perspectives there are potential to give good quality supervision in discussion boards which can lead to better learning outcomes of the

clinical placement. Especially as the potential for professional social interaction is great. The supervisor's competency on moderating in a discussion board can be significant to redeem the potential it can have. Better learning outcome will also presuppose that the discussion board is thoroughly built brick-by-brick, which Salmon (2011) five-stage model can be both an inspiration as well as a tool for. Especially more focus on stage 1 and 2 in the model can make a severe difference in the experience and perception of confidence and trust in fellow participants. The combination of a competent online-supervisor and a discussion board with clear and well thought out structure can be one way of enhancing supervision quality of nursing students in clinical placements.

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Blended learning for non-traditional learners. Seven years of experience and future challenges at a dual mode university

Elisabeth Katzlinger

Department of Data Processing in Social Sciences, Economics and Business
Johannes Kepler University Linz, Austria
Elisabeth.katzlinger@jku.at

Ursula Niederländer

Department of Data Processing in Social Sciences, Economics and Business
Johannes Kepler University Linz, Austria
Ursula.niederlaender@jku.at

Abstract

This paper introduces a blended-learning strategy for a dual mode university in Austria. It deals with a faculty-wide blended-learning concept called MUSSS (Multimedia Study Services Social Sciences and Economics) and summarizes the vision of MUSSS as well as findings and results of the strategic conception after seven years of experience of creating, launching as well as establishing this program.

The basic idea is to provide and facilitate university studies for non-traditional learners by means of an offer, which runs parallel to traditional on campus university courses. Our program addresses for instance students having to care for children, being obliged to work, residing away from university but it is also an additional offer for on-campus students. While some (seminar) courses consist of compulsory attendance-based classes on campus, because the students' presence is required on-site due to the structure and learning content of the course, others – especially lectures courses - are held merely via distance learning in e-learning scenarios.

In this program the processes around teaching and learning are reorganized and part of the digital transition of the university such as organizing e-assessments or video lectures.

The paper shows findings from different studies on enrolment development, e-assessment, and additionally presents a study concerning dropout quotes and reasons for students to leave their university without a final degree. Besides, future perspectives and prospects are introduced and explained.

Keywords: non-traditional learners, blended-learning, e-learning, distance-learning, dual-mode university

1. Introduction

This paper introduces a strategy for a blended learning program at the Johannes Kepler University Linz in Upper Austria. In 2008 the Faculty of Social Sciences, Economics and Business developed a concept for a dual mode university, which has been gradually implemented since then.

One year later, in 2009 a multimedia study program called MUSSS (Multimedia Study Services for Social Sciences and economics) was initiated. The target of this concept is to integrate more students into higher education by means of a blended learning approach and to enable also non-traditional learners to take up university education. This should facilitate media-supported lifelong learning.

Studies show that higher education in Austria is well behind other OECD countries concerning access, duration and graduation (OECD 2016).

In the concept of MUSSS two thirds of the bachelor curriculum of business and economics are offered as blended learning courses, one third are on campus courses to train social skills by means of discussions and presentations given by students. The concept provides two different versions: one MUSSS Online Content (O.C.) version and a fee-based version, which is due to intensive support from teachers and tutors, additional exercises etc. and smaller numbers of participants during the on-site periods.

Currently one ECTS point (European Credit Transfer System) of one course is 12 euro, courses as well as course materials (text books and the like) can be ordered from the MUSSS webshop.

2. Vision of MUSSS

2.1 Non-traditional learners

The student social survey 2015 reveals that 61% of Austrian students work either full-time or part-time (on average around 20 hours a week) while studying (Zaussinger et., 2016). At the Johannes Kepler University Linz in Upper Austria approx. 75% of all students work besides studying (Steinbock, 2015), hence significantly more than the nationwide average. Taking this into account and in order to accommodate the needs of these working students, the university's development plan 2006 provides that e-learning studies are to be integrated – with the objective of developing a dual mode institution of education. This means that traditional on-site teaching was to be expanded by a virtual campus, in order to create a second digital distribution channel. The intention was to develop so-called hybrid solutions, which include virtual, as well as semi-virtual modes of learning and teaching, as for example in the form of blended learning offers (JKU Linz, 2006).

By then JKU Linz had already developed and offered multimedia law studies, conceptualized as a virtual study program with online and offline media. Following this example, the faculty of social sciences and business studies decided to expand its offers by providing students with e-learning opportunities, too. Therefore a project called MUSSSS (Multimedia Studies Service SOWI) was initiated to gradually reach the goal of implementing a dual mode university.

Besides facilitating lifelong learning, MUSSS should also enable working students and students with caregiving responsibilities (e.g. caring for children or elderly parents etc.) to obtain a degree. Hence special emphasis has been placed on flexibility in terms of time and location in order to help overcoming the barriers to university access and to support students to balance the double burden

of study and work. Thus the offer is not only aimed at school-leavers, but at everyone who is interested in higher education.

One of the most important conceptual factors in this blended learning approach is the implementation of decentralized study centers. Several of these centers were planned in different regions of Upper Austria, in order to facilitate access for those, who reside too far away from the university in Linz to attend on-campus classes. This includes particularly persons who care for children and/or have to work and are thus even more deterred by the long journey to the campus.

The careful timing of the on-site periods (e.g. taking place on Friday evenings, weekends or as blocked classes) makes it easier for working students to attend.

2.2 Dislocated learners

In order to meet the needs of students who live too far away from university, the implementation of different study centers in various regions of Upper Austria was planned. The organizational and administrative implementation of the study centers was to be achieved with the aid of local partners, mainly colleges for higher vocational education – not least in order to attract future university students, i.e. the school's pupils, to JKU as soon as possible. Further advantages of choosing schools as partners are that already existing regional resources, such as IT infrastructure and facilities, provide the necessary infrastructure and that in this way the school buildings' common under-utilization can be prevented.

The decentralized study centers serve as venues for on-site periods as well as for exams. Regional partners should particularly benefit from a job market upgrade and a better utilization of existing resources.

Currently MUSSS students can complete their degrees in two such decentralized study centers, located in Rottenmann and Gmunden.

2.3 Didactic and media technological concept

The didactic concept was set out as a combination of traditional on-site teaching and many different digital modes of teaching and learning. On-site classes should offer students the opportunity to deepen the knowledge previously acquired by means of self-instruction and serve as an opportunity to reflect upon and discuss the learning contents.

The question of how to take into account social learning also played an important part within the framework of this approach. This has been achieved by means of group-oriented courses. In addition to self-directed learning processes, students should acquire and deepen their knowledge through communicative and cooperative learning. Therefore web conference systems, forums and chats are provided, which facilitate social learning in groups. Furthermore the students are encouraged to meet for joint learning sessions during the on-site periods.

Another important aspect was the breakup of the weekly course structure. This implied a restructuring of the learning contents, which was guided by findings on how long on screen learning units should reasonably last. As the average attention span is only between 20 and 30 minutes in such cases, the individual (online) learning units should not exceed this time span either (Dathe, 2005). Practical examples, problem situations or technical questions are useful ways to get started,

as they familiarize students with the contents to come in various ways, while exercises help them to acquire knowledge and assess their learning progress. Within the course of this learning process, self-directed learning in the form of individual work alternates with group work.

Depending on the subject matter either theoretical or practical blocks are dominant. Additional support shall be provided by means of online tutorials.

Each subject was conceptualized as a modular unit and was subsequently implemented and designed through media technology. The structuring of the different learning contents was guided by didactic considerations.

Many different learning activities were (and still are) used:

- Learning videos/pre-recorded videos/video streams
- Learning programs/online training
- Web conferences
- Weblogs, forums, chat
- Slides with audio
- Cooperative learning
- Peer review
- E-Portfolio
- (Decentralized) computer tests
- Self-assessment etc.

The use of various types of auditory and visual learning media intends to involve the different senses in the learning process. Both, older and more recent studies reveal that although students use digital media for private purposes, this use is not necessarily transferred to the academic domain (Kleimann, 2008; Persike & Friedrich, 2016). Hence the application of many different learning scenarios is regarded as a contribution to the increase of the students' media competency, e.g. by means of organizing conducting a web conference, and thus provides them with additional professional qualifications.

Online tutors

The whole concept is furthermore based on tutorial support from fellow students, who, on the one hand, motivate the learners, support their learning process and encourage self-regulated learning and on the other hand help them with content-related questions.

Students can also turn to these online tutors in case of organizational or technical questions. In order to provide them with the respective skills and knowledge, special training is offered to future online tutors. It deals with legal, technical and didactic aspects and has to be attended by those interested before starting the job.

Lifelong learning

As far as the media technological concept is concerned, students were presented with a “learning box+” as a haptic unit, containing digital data storage devices and learning media as well as printed teaching materials, within the course of a so-called “introduction day” at the start of their course.

The idea was to develop it as a sort of lifelong subscription so that contents could be constantly updated and further modules could be completed after the completion of a first degree. This should meet the increasing demand for lifelong learning and additionally strengthen the bond between students and university.

Lifetime Study should provide another important aspect in the continuation of lifelong learning, as for example in the form of part-time postgraduate programs. This should offer alumni and alumnae the opportunity for advanced training and further qualification while they are already working.

3. Experiences

At the initial phase of the development of MUSSS the re-conception or re-working respectively of courses was of prime importance, teaching contents were enriched, using digital learning media. Classroom learning phases have been minimized or replaced altogether by web video conferences and are only employed where interaction among learners or between teachers and learners seems crucial, as for example recommended in the concept of the “Flipped Classroom Models” (Bergmann & Sams, 2012).

3.1 Digital transformation

As it is the case for many other fields of our lives, too, our basic conditions for teaching and learning are changing. Like everyone else, students are never far away from screens, they spend more than 30 hours a week in digital media, use multiple channels for leisure activities, studying, shopping and produce a high amount of data (Ofcom, 2015)

Discussing the digital transformation of organizations covers three key areas: customer experience, operational process and the business model (Capgemini-Consulting, 2011). Strategies for e-learning must cover all three key areas (see figure 1).

Customer Experience

- Student touch point
- Digital media (Video, screencast, text)
- Learning process (Blogs, Wiki, E-Portfolio)
- Assessment tools

Operational Process

- Student administration
- Assessment administration
- Employee Enablement

Business Model

- Dual mode university
- OER Open Educational Resources
- Life Long Learning

Figure 1: Digital transformation in higher education

- **Customer Experience:** The first keystone of a digital transformation is the customer experience with the student's touch point. The use of digital media, such as e.g. video, audio, screencasts or text, in the learning process is an important step towards a digital education. To support self-directed learning processes Blogs, Wikis or E-Portfolios are considered as appropriate means. On the other hand teachers and administration are supported by e-assessment tools when it comes to grading (see sec. 3.3). Transformed customer experiences are the most visible aspects of transformation.
- **Operational Process:** Organization benefits from the transformation of internal processes such as student's administration. Furthermore e-assessment tools application, leads to a transformation of the whole process of assessment administration. The digital transformation creates a cycle of knowledge sharing from which employees benefit.
- **Business Model:** Higher education institutions transformed to digital business models like the dual mode university with face-to-face and online learning or the use of OER (Open Educational Resources). In the scope of lifelong learning the universities have to open up to new target groups.

Like the industrial revolution produced a large number of goods at low prices, institutions like schools or universities foster an industrialisation of education that results in mass universities. In digital business the trend is now towards the personalization of products and one-to-one marketing. Where do the universities go to?

3.2 MUSSS at a glance

After a pre-test phase with two courses in the summer term 2009 MUSSS finally started in October 2009 with 20 courses. One hundred sixty students started in the program and signed up for up to five courses. At the beginning all courses started as blended learning courses with up to one third of face-to-face classes depending on subject and learning objectives – in language learning there is more synchronous communication needed than e.g. in history. Instructional design follows the “flipped classroom model” (Bergmann & Sams, 2012) where the learning materials are available online, while discussion and reflection of the learning content take place in a face-to-face mode. In the starting phase all courses were part of the bachelor curriculum of economic and business sciences.

The target group of MUSSS was (and still is) non-traditional students. In the first cohort one quarter of students had enrolled at university more than ten years earlier and another quarter had been studying for more than five years, many of them being working students.

In summer term 2010 another format – MUSSS OC – started with 14 courses. OC in this context is an abbreviation for online content. This format was created especially for lectures with a large number of participants in predominantly compulsory courses. The online courses were an additional offer to the previously existing face-to-face courses with identical course content and assessment.

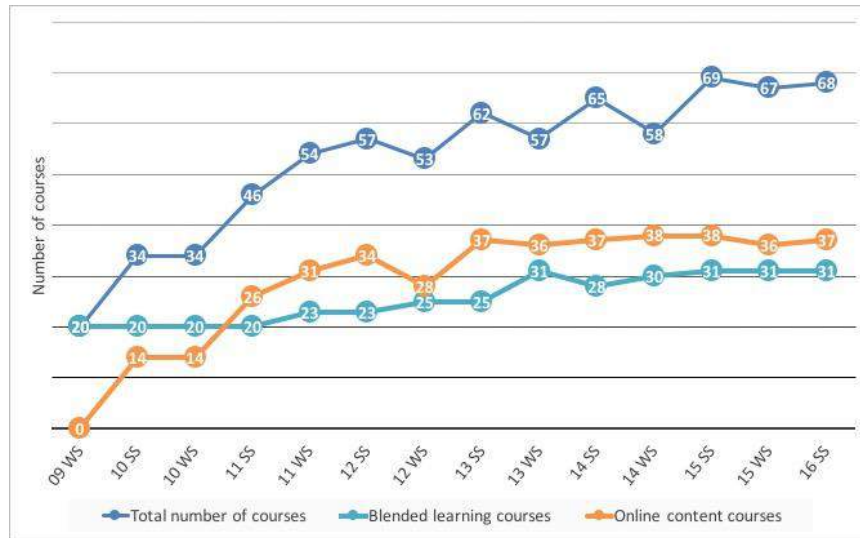


Figure 2: Number of courses

With the launch of MUSSS OC the number of students and course enrolment tripled, as it attracted a great number of traditional students, too, who attended the courses partly parallel to face-to-face lectures, because they wanted the online materials for learning and exam preparation. In the second year of MUSSS the number of students increased tenfold and the number of courses doubled. At this time MUSSS was no longer attractive for non-traditional students only, but it was also for traditional students. Most students majoring in economics or business work beside their studies.

Since 2013 the number of courses in MUSSS has been between 60 and 70 with a lower rate of increase. However, the number of students and the course enrolment is still expanding. This reflects the trend towards lectures with a large number of students where learners prefer self-directed learning with online content (figure 3). On the other hand, the individual students enrol more courses.

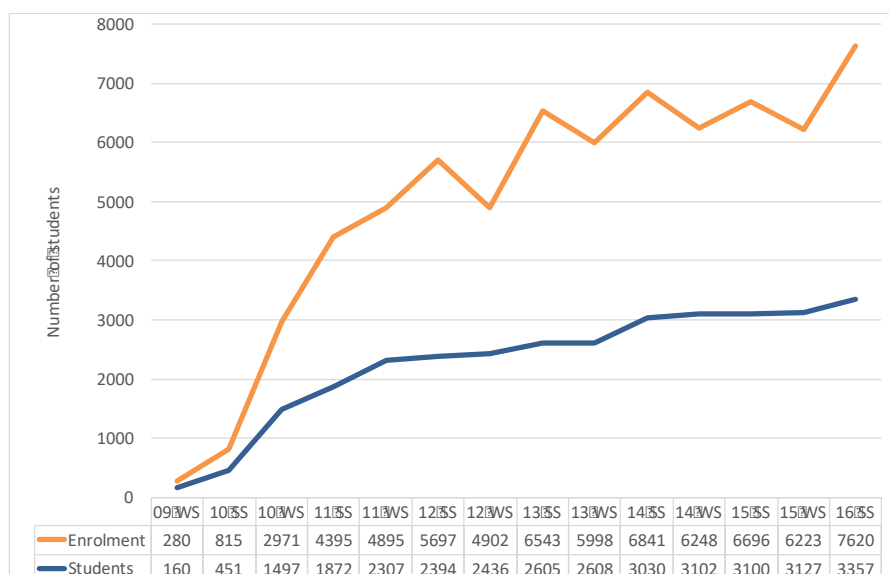


Figure 3: Number of students and course enrolment

Over the last two years the number of courses in the blended learning format has been nearly constant but the number of students and their course enrolment fluctuate. So the average number of students in a course differs between 22 and 36 (see figure 4).

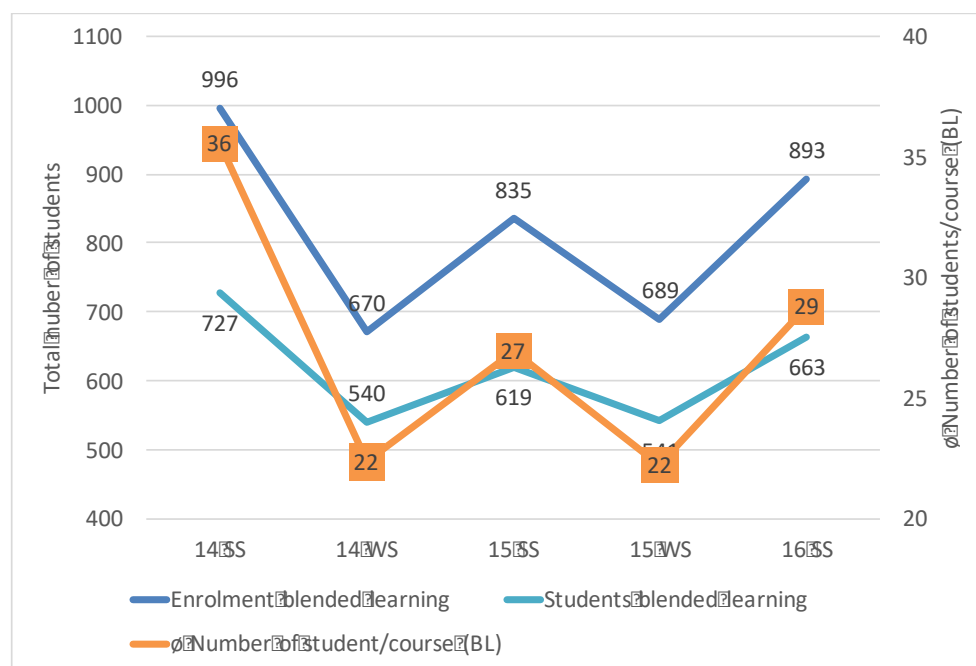


Figure 4: Students enrolment in MUSSS – blended learning

The number of courses with no face-to-face classes (MUSSS OC) has been nearly constant in the last years. But the number of students and their enrolment has been increasing. So the average number of students in MUSSS OC was 182 per course in the summer term 2016. (see figure 5)

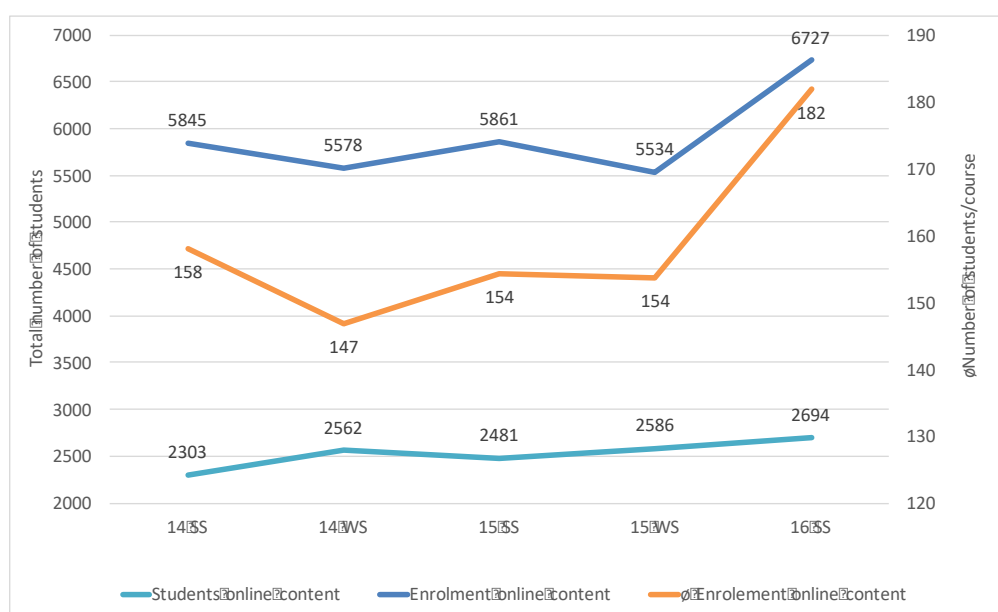


Figure 5: Students enrolment in MUSSS OC – online content

3.3 Drop-Out

In 2013 Austria initiated the implementation of a capacity-oriented, student-based funding of universities, the consequence being that individual active students have become increasingly important and dropout rates need to be considered and reduced. Therefore a study was done, investigating the reasons for students dropping out of the MUSSS program.

In this study approx. 30% of participants said their dropout was due to a wrong choice of study course. Just as many students stated that it had to do with an incompatibility of study and work. Another third ascribed it to their career reorientation. However, financial reasons (8%) and exam anxiety (8%) were not decisive factors (Hummer, 2014).

3.4 E-Assessment

At the initial phase of the development of MUSSS the re-conception or re-working respectively of courses was of prime importance, teaching contents were enriched, using digital learning media. In the further course of its development, however, competency assessment became the focus of attention. The assessment of the different dimensions of knowledge - which in this context also means the grading of students – is a big challenge for teachers, especially when it comes to lectures attended by a huge number of students. Thus for the very reason of the working capacity of the teaching staff, computer-assisted assessment (e-assessment) becomes more and more important.

By now e-assessment systems offer a whole range of question and answer forms, such as single choice, multiple choice, yes/no or right/wrong type answers, which can be evaluated automatically. Furthermore there are matrix questions, fill-in-the-blank-text and short-text answers, as well as the possibility to include images or animations. For each subject the adequate sort of task is available, such as for example the question type “accounting record” for the subject “Accounting” or alternatively “open book exams”, where learners complete research tasks by means of webquests.

The whole process of preparing, running and evaluating exams requires a range of tasks, which can be supported by means of several organizational and technical measures. The concept of the electronic examination room introduced here facilitates exam organization in many different ways. However, in the following its technical facilities shall be in the focus of attention.

A PC laboratory with 62 workplaces (two of them with height-adjustable desks for wheelchair users) and one facilitator’s workplace was established, which is exclusively used for electronic exams (Katzlinger & Höller, 2016). Other than the standard practice of surrounding the workplaces by means of high partition walls, an alternative solution introduced by the University Duisburg-Essen was chosen (Biella et al. 2009). Its advantage is that students can be overseen by a small number of proctors, while the traditional solution makes it a lot easier for examinees to hide away almost completely behind their desks. The screens are recessed into the tables; the 20 cm-high partition walls shall prevent students from putting unauthorized aids onto the desks or peeking to the workplace on their right (see Fig. 6). In order to prevent students from cheating by peeking to the workplace on their left, additional polarizing filters were applied.



Figure 6: E-Assessment Room

A successful login is registered at the facilitator's workplace and displayed through student number and the photo of the student card. Furthermore the screen content of the examinee's workplaces can be monitored at the facilitator's workplace if desired. The exam ends either when the examinee decides to submit the exam or because examination time has expired. In both cases not the standard Moodle function is used, but a specially programmed intermediate step is interposed: the questions asked as well as the answer(s) chosen by the student are shown in a secure viewer mode. The student checks the document and confirms by means of a digital signature that the answers chosen are his or hers. At this stage, no changes can be made any longer.

4. Future perspectives

In business the digital capabilities are characterized, among other things, by SoLoMo (social, local, mobil) and by using idle capacity (share economy) and analytic capabilities. SoLoMo is a concept referring to the convergence of Social, Local, and Mobile in the future development of the Web. The integration of social network, location-based service and mobile application does bring many new possibilities that could sustainably change teaching and learning in the future. Information management and analytics are highlighted as major goals across business.

The main principle of share economy, as we know it for mobility like bike or car sharing, is to make idle capacity accessible for others. As far as learning is concerned, this trend encourages fragmented learning processes and scenarios and increases the importance of self-directed learning, fragmented learning objects, personalized learning and gamification.

The capabilities of analytics are the basis for this trend of personalization under the heading of Big Data. Learning analytics and big data have the potential to intervene with the learning process and to support students by means of individual feedback – not only at the end of a course in the form of a grade. This is the requirement for analytics and personalization – each student learns in an

individual way and rate of progress. The trend micro learning is the requirement for personalization and individual feedback.

Currently the business models of higher education institutions are changing. It is at risk by the variety of new competitors. The requirement of external standardization of assessment is increasing, especially where professional rights depend on university degrees like for example in the medical sector. University degrees may lose in value. Hence the importance of quality management of administrative and teaching processes increases. On the other hand, this is a chance for the universities to capture new markets.

Currently, there is great demand for additional online courses on the part of the Students' Union at JKU as well as on the part of the students themselves. Especially those courses that are blocked or take place at off-peak time(s) are in demand. In addition, the Students' Union are keen on increasing the number of summer courses, so that students are given the opportunity to speed up their studies.

In 2014, the Faculty of Medicine was founded at the JKU Linz and from October 2016 on, up to 300 students are going to be taught there. In order to meet the demands of students as well as of lecturers it is intended to launch, support and facilitate e-learning offers with MUSSS.

5. Conclusion

Back in 2008 the concept of MUSSS implied the establishment of decentralized study centers. It was planned to found a number of branch offices in Upper Austria; by now two study centers have been established: one in Gmunden, Upper Austria, and one in Rottenmann, Styria. Lecturers from the JKU travel to these study centers to teach the local students during the attendance phases. In addition to that these study centers serve as exam venues for local students as well as for on-campus students from Linz if they so wish.

The concept of a dual mode university is not only aimed at non-traditional learners. At the beginning of MUSSS students, who work beside their study or who have to assume social responsibilities like taking care of children were considered as the main target group. Now we can see that the traditional learners also prefer courses where online learning materials are provided or courses that take place during the summer holidays. Surprisingly, social responsibilities were only in rare cases the reason for choosing the e-learning offer of the JKU – many fewer than expected. Only 22 out of 151 students of those who participated in the study stated that they had to take care of children. 5 students mentioned that they had to look after other persons, that is to say had other caregiving responsibilities; however just a little under 80% of the students said, that they were working besides studying.

The program started in business, economic and social sciences. However, currently an increasing interest of other disciplines can be observed, especially in Medicine, which started in October 2016 at our university. The capabilities of e-assessment are also used by the different disciplines.

Organizational and administrative processes change substantially during the transition to a dual mode university. The workflow and the distribution of responsibilities between the different organizational units have to be restructured to get an optimal service and working environment for students, teachers and administrative.

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Development and Evaluation of an Educational Scenario

Jean-Michel Jullien

Distance University (UniDistance), Switzerland
jean-michel.jullien@unidistance.ch

Nicole Ruffieux

Distance University(UniDistance), Switzerland
nicole.ruffieux@fernuni.ch

Valérie Follonier

Distance University(UniDistance), Switzerland
valerie.follonier@unidistance.ch

Damien Carron

Distance University (UniDistance), Switzerland
damien.carron@unidistance.ch

Abstract

Distance University Switzerland (UniDistance¹²⁵.) offers blended-learning bachelor's and master's study programs. The lecturers are recruited from traditional universities. The necessary changes in educational style and professional practices constitute a challenge for both the lecturers and the institution. The Educational Development Unit for Distance Learning (EDUDL+), a division of UniDistance, provides support for lecturers who are new to distance learning. Based on the learning outcomes of a course, lecturers and EDUDL+ jointly develop descriptions of content, activities, interactions, and assignments for the course. Caution is needed to ensure a didactic balance and diversity of methods, especially in the coordination of the various educational components.

To address these considerations, EDUDL+ developed a template for an educational scenario that includes a standardized syntax. The educational scenario provides a quick overview of a course during a semester. In addition, the scenario is intended to identify relationships between content, activities, assignments, and interactions and generate a constructive dialogue among lecturers about reflections and suggestions. In a pilot project, this scenario was evaluated by the lecturer of an entire faculty.

The aim of this contribution is to present our educational scenario and the results of its evaluation in the pilot faculty. Structure and content of the scenario were evaluated. Furthermore, the cost-income ratio of using the scenario for the lecturers was investigated. Overall, the results are very promising; they suggest that the educational scenario can readily be used by other faculties. As a next step, the scenario should be evaluated with regard to utility and usability for the students.

¹²⁵ www.unidistance.ch / www.fernuni.ch

Keywords: distance learning, educational scenario, didactics, evaluation

1. Introduction

Having precise and accurate descriptions of the individual modules of a study program has always been a very important issue for our institution. Current, reliable descriptions of all modules in a study program are considered critical to provide the necessary information on course content, learning outcomes, expected workload, and number of Credit Points which can be acquired. A module description is the summary of the key information about a module—essentially, it is a fact sheet. Often a module description consists of basic information such as the name of the module, the names of the lecturers, the number of Credit Points, the teaching language, and the duration of the module. In addition to this basic information, most module descriptions contain more detailed information on course content, learning outcomes, type and scope of assessments, and literature.

Such descriptions are highly beneficial for students, prospective scholars, deans, study coordinators, heads of degree programs, and teaching teams. With the learning outcomes and the expected workload spelled out, students can better organize themselves; they can structure their learning and prepare for examinations in a more efficient way. Prospective students gain an estimate of what is required of them during their studies and in each module; furthermore, they can learn what competencies they will acquire. Clear and informative module descriptions may also sway prospective students to sign up for a study program. The deans, the study coordinator and the head of the degree easily get an overview of the entire curriculum. They can identify where there are overlaps or gaps in the curriculum. This allows them to intervene and to guarantee a coherent curriculum. They thus have at any time at their disposal all the necessary information from their faculty and their study programs. For the teaching teams, the module descriptions provide an overview of the entire curriculum and let them see how other modules are constructed, which topics are taught, what kind of methods are used, and how the students are assessed. This leads to a more coherent curriculum, as overlapping is avoided and modules can also be better coordinated with one another.

The necessary changes in educational style and professional practices constitute a challenge for both the lecturers and the institution. The Educational Development Unit for Distance Learning (EDUDL +), a division of UniDistance, provides support for lecturers who are new to distance learning. This support also includes a training program. In the context this training program for new teachers, we established, together with the lecturers and a pool of experts, a uniform module description. The outcome was a document that should serve as a guide for future modules. Furthermore, we developed an additional document beyond this fact sheet which would make it possible to capture the entire semester sequence of a module with its important information—an educational scenario. We believed that if the fact sheet were enhanced with an educational scenario, then students, the teaching team, the dean, and staff providing institutional services (in particular, student services and faculty services) would get not only the basic information but also a very useful view of the module throughout the semester. We anticipated that this visualization would be extremely useful for students in terms of time management as it would allow them to better organize their semester. The aim of this short article is to introduce the educational scenario as an important and novel part of a module description. In addition, we present the results of the evaluation of the educational scenario in a pilot faculty and discuss the establishment of this new document in the other faculties.

2. Educational Scenario

EDUDL+ developed an educational scenario that includes a standardized syntax. The educational scenario provides a quick overview of a course during a semester. In addition, the scenario is intended to identify relationships among content, activities, assignments, and interactions between students or between students and lecturers. This document contains the following information about the module: teaching activities, resources, synchronous and asynchronous interactions, and evaluations during the semester.

The document was designed such that all the information can be seen in visual form on a page, thus making the whole semester sequence visible at a glance. This design choice was made to facilitate comprehension—for example, it allows students to recognize quickly the phases in which there is higher or lower workload, when and which activities take place, and when exercises must be submitted. It is also readily apparent when, where, and how themes are addressed and whether there are opportunities for interaction. Furthermore, the design makes it possible to identify relationships among activities, assessments, and interactions.

We elaborated a general syntax for the educational scenario, so that each would have a consistent pattern. The syntax makes clear which visualization elements can be freely selected and which are set; for example, it defines what the different colors and shapes signify and when solid or dashed lines are to be used. Thus, while the syntax creates some degree of standardization of the educational scenarios, it still allows for depiction of the individuality of each module.

3. Working with the Educational Scenario

Based on an initial draft of an educational scenario for a module, the lecturers of a pilot faculty were asked to consider, modify, and partly rebuild the document. Lecturers were encouraged to cope alone with the main steps, to assess how well they managed them. If they had questions, they were supported by an EDUDL+ employee.

4. Evaluation of the Educational Scenario

The aim of this evaluation was to examine the usefulness of the educational scenario. In particular, the document's usability was evaluated—that is, whether and how easily the lecturers could use the functions of the document.

Method

All lecturers of the pilot faculty who worked with the education scenario took part in the evaluation. The 20 lecturers were contacted by e-mail. Here they were again thanked for their participation in the pilot project. They were asked to participate in a short online survey as the final part of the pilot project. All 20 lecturers completed the online questionnaire (response rate 100%). The survey was created using Survey Monkey and included both closed and open-ended questions, which allowed collection of both quantitative and qualitative data. We were interested to know how the lecturers evaluated the structure and content of the scenario. The rating of the structure of the document was based on the criteria “logical,” “comprehensible,” and “useful.” The rating of the content of the document was based on the criteria “complete,” “understandable,” and “reasonable length.” For the closed questions, the lecturers had to answer using a 5-point Likert scale.

Results

The structure of the educational scenario was rated with a mean of $M = 4.58$ ($SD = .59$) as “logical/comprehensible” and with a mean of $M = 4.67$ ($SD = .56$) as “useful.” The content of the educational scenario was rated with a mean of $M = 4.89$ ($SD = .31$) as “complete,” a mean of $M = 4.44$ ($SD = .67$) as “understandable,” and a mean of $M = 4.94$ ($SD = .22$) for “reasonable length.” Fifty percent of the lecturers considered the cost–income ratio of working with the scenario as “very good” (50%), 40% considered it “good,” and 10% considered it “neither good nor bad.” Nobody said that the input–output ratio was “bad” or even “very bad.”

5. Discussion

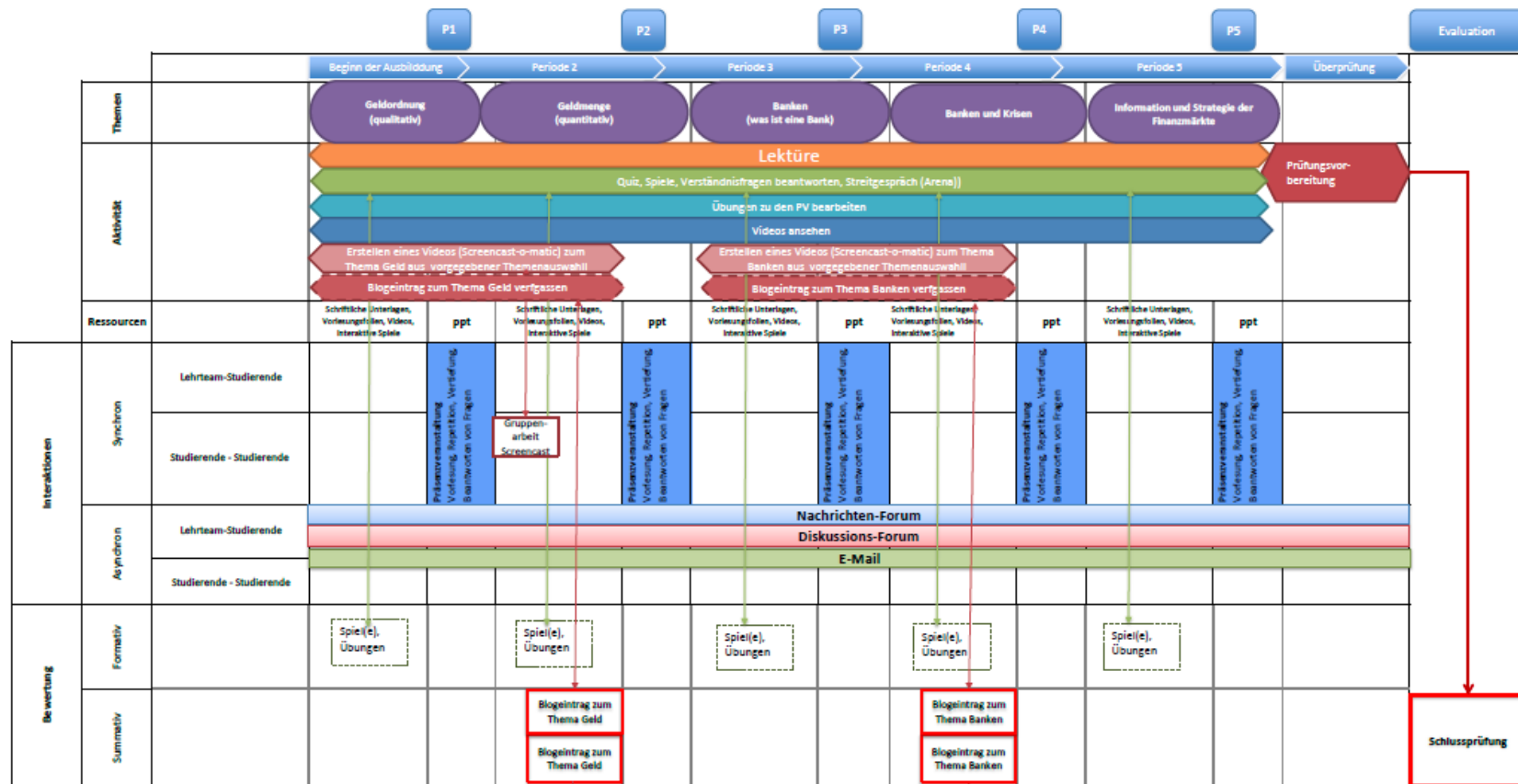
The educational scenario was considered logical, comprehensible, and useful. The content seems to be understandable, complete, and of reasonable length. These results are very encouraging. Therefore, the educational scenario should be introduced and established in other faculties. The results of the evaluation clearly show that the lecturers are able to work with this newly developed document. Preparing the lecturers with a good introduction seems critical to facilitating their success in using and modifying the scenario. It is advisable to meet individually with the teaching team for the development of educational scenarios—to explain the educational scenario, to develop first or additional ideas to identify new opportunities, or even to talk more about general experiences. The pilot project can and should serve as a forerunner for other faculties, so that in the near future, UniDistance may have a pedagogical scenario for all modules.

6. Future Work

In the near future, the support provided to the participating lecturers will be offered to the remaining faculties and the new lecturers as part of a training. Furthermore, another evaluation will be conducted to verify the utility of educational scenario for the deans, the teaching teams, the students, and the institution.

7. Example of an educational scenario and the accompanying fact sheet

Bachelor of Science in Economics - Deutsch
Modul 11: Finanzmärkte



50%

25%

Wahlweise erstellen eines Blogbeitrages zum Thema Geld oder zum Thema Banken

25%

Wahlweise erstellen eines Videos zum Thema Geld oder zum Thema Banken

50%

Modulbeschreibung
Finanzmärkte
FS 16

Modulbeschreibung: M11 Finanzmärkte

Modulname	Finanzmärkte		
Modulnummer	M11		
Zuordnung zum Studiengang/zu den Studiengängen	Bachelor of Science in Economics		
Studienstufe	Bachelor ☐	Master ☐	
Modultyp	Pflichtmodul ☒	Wahlpflichtmodul ☐	Wahlmodul ☐
Lehrteam/ Modulverantwortliche**	Dozierende: Prof. Dr. Email: xxxxx@fernuni.ch		
	Assistierende: M. Sc., M.Sc. Email: xxxxx@fernuni.ch, xxxxx@fernuni.ch		
Durchführung des Moduls	HS ☐	FS ☒	HS/FS ☐
Moduldauer	1 Semester		

Unterrichtssprache	Deutsch		
ECTS	10		
Modulniveau	Einführung ☒	Vertiefung ☐	Spezialisierung ☐
Themen und zentrale Konzepte / Inhalte	Die Finanzmärkte und insbesondere das Geldwesen prägen unser Leben, oft mehr als uns lieb ist. Gleichzeitig sind Geld und Finanzen für viele ein Buch mit sieben Siegeln – zu Unrecht, wie der Kurs zeigen will. Im Kurs werden die wichtigsten Zusammenhänge vermittelt und das Gelernte an aktuellen politischen Fragen getestet. (1) Was ist Geld? SNB, Geldmenge und Zinssatz, Inflation/Deflation, Aktuelle Probleme der Geldpolitik (2) Banken, Geldschöpfung, Bank-Runs, TBTF, Vollgeldinitiative (3) Information und strategisches Verhalten auf den Finanzmärkten.		
Vorkenntnisse/ Eingangsvoraussetzungen	Module: M02: Grundlagen der Volkswirtschaftslehre M03: Law & Economics M04: <u>Makro- und Mikroökonomie</u> M05: Accounting		
Learning Outcomes/ Kompetenzen*	Nach Abschluss dieses Moduls... • verstehen die Studierenden die 50 wichtigsten Begriffe auf dem Gebiet des Geld- und Bankwesens. • können sie die Geld- und Währungsordnung der Schweiz beschreiben. • kennen sie die Grundzüge der Schweizer Währungsgeschichte. • können sie aus der Bilanz einer Bank auf deren Tätigkeit schliessen. • können sie die Geldschöpfung einer Bank erklären. • können sie Medienbeiträge zum Geld- und Bankwesen qualitativ beurteilen und kritisch hinterfragen. • können die Studierenden an Volksabstimmungen zum Geld- und Bankwesen ihre Präferenzen zum Ausdruck		

	bringen. • können sie die Folgen geld- und währungspolitischer Entscheidungen der Notenbanken qualitativ abschätzen. • wissen sie, wie sie sich gegen Inflation oder Deflation schützen können. • können die Studierenden die Struktur einfacher strategischer Situationen anhand von Spielbäumen aufzeichnen und Vorhersagen über das Ergebnis rationaler Entscheide treffen. • verstehen sie die Rolle der Informationsverteilung in strategischen Situationen. • sind die Studierenden in der Lage einen eigenen kurzen, konzisen Text zu einem selbstgewählten Thema auf dem Gebiet „Geld und Banken“ zu erstellen. • können Sie einen kurzen eigenen Videobeitrag zu einem Lehrinhalt auf dem Gebiet „Geld und Banken“ produzieren.								
Lehrmittel	Schriftliche Unterlagen, Vorlesungsfolien, Interaktive Spiele, Videos								
Leistungsnachweise		Gewichtung	Form			Modalität			
			schrift- lich	münd- lich	multi- medial	Einzel	Gruppe	Präsenz	Distanz
	Schlussprüfung	50%	☒	☐	☒	☒	☐	☒	☐
	Blogbeitrag	25 %	☒	☐	☒	☒	☐	☐	☒
	Videoerstellung	25 %	☐	☒	☒	☒	☐	☐	☒
Workload - Studierende (h)	Interaktionen Studierende - <u>Lehrteam</u>								

	Präsenzveranstaltungen	15
	Visio Konferenzen und virtuelle Klassen	
	Lesen und Schreiben von E-Mails, Lesen und Schreiben in Foren, Wiki,	
	Individuelle Arbeit Studierende	
	Lesen und Hinzuziehen von Ressourcen, welche vom <u>Lehrteam</u> zu Verfügung gestellt oder angegeben wurden, inkl. der Pflichtliteratur	75
	Individuelle Recherchen und Erstellen von persönlichen Dokumenten	50
	Interaktive Übungen und formative Evaluationen	25
	Gruppenaktivitäten der Studierenden	
	Virtuelle Klassen, Visio Konferenzen mit anderen Studierenden	50
	Gruppenarbeiten (incl. Spiele)	50
	<u>Summative</u> Evaluation des Moduls	
	<u>Summative</u> Zwischenevaluationen (inkl. Vorbereitung)	10
	<u>Summative</u> Schlussevaluation (inkl. Vorbereitung)	25
	Total <u>Workload</u> Studierende(h)	300

Electronics remote lab integration into a MOOC – Achieving practical competences into MOOCs

Felix Garcia Loro, Elio Sancristobal, Rosario Gil, Gabriel Diaz, Manuel Castro

Electrical and Computer Engineering Department (DIEEC), Industrial Engineering Technical School (ETSII), Spanish University for Distance Education (UNED), Spain
fgarcialoro@ieec.uned.es, elio@ieec.uned.es, rgil@ieec.uned.es, gdiaz@ieec.uned.es, mcastro@ieec.uned.es

Maria José Albert-Gómez

Faculty of Education, Spanish University for Distance Education (UNED), Spain
mjalbert@edu.uned.es

Gustavo Ribeiro Alves

Polytechnic Institute of Porto, Portugal
gca@isep.ipp.pt

Abstract

Massive Open Online Courses (MOOCs) phenomenon introduces a new philosophy in educational models. Regardless of users'/students' motivation when enrolling (lifelong learning, educational support, interest in new educational areas, etc.), MOOCs expand the ways of reaching knowledge. Flexibility is one of the key aspects of this new educational methodology. This flexibility has to be expanded/translated to all the aspects/features of the course. For educational institutions, traditional approaches must be left behind when designing courses and must provide a new approach to educational process.

MOOCs fit very well to several areas of knowledge. However, they involve significant challenges for science MOOCs to be really effective, especially in developing courses. These educational challenges are highlighted in courses which need to offer practice-oriented learning in order to build successful cross-curricular capabilities and abilities. Nowadays, educational institutions trust in experimentation as one of the pillars in which learning is based. In fact, theoretical models used in books and in traditional classrooms just try to bring closer to students the actual behavior of real systems. Unfortunately, it is not possible to provide students with a laboratory in a totally/one hundred percent remote learning environment.

This paper deals with the results of the integration of a remote laboratory in a MOOC; how it has been taken advantage of VISIR pros and how its cons have been solved, as well as the evolution of the global system (LMS+VISIR) in continuous improvement.

Keywords: Index Remote laboratory, MOOC, VISIR, Electronics, Experimentation.

1. Introduction

Broadly speaking, the experience acquired through laboratories provides active learning complements to traditional lecture-based education and an understanding of the subject beyond ideal modelling. In-person laboratories, remote laboratories, virtual laboratories and simulators are the options available for educational institutions in order to complement the learning materials and are necessary for the structure of courses in which experimentation plays an essential role [1]-[5].

Nowadays, there is an extensive variety for providing theoretical contents in distance learning (videos, documents, tutorials, scaffolding activities, peer-to-peer reviews, forums, etc.) to students. These tools, by an efficiently and appropriate selection from professors and use from students, can complement or replace successfully in-person education, even they can reach some aspects that in-person education cannot achieve. Unfortunately, practical issues are not as developed as theoretical ones are. A first approach to this problem is clearly the use of simulators and virtual labs. Although, they are still a bit far from providing to student the real performance and features of equipment under real-life operation conditions. The major challenge is the provision of laboratory working online along with the theoretical contents in a massive context.

A remote laboratory is a tool which comprises a hardware layer (equipment, instruments and experiments) and a software layer (responsible for monitoring equipment and instruments over the experiments). The main advantage of remote laboratories - when compared with traditional electronic laboratories, - lies on its availability that has either temporal nor geographical restrictions. With remote laboratories students are provided on-line with real equipment located in an educational institution. A review of the current literature shows a great number of universities or organizations which have created their own virtual and remote laboratories to support life-long learning and students' autonomous learning activities [6]-[12].

Remote laboratories, if properly designed and managed, provide controlled and safe scenarios at the expense of flexibility. This loss of flexibility when experimenting is due to the protections and constraints established by teachers in the design stage of the experiments and limitations established by remote lab operation. For example, destructive experiments that students may be carried out erroneously in in-person laboratories, cannot be allowed in remote labs. But sometimes, this loss of flexibility in the interest of safety also limits the students' freedom, thus limiting students' options to explore.

The essential difference between remote laboratories and in-person laboratories results from how the interaction between student and workbench is performed. Therefore, remote laboratories have very limited ability to provide manual skills; "Physical presence however is only one element in the perception of reality, a student's subjective mental reality" [3], [13]- [14].

VISIR (Virtual Instruments System In Reality) is a remote lab for electric and electronic circuits experiments, developed at Blekinge Institute of Technology (BTH) in Sweden and in use in several universities all around the world [15]. Although VISIR allows concurrent users, it does not allow an indeterminate number of them. The intrinsic limitations of a real laboratory such as VISIR collide with one of the most relevant features that any MOOC must have: scalability.

The essential difference between remote laboratories and in-person laboratories results from how the interaction between student and workbench is performed. The main advantage of remote labs when compared with in-person laboratories lies in its availability that has neither temporal nor geographical restrictions. They also have some underlying improvements: low maintenance cost and requirements, no need of human resources during students' experimentation, no associated risks neither for students nor instruments and equipment (if well designed), etc. But, obviously, remote labs have limitations not available in in-person laboratories, for example freedom degrees while designing experiments or destructive

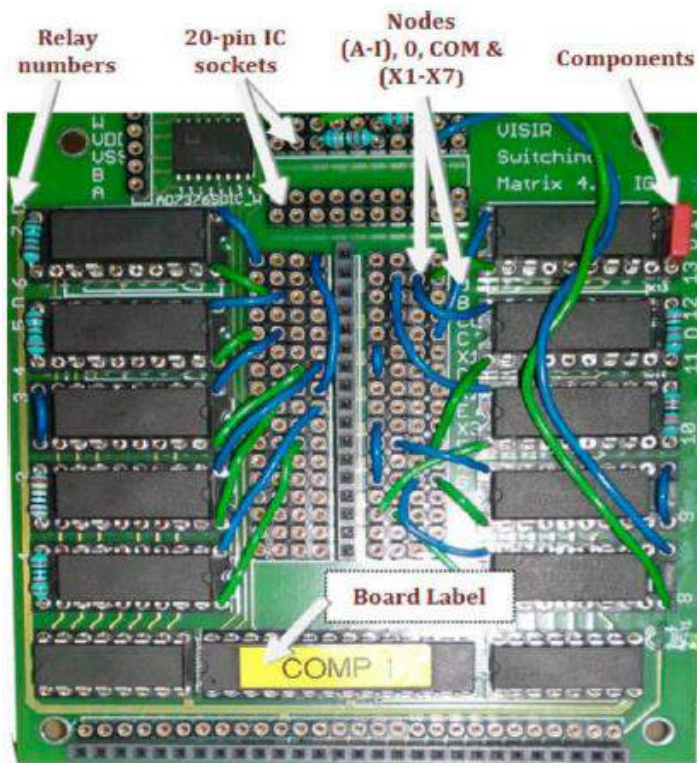


Figure 1. Component board

experiments. Meanwhile remote lab VISIR finds constraints in the number of components available <<hardware limitation stated by the room in the component boards>> (see Figure 2) and constraints in the experiments designing <<hardware limitation due to the components internal disposal and short-circuits implemented in the matrix>>, in-person laboratories have no limitations when using components and designing circuits.

2. Deployment Scenario

2.1. Remote lab

In VISIR, the traditional equipment (DC-power source, function generator, multimeter and oscilloscope) are replaced with an equipment platform, which is suited for remote control such as PXI (PCI eXtensions for Instrumentation), LXI (LAN eXtensions for Instrumentation) and GPIB (General Purpose Interface Bus) [16]. The traditional instruments are replaced by the modules cards NI PXI-Instruments (manufactured by National Instruments). The NI-PXI Instruments and the NI-PXI-Controller (a PC) are plugged into the NI PXI-Chassis.

The relay switching matrix is where the components are allocated and connected to the modules cards NI-PXI. It is manufactured in BTH. The construction of the circuit is possible by means of

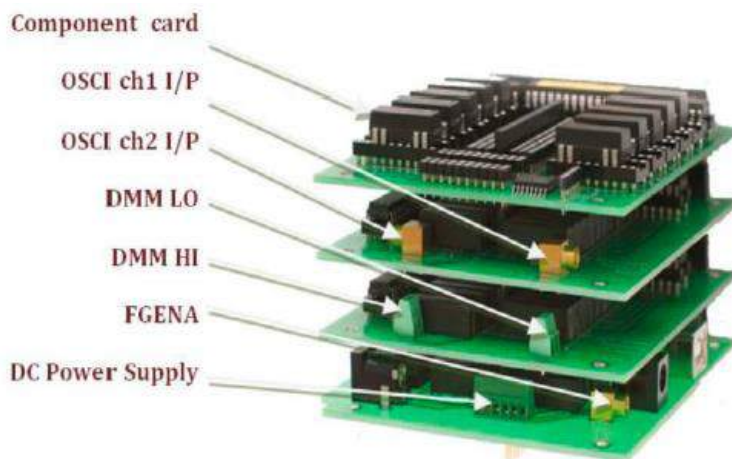


Figure 2. Relay switching matrix.

relays which act as a switch between nodes and components (Figure 2). Each NI PXI-Instrument is also connected to the relay switching matrix (Figure 1).

The VISIR software is released under a GNU GPL license [17]. The “Web Interface” is the webpage of VISIR. When a client logs in, it generates a session cookie to be recalled by the “Measurement Server” for authentication purpose. Through the Web Interface, the “Experiment Client” is accessed. The Experiment Client represents the entire laboratory workbench through an HTML page as an embedded object. The roles of the Measurement Server are: The authentication at each request of the session cookie; The validation of the construction of the circuit and instruments values (defined previously by the administrator/teacher); The handling of time-sharing between simultaneous users; The handling of queue of requests. The “Equipment Server” is a stand-alone equipment controller written in LabVIEW, which handles all the instrument hardware together with the relay switching matrix.

The remote lab VISIR used during the different editions of the MOOC is located in Electrical and Computer Engineering Department (DIEEC) of the Spanish University for Distance Education (UNED).

2.2. MOOC platform

UNED-COMA platform (Massive Open Online Course in Spanish: Curso Online Masivo Abierto), aimed at the deployment of MOOCs from different departments of UNED, is an UNED-Abierta (Open-UNED) initiative and part of its platform [23]. UNED-COMA platform is based on OpenupEd MOOC platform provider [23]. Open-UNED was created by the UNED in order to draw together Open Educational Resources (OER) from UNED. The platform explodes the rich experience of UNED educational system in distance education.

MOOC course

The MOOC has been named: “Circuits Fundamentals and Applied Electronics” (BCEP; “Bases de Circuitos y Electrónica Práctica” in spanish) and has been running for 3 editions. The core of the MOOC is the remote laboratory VISIR. The evaluation and activities spin around the remote laboratory and the objectives and evaluation are focused on the handling of the instruments and measurements. The students have not time limitation for completing the different modules and tasks.

The acquisition of the competences for analyzing circuits is not an objective for this MOOC. The knowledge, at least theoretical, on analyzing electrical and electronics circuits and the electrical characteristics of most common components are necessary requirements for participants. However, supplementary materials are provided, in each module of the MOOC, in order to facilitate the understanding of the behavior and circuits for those students that fulfill only part of the requirements but are interested in following the course.

With respect to the objectives associated to the principles established when designing the course, the structure of the MOOC could be divided into 3 blocks:

- Block 1: The purpose of the activities associated to this block is to collect information: basic data such as age, genre, country, labor situation, etc.; training information such as the maximum academic level, previous experience in any kind of laboratories, training, level of knowledge to address the learning outcomes effectively, etc.; and finally the motivation of the enrollment in this course such as the expectations about the remote laboratory, the interest of the students in electronics, etc. The method employed for obtain this information are the non-evaluative exams (two non-evaluative mandatory exams throughout the course) and surveys (three optional surveys during the course). This block is made up of Module 0 and Final Module.
- Block 2: The main idea behind this module is to give the students a work philosophy on how to deal with laboratory practices. Another objective of this block is to disenchant and/or to cause the “MOOCaholics”
- Block 3: This block is where the students interact with the remote laboratory VISIR and where the designed practices take place. This block is made up of Module 3 to Module 8.

2.3. Students

The enrollment philosophy is consistent with the policy of the MOOC courses: Massive —no restrictions on the number of participants— and Open —open access, anyone can enroll the course— [21]; this philosophy is inherited from UNED-COMA platform but it doesn't collide with B CEP principles. However, course's syllabus warns that B CEP MOOC is a nonbasic course and the participant must have previous theoretical knowledge in electronics analysis and components behavior.

3. Actors' Integration

3.1. Scalability

One of the pillars on which MOOCs rest is the scalability: courses are designed to support an indefinite number of participants [21]. In VISIR, there is a physical constraint to the number of concurrent users performing measurements; threshold limit value is 60 even though it is very unlikely that all connected users perform measurements simultaneously due to laboratory time is mostly allocated in the circuit assembling and configuring the equipment much more than for measuring. Unfortunately, the intrinsic limitations of a real laboratory such as VISIR collide with one of the most relevant features that any MOOC should achieve: scalability. This is one of the critical points we wanted to analyze: the adaptability of the remote laboratory VISIR into a massive environment.

3.2. Remote laboratory response

Remote laboratories have very limited ability to provide manual skills; "Physical presence however is only one element in the perception of reality, a student's "subjective mental reality" [18]-[20]. This difficulty can be overcome by immersing users in the laboratory by means of its interface.

Aside from remote lab interface, which cannot be improved or modified easily, an optimal time response of remote lab improves the immersion in real-time systems.

VISIR allows two ways of measuring: single measurement mode or continuous mode. Single measurement mode is used when measuring with VISIR's digital multimeter, but it also can provide a VISIR's oscilloscope snapshot when using oscilloscope probes. For intermittent measures, such as the ones mentioned above, time response is not a critical factor. However, in continuous mode time response gets critical for users' immersion in a real-time system such as VISIR. On the other hand, laboratory time response depends on several factors: circuit, frequency, number of measuring requests, etc.

Figure 3 to Figure 5 show VISIR's time response in different scenarios.

3.3. Booking system

The limitation imposed by VISIR on the number of simultaneous users that it is able to manage in a satisfactory way requires the use of a booking system. VISIR has its own reservation system, however it

requires user authentication. To prevent users from managing two user accounts, one for UNED-COMA platform and another one for VISIR remote lab, it was necessary to create the resource (booking system) in UNED-COMA platform. UNED-COMA sends data coded in a json file: authentication token and id-slot; the resource decodes the json file and sends back a request to check that the the data received by means of an Application Programming Interface

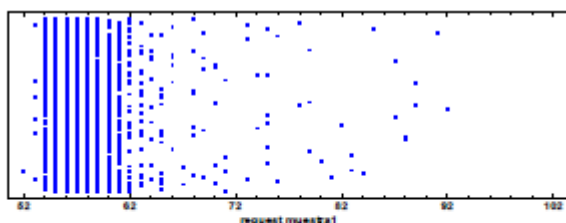


Figure 3. Unique user, time response in milliseconds; 5 minutes in continuous mode.

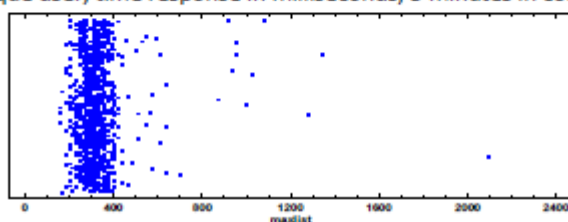


Figure 4. 5 users simultaneously measuring, sample time response in milliseconds; 5 minutes in continuous mode.

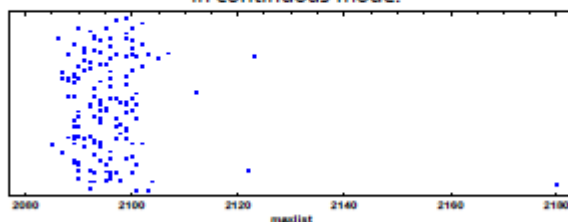


Figure 5. Over 20 users simultaneously measuring, sample time response in milliseconds; 5 minutes in continuous mode.

key (API key). This resource is not designed exclusively for VISIR access, but it is designed for any kind of tool which requires a booking; for example, video-conferencing or web conferencing through AVIP classrooms (Audiovisual tool over IP technology) developed by UNED-INTECCA (Technological Innovation and Development in the Study Centers) [22].

The settings used in the booking system from UNED-COMA for the three BCEP editions has been: 16 concurrent users per turn, 60 minutes per turn, a maximum of 2 simultaneous turns reserved per user and a limitation of 14 reserves throughout the course. With these settings, VISIR allows a maximum of 384 students to experiment with any of the practices designed in MOOC daily. This configuration may have been altered during MOOC depending on the demand, but it was not necessary.

The booking system was developed from the side of the MOOC platform, but it was also required to develop a new authentication service in VISIR for users from UNED-COMA platform. The new (mooc-user access) and existing (traditional access) authentication systems "live" together: both authentication services coexist. Students from other courses, teachers and administrators have accessed VISIR following the traditional process, meanwhile UNED-COMA users have interacted with the new authentication services.

3.4. UNED-COMA

UNED-COMA platform does not provide any type of tool for teachers to track the progress of students in the MOOC, only provides general information (number of enrollments, number of badges obtained, etc.). In order to obtain more specific information, i.e. for an individual monitoring or to obtain the grades of the students, the databases (PostgreSQL, MongoDB) of the MOOC platform have been analyzed. Unfortunately, UNED-COMA no longer provides access to the databases; only first and second editions have could be analyzed.

Besides, the possibilities offered by UNED-COMA platform, when establishing activities and assessment tasks in the designing phase of the course, are very limited: the viewing of videos, video-questions or P2P activities are the assessment tools for evaluating student progress. Assessment tools provided by the platform are not ductile for any type of subject, but even less when the target is to evaluate the practical skills acquired.

3.5. BCEP course

In first modules, the MOOC aims to provide students with a work philosophy to follow in the subsequent modules. This work philosophy proposes the students these sequential steps:

Theoretical analysis of the circuit.

Performing an analysis of the circuit using a simulation tool with the purpose of monitoring the time-dependent signals.

Experimenting in a real environment (laboratory).

Analyzing the behavior and comparing the limitations, advantages, differences, etc. between the different methods.

The course contains 97 evaluative activities, 55 standard multiple choice questions (including single-answer questions and multiple-answer questions) and 42 videos. The weight of the videos is 30% of the final grade and they need 80 over 100 to obtain the certifying badge. Besides this structure, two extra modules (one before the beginning of the course and another one once the students have completed the course) are responsible of compiling the students' profile and their knowledge level by means of optional surveys and questions about basic circuit analysis and electronics components. UNED-COMA platform doesn't have any tool to carry out surveys, so an external tool has been used to accomplish it, therefore there is no way to identify the behavior of students according to their profile. The basic electronic practices included in this MOOC are focused on:

- Basis of laboratory equipment and instruments.
- Measurements of resistances, voltages and currents.
- Rectifiers.
- Filters.
- Zener diode as regulator.
- Rectifier diode and Zener diode as clipper.
- Inverter and non-inverter operational amplifier.
- Operational amplifier as a driver.

The course structure comprises 8 modules: Module 1 is dedicated to electronics simulation: MicroCap software is proposed and several demonstrative videos and a manual are supplied to students together with documentation about the theoretical contents of the course; In Module 2 the remote laboratory VISIR is introduced to students, but they do not have granted access yet, demonstrative videos with the special features of every instrument and a manual are provided to students in order to familiarize with the laboratory workbench; From Module 3 to Module 8 students interact with lab, building real circuits with VISIR and taking measurements related with them. Every module is focused in one or more functionalities and handling of the laboratory instruments (breadboard, multimeter, function generator, power supply and oscilloscope). Module 3 and Module 4 aim specially in teaching the handling of the lab equipment,

components and instruments, whereas Module 5 to Module 8 are centered on showing the behavior of real components and specific features of the instruments (coupling, trigger, cursors, measurements menu, etc.).

3.6. Students

The age of students is distributed evenly. Slightly stands out the group of students over 40 years old. By contrast, the group of students under 20 years old was the minority one. This results are

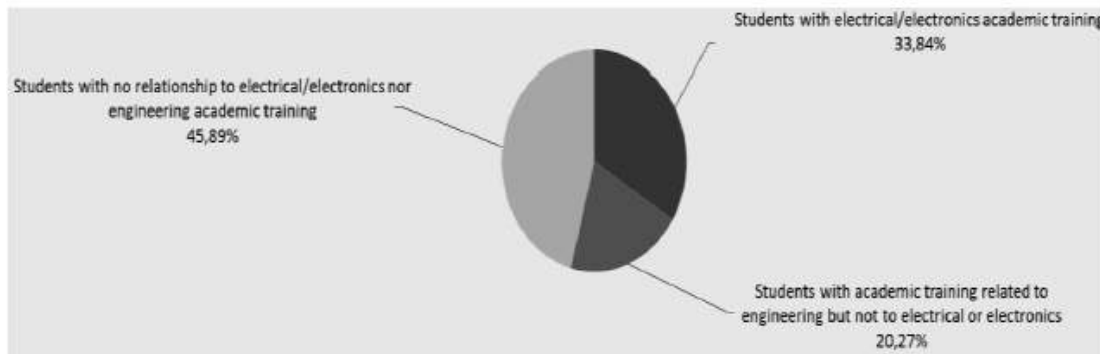


Figure 6. Students' previous training

shown in **¡Error! No se encuentra el origen de la referencia.¡Error! No se encuentra el origen de la referencia..** Regarding to students' availability of time, **¡Error! No se encuentra el origen de la referencia.** shows the labor status of students.

Only 33.84% of those enrolled have some training related to electrical/electronics engineering previously to the MOOC (see Figure 6); from the remainder, 20.27% had some type of training related to engineering but not with the electrical/electronics area. Therefore, only 33.84% of those enrolled had the training required as it is specified in the syllabus of the MOOC.

Figure 6. Students' previous training.

4. drawbacks and Solutions in the Integration Process

4.1. Booking system

The MOOC's design allows the administrator to use several parameters, as the number of slots per turn, number of simultaneous turns and total number of allowed turns in the course. Each turn has assigned 1 hour. By changing these parameters, we can regulate the remote laboratory availability to the demand of use. However, these parameters were enough to cover the demand of the remote lab: only four turns have had all the slots used. In this regard, the booking system has managed satisfactorily the remote lab turns.

In the other hand, other courses (external to UNED-COMA platform) require access to the lab as well. When these courses need the access to VISIR, it entails to avoid access from UNED-COMA platform. So, the booking system should be unique in order to allow all the courses to share the remote lab resource.

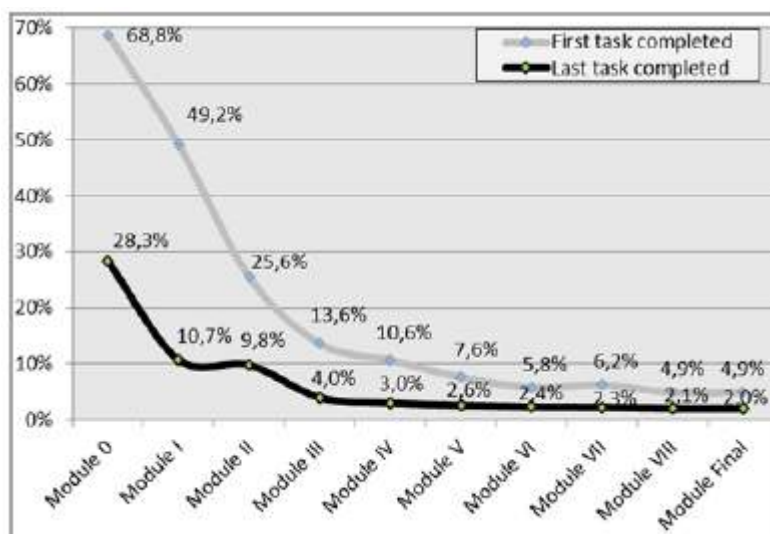


Figure 7. Dropout.
Percentages expressed from enrollments

4.2. Databases

UNED-COMA platform is not intended/designed for the integration of a remote laboratory in MOOCs. Therefore, due to the technical problems resulting from the adaptation, is not possible to cross the data available in the UNED-COMA platform and the one registered in VISIR. Consequently, it is not possible to carry out a reliable learning analytics. Furthermore, the booking system designed in UNED-COMA has not been the most suitable for a post-analysis of students' behavior: the interaction between MOOC BCEP hosted in UNED-COMA platform and remote laboratory VISIR is not carried out as a whole but as two separate entities. The communication between the UNED-COMA platform and remote laboratory has a gap because it is focused on the veracity of the access request and ignores user information, so, in the eyes of VISIR, all the users with a reservation from UNED-COMA are correctly authenticated in VISIR but anonymously.

Students

The dropout rate has been high as is usually in this type of courses (Figure 8); less than 4% have obtained the course credential badge of those who started the course. One of the main reasons for this dropout have been the need of a theoretical background to understand circuits' behavior. This fact is reflected in the high dropout rate in the first modules.

A bad design of the MOOC activities (both laboratory experiments and associated activities derived from the measurements from VISIR remote lab) may cause to students to focus more on completing them than in analyzing the results and understanding the behavior of the circuit and/or components. In this regard, when students have been asked about the duration of the experiments (Figure 9, left) and activities associated (Figure 9, right) with the experiments in general they agree that, both activities, they have had to perform in the remote laboratory (measurements, wirings, variations of the same circuit, etc.) and the activities derived from it (calculations, graphs, tables, etc.), are long. Both distributions are slightly skewed to the right (the mean is slightly greater than the median), exceptional high values impact the mean and pull it to the right, but both distributions are concentrated between "5" and "8" (lower and upper quartiles from Figure 9).

So, in general, the students' opinion opts to consider that the course's activities are long or very long. Figure 9 take into account all students who have completed several activities into the BECP MOOC, the trends shown in both are more pronounced when taking into account only those

students who have completed the course (their opinion have more judgment elements), as reveal Figure 10.

Table 1. Accesses to instruments and components. Shortcuts include all shortcuts allocated into relay switching matrix (24 used). (*) More than one resistor with the same ohmic value used from the relay switching matrix

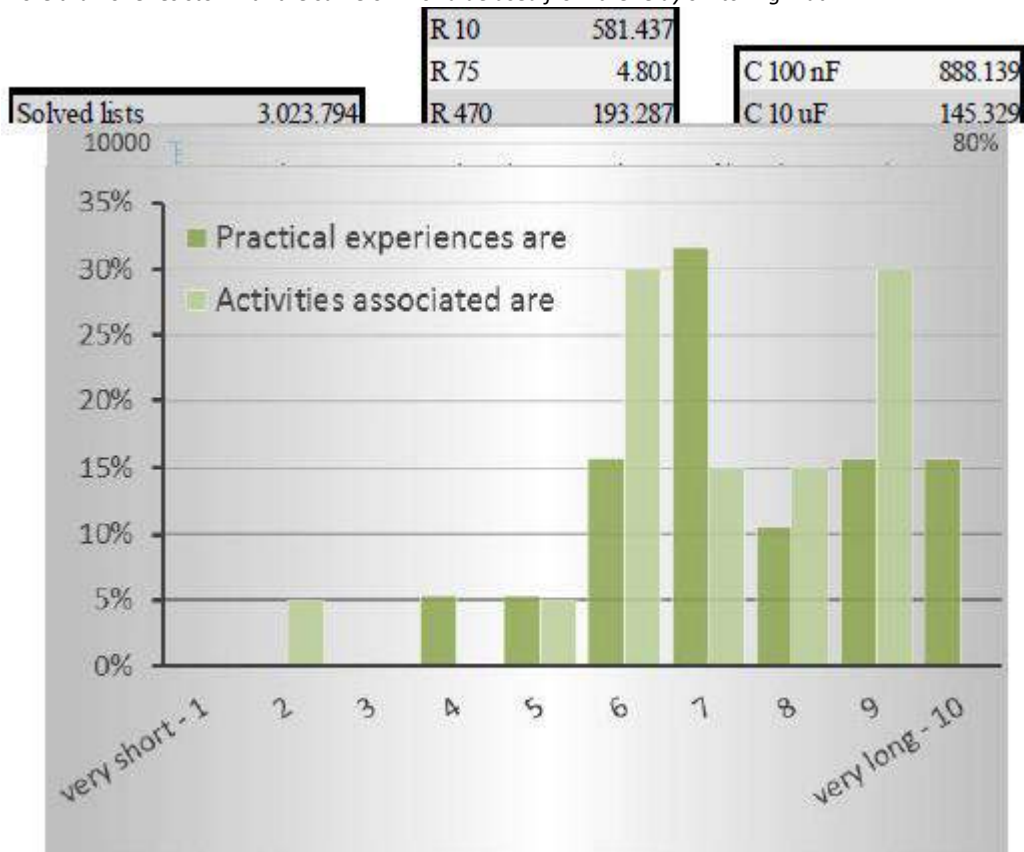


Figure 9. Answers from students who has completed BCEP MOOC.

4.3. UNED-COMA platform

UNED-COMA platform doesn't provide the tools and mechanisms to flexibly the design of courses. However, students have been able to course the MOOC, to complete the different activities and tasks, to interact with the remote lab, to interact in the diverse forums, etc. for students, the platform has accomplished its function without fanfare. But for teaching staffs, the platform doesn't provide the flexibility and resources that other MOOC platforms as Open edX or Coursera have and that LMSs (Learning Management Systems) have exploited for years. In addition, the data provided to teaching staffs don't allow a learning analytics in order to find potentials dropout causes.

4.4. Remote laboratory VISIR

The reliability of the remote lab has been tested through the massive and continuous access from MOOC. Table 1 shows the number of measurements in every single component. With the constraints imposed there were no need to change any component and the remote lab was active and functional 24/7.

The operation cycle depends on the number of concurrent users, the circuit designed, the settings of the equipments, etc. For example, for a clipping circuit, by means of a Zener diode (practical experience 5) with 182.979 measurements, the mean time needed for a cycle has been 291 ms and the median 203 ms. The minimum time has been 62 ms. Using an operational amplifier as inverter (practical experience 6) with 182.979 measurements, the mean time needed has been 331 ms and the median 219,3 ms. The minimum

time has been 78 ms. Taking into account the 3 million of accesses of the whole course for all the practical experiences, the mean time was 118,7 ms and the median 68.

About the time needed by the measurement server in deciding whether or not a circuit designed is allowed, it only takes 6.0496 ms to determine that the design is correct, 6,95884 ms when it is no allowed. This time required by the measurement server is included in the operation cycle.

5. Conclusions

Remote laboratory VISIR has been used (and currently still is) in a massive and tough environment. The results of use it in both engineering subjects as in the MOOC are satisfactory. In addition, the designed practices became stimulating, providing users the clear feeling of working with a real laboratory.

UNED-COMA platform is not intended/designed for the integration of a remote laboratory in MOOCs. Therefore, and due to the technical problems resulting from the adaptation, is not possible to cross the data available in the UNED-COMA platform and the one registered in VISIR. Consequently, it is not possible to carry out a reliable learning analytics. Furthermore, UNED-COMA platform does not provide any type of tool for teachers to track the progress of students in the MOOC, only provides general information (number of enrolled, number of badges obtained, etc.). In order to obtain more specific information, i.e. for an individual monitoring or to obtain the grades of the students, the databases of the MOOC platform have been analyzed. Unfortunately, UNED-COMA no longer provides access to the databases. In this regard, a MOOC platform with the necessary tools for a deeper analysis of the students' learning process and that integrates both environments (MOOC and remote laboratory) seems necessary in order to evaluate the convenience of the supplementary documentation (videos, documents, activities, etc.) and their relationship with learning and dropout.

Given the students' profile enrolled in the course (previously to the course only 33.84% had some type of training in electrical/electronics area), this kind of courses, with a design according to the goals, can be used by educational institutions as a claim for potential enrollments in the field of engineering. In this respect, the interest in electrical/electronics field from potential students under 20 years old (group with minority of enrollments in BCEP MOOC and with the greatest potential interest from universities) should be achieved by means of the design of MOOCs based on experimentation but containing at least a basic theoretical framework with which novice students could be able to understand the behavior of the components and circuits used in the remote experimentation, so they are introduced to a unconnected knowledge area for them until then. Getting access to school-age students through educational institutions and covering their teachers' concerns by means of designing/adapting MOOCs for this group of students could benefit students, teachers, educational institutions and universities providing a more complete education and bringing university to potential students.

Therefore, the integration of remote laboratories in online learning environments, together with good practices in designing practical experiences, can alleviate the disadvantages of remote laboratories compared to in-person laboratories, without leaving behind their inherent advantages.

Acknowledgment

Special thanks to the Electrical and Computer Engineering Department of UNED for their support and to the Industrial Engineering Technical School of UNED inside the projects 2016-IEEE15 and 2016-IEEE13, and for the co-funded of the European Erasmus Plus Project "VISIR+ 561735-EPP- 1-2015-1-PT-EPPKA2-CBHE-JP" as well as to the eMadrid excellence network, "Investigación y desarrollo de tecnologías educativas en la Comunidad de Madrid – S2013/ICE-2715".

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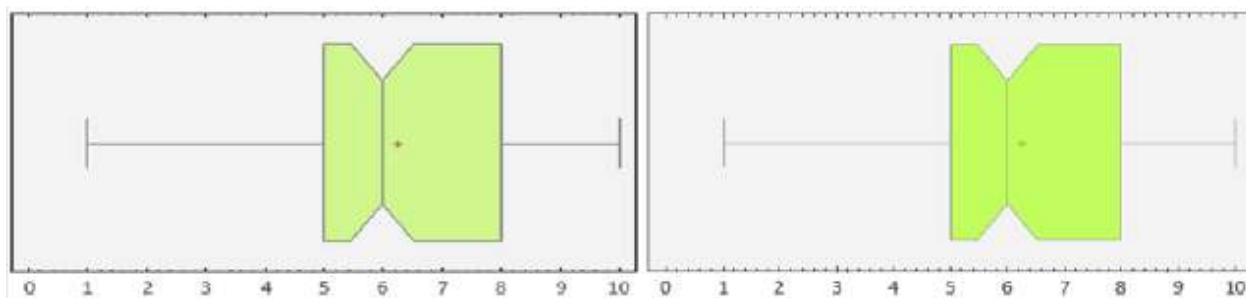


Figure 10. Box plots for: (left) "The realization of the experiments have been:"; (right) "The activities associated to the experiments have been:". Answers from '1' (very shorts) to '10' (very long). Answers from students who has completed at least some activities in BCEP MOOC

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Students' experiences of different types of (distance) learning

Sami Suhonen

Tampere University of Applied Sciences, Finland
sami.suhonen@tamk.fi

Abstract

At Tampere University of Applied Sciences four different types of studying methods in different courses were used to deliver adult education in mechanical engineering. The students were able to choose between different methods even within the same course implementation. They live in an area, which furthest places are more than 100 km apart from each other and the farthest student residences were 90 km from the university's main campus. The four different methods used to deliver the education were:

1. Face to face teaching
2. Face to face teaching streamed to distance learners
3. Virtual classroom
4. Asynchronous online course

The students were asked to evaluate the above mentioned studying methods from their own perspectives: how suitable the methods were for them, how they learned best, were there any technical or other aspects that limited their participating in the teaching. The students were also asked to list the methods in their preferred order.

This study shows that broadcasting classroom teaching online is not the most suitable method for adult learners. It only transfers the face-to-face methods to a new environment, and it doesn't actually fully utilize the opportunities provided by the internet and online world. By far the most liked studying method was asynchronous online course. Therefore, it is recommended that in the future the availability of genuinely asynchronous, online courses should be enhanced.

Keywords: Asynchronous studying, online courses, student experience, adult education

1. Introduction

The need to be able to study independently of time and place is relevant especially in adult education in which many of the learners work simultaneously with studying. These learners in many cases have families to take care of, which reduces their ability to study in normal classes at normal times. Therefore, the course implementation methods and the structure of the whole syllabus should take those limitations into account.

The amount and availability of online learning has increased over the decades dramatically. Especially in adult education it provides time and place independent studying opportunities. However, instructor's attitude to online learning and its benefits can form a barrier to innovative online pedagogy [1]. Based on recent studies, online learning gains can be as good as face-to-face learning gains [2] or even better [3]. Blended learning benefit the social and activating aspects of face-to-face learning and simultaneously offer material and assignments in online environment, delivered for example using flipped classroom methodology [4]. Peer work is reported to dramatically improve learning outcomes and motivation [5]. However, it can be difficult to implement peer instruction successfully in a fully online environment, in which the learners are not able to meet each other in real life and which largely rely on video content [6,7]. Teaching methods that encourage active engagement are reported to strongly improve learning outcomes [8]. Encouragingly, there are also examples of successful virtual team work and even PBL-implementations online [9].

2. Student group

The group in this study consisted of 31 Bachelor's level mechanical engineering first year adult students at Tampere University of Applied Sciences, of which 26 (88 %) were male and 5 (12 %) female. They lived in an area, which furthest places are more than 100 km apart from each other and the farthest student residences were 90 km from the university's main campus. The amount of years passed after their previous studies is presented in Figure 1 A. Majority of the students had studied during the past ten years, but the oldest one had studied 29 years ago. Most of the students (56 %) had some sort of prior experience in online learning (Figure 1 B).

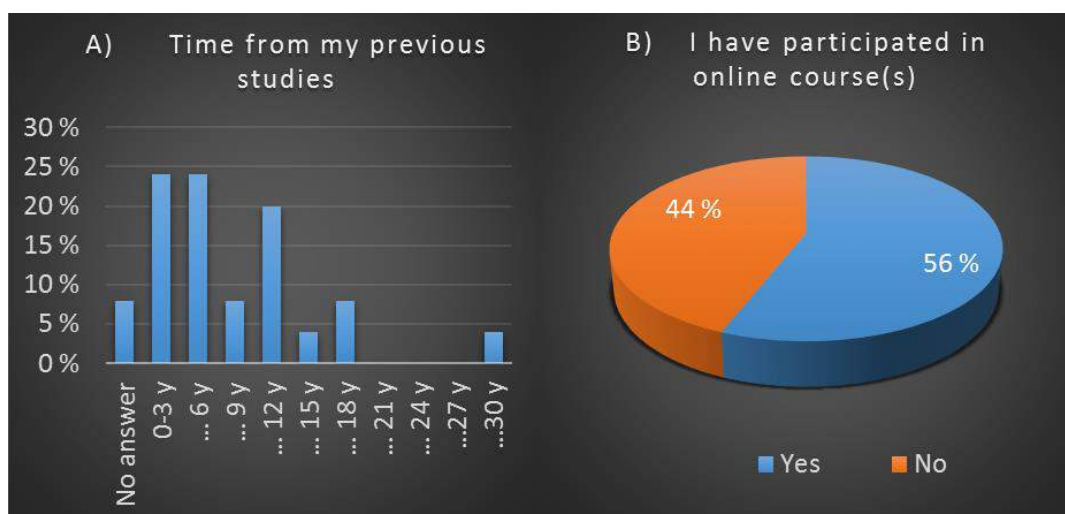


Figure 1: The time from students' previous studies (A) and their prior participation in online learning (B).

3. Teaching methods

At Tampere University of Applied Sciences (TAMK) four different types of studying methods in different courses were used to deliver adult education. In a few cases, the students were even able to choose between different methods within the same course implementation. Most of the students in this study lived in the province outside Tampere (Figure 2). If all the teaching would have been arranged only at TAMK's main campus, the students would have needed to drive altogether 40 000 km as a sum and spend 600 h in cars. Therefore, other options to arrange education were considered and four of them were chosen: 1) It is better that the teacher travels instead of the students and arranges classes closer to their homes. 2) Those who live far away or are otherwise unable to attend classes were offered the possibility to follow lectures online. 3&4) Part of the education was chosen to be fully online either as a virtual classroom or as an asynchronous online course.

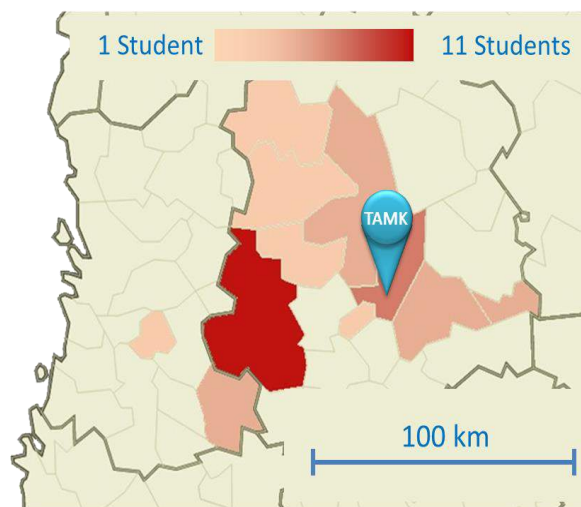


Figure 20: Students' residences and TAMK's main campus.

The above-mentioned options led to four different teaching and studying method as listed below. They all are described in greater detail later.

1. Face to face teaching (Fig 3 A)
2. Face to face teaching streamed live to distance learners (Fig 3 B)
3. Virtual classroom (Fig 3 C)
4. Asynchronous online course (Fig 3 D)

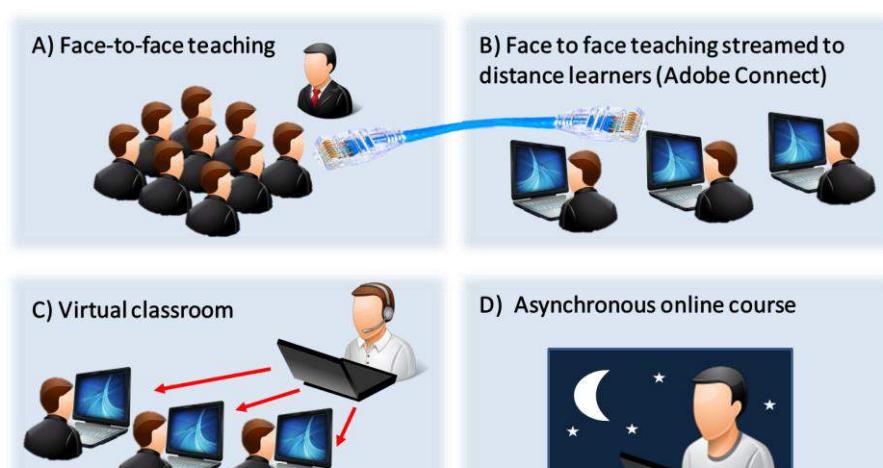


Figure 3: Different teaching and studying methods used.

3.1 Face to face teaching

Face to face classroom teaching: part of the courses was taught face to face in classrooms. Usually lectures are given at main campus in lectures halls. However, in this case the teaching took place in various locations according to the students' residences instead of one single place. Altogether five different locations outside main campus around the province were used. This aimed to offer the students better accessibility to f2f teaching. Otherwise this type of teaching was organized quite traditionally consisting of lectures, exercises, instructions etc.

3.2 Face to face teaching streamed live to distance learners

The face to face teaching was simultaneously streamed to internet using Adobe Connect (AC) software. Distant learners had the opportunity to stay at home or their workplace and follow the lectures live online. The lectures were also recorded for later viewing. In the classroom, the teacher had a portable microphone attached for voice transmission and a stationary video camera which was aimed towards the whiteboard. In principle, distant learners saw and heard the same lecture as classroom students. These lectures were also recorded. Distant learners had an opportunity to "raise virtual hand" in AC. However, teacher's attention was divided between the students present in the classroom and online students, the emphasis being on the classroom. This led to delays in answering the online students' questions and some questions remained even unnoticed.

3.3 Virtual classroom

Teaching in "virtual classroom" the teacher was in his/her office or in real classroom without any students and concentrated on using the AC software to present PowerPoint slides or whiteboard and to interact with the students. There lectures were also recorded for further viewing. In this method, the teacher doesn't need to divide his/her attention and time between two different student groups - they all are online. On the other hand, the communication between the teacher and the students and especially between students is rather limited and cumbersome compared to normal face to face teaching.

3.4 Asynchronous online course

Asynchronously offered course was elementary engineering physics "Mechanics". The online teaching was based on Moodle platform with which all course materials, learning activities, assignments and exams were delivered. One key element in the course material was short educational video clips recorded at TAMK by the physics teachers. At the moment, TAMK's ten physics teachers have altogether produced approximately 1000 educational video clips, of which 130 were used in this course. The actual channel for educational videos was YouTube, but links to the videos were in Moodle and they were kept as "unlisted" in YouTube. It is known that students tend to intensify studying prior exams and deadlines [10, 11]. Therefore, in this online course all major entities and activities were strictly scheduled at week level. Within the week students were free to choose their study times.

The general course structure and schedule are shown in Figure 4 and is explained in more detail in our previous publications [7, 11]. Each content package had one assessed assignment. This meant that students had every week either week exam or measurement assignment which both had deadlines. Within each week students were free to share their workload and proceed at their own pace. They were even free to choose the time to take the exam. When a student opened the exam in Moodle, he/she needed to finish the exam in a certain given time (in week exams it was 90 min and in final exam 180 min). Weekly assignments had 50 % weight in the course assessment and the other 50 % came from final examination.

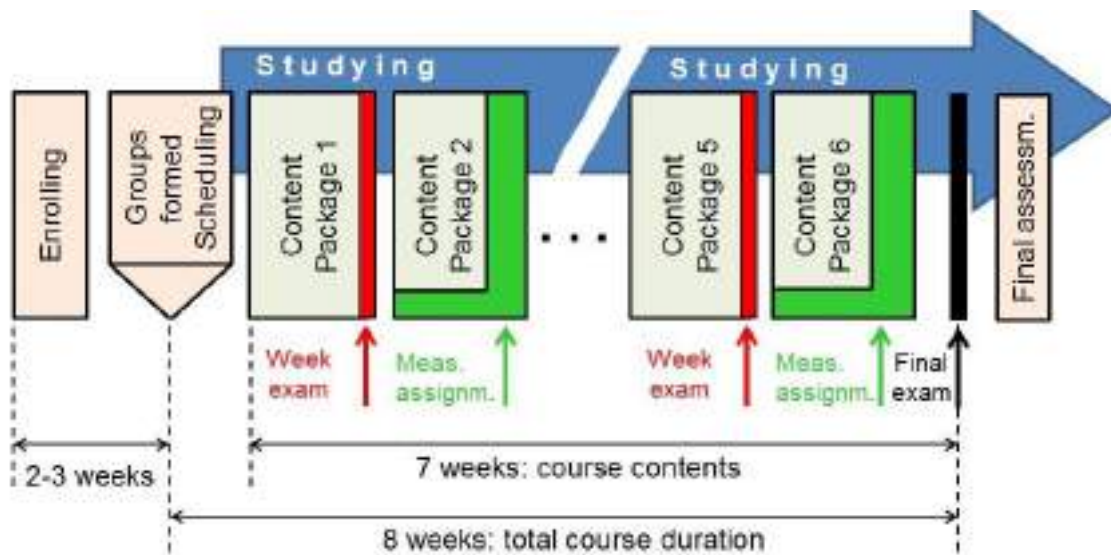


Figure 4: Schedule for course entities and the course structure.

Earlier feedback and student experience about measurement assignments in physics [12] have been rather positive and therefore this activity was included even in this asynchronous online implementation. However, the delivery of measurement equipment to distant learners is, if not impossible, at least very difficult. Therefore, most of the measurement assignments were offered as recorded video clips. Alternatively, in a few cases, students were able to carry out the measurements themselves using smart phone's video recording and its analysis or suitable physics apps [7].

4. Research

Experiences about different studying methods were investigated with online survey questions sent to all students participating this adult education. In the form they were asked to evaluate studying methods from their own perspectives. How suitable the methods were for them? How they learned best? Were there any technical or other aspects that limited their participating in the teaching? The students were also asked to list the methods in their preferred order. With open ended questions their reasons and points of view were collected. The focus was in the evaluation of the different methods, not in the content or teachers teaching styles. However, courses are entities and all aspects affect student experience about the course. In their answers, the students mostly limited their comments to technical aspects and referred to course contents or teachers only a few times.

In addition to online survey, learning analytics was used to find out how, what, and when the students studied in the asynchronous online course. Moodle's log file was exported to Excel with which all data mining was done. There were approximately 18 000 log events resulting in 600 log events per student on average. These log events were sorted and investigated. The logs were of course viewed in general level also during the course to find those students who were in the danger of dropping out.

5. Results

5.1 Evaluation of different learning methods

Students need to have own experience of different teaching methods before they can reliably comment on them. According to their answers (Figure 5) they had participated all other methods, but the streamed version of classroom teaching had only a few followers.

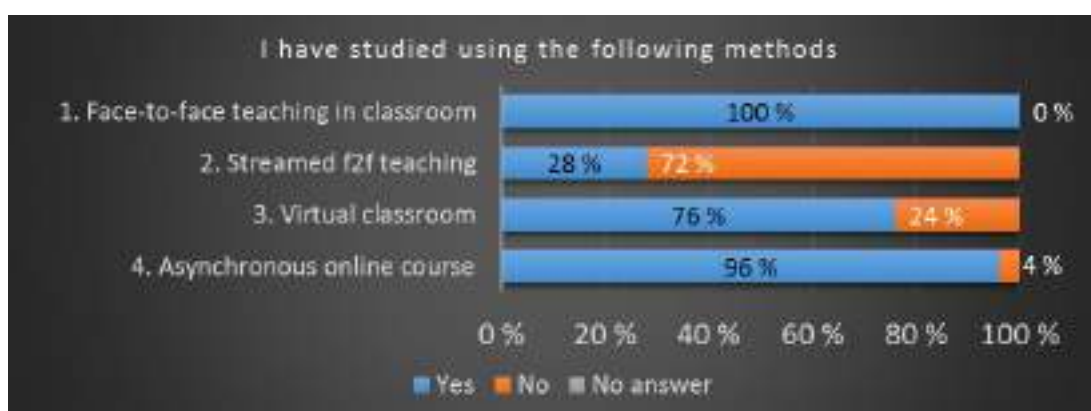


Figure 5: Student participation in different teaching methods.

The students were asked to comment on how suitable different teaching and learning methods were for them. Their answers are presented in Figure 6. Most of the students considered asynchronous online course to be the most suitable way to study. These students had families to take care of, they had their daily work to do and they lived outside Tampere region. The freedom to choose studying times, the possibility to study at home or at workplace and the ability to proceed at own speed were mentioned as the most beneficial aspects in this type of course implementation. The weekly schedule and deadlines made them to study more evenly. Also the educational short video clips were considered to be a very good way to study. With videos, it is possible to pause, rewind and watch the teaching many times – which is impossible in classroom teaching.

The students considered the streamed lectures to be the worst option for them. It is noteworthy, that there are more negative answers than there are students who have experience in this type of learning. Negative comments to open ended questions revealed that there had been some problems with the internet connection and therefore the sound and image had lags and interruptions. This is of course very annoying to those who seriously are trying to learn. Anyhow, most of the students don't consider this as a primary option, but rather as a "plan-B" if there is no possibility to attend the live classroom teaching.

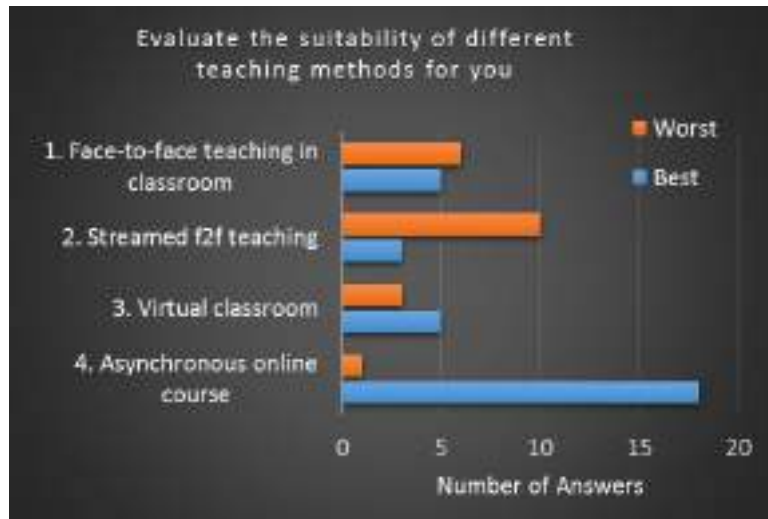


Figure 6: The suitability of different teaching methods.

5.2 Learning analytics view to asynchronous learning

The temporal distribution of all log events is presented in Figure 7. There are very distinct peaks at certain dates, or more specifically, before certain dates. The peaks appear mostly one days before a week exam deadline or measurement assignment deadline. The peak at the end of March is just before the final examination. The deadlines seem to strongly affect the pace to studying. Similar behaviour is recorded also in earlier studies [10, 11] and this is one of the main reasons why the asynchronous online course “Mechanics” had deadlines every week. Otherwise there could have been only one huge spike in the graph just before final exam.

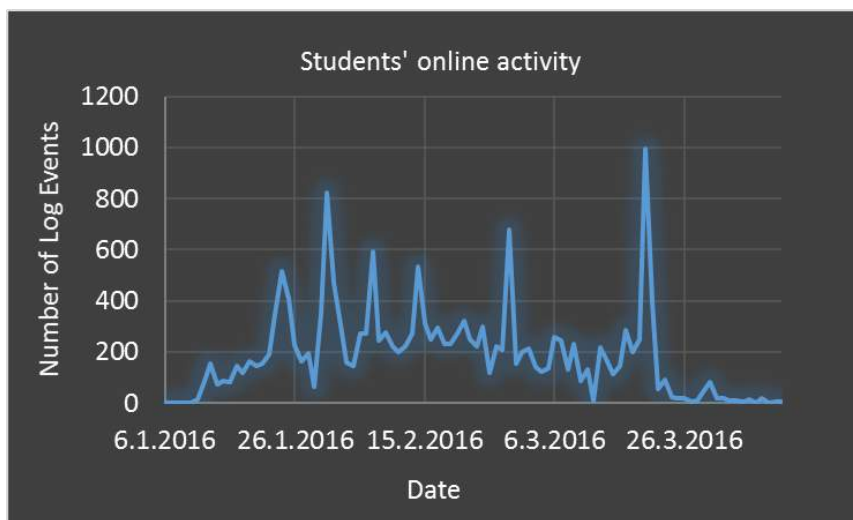


Figure 7: The temporal distribution of all log events on the asynchronous online course “Mechanics”.

According to Figure 8, the online activity is highest in the evenings after normal working hours. This is somewhat earlier than what is reported about MOOC's [13] where the peak for watching educational videos was between midnight and 2 a.m. Nevertheless, the late hours put pressure on the teachers. If a teacher genuinely wants to help students he or she should be available for questions and guidance during the active studying phase. To tackle this time difference between teacher's work hours and students' studying hours, WhatsApp discussion groups were used, in which the students could present questions and also answer to each other. The teacher in "Mechanics" also promised to be online from 8 p.m. to 9 p.m. once a week. In physics, the questions and answer frequently include calculations and WhatsApp has turned out to be a rather straightforward tool for that: both the students and the teacher can easily take a photo of calculation papers. No cumbersome upload-download cycles on LMS-platform are needed.

Due to peer work's influence in motivation and learning outcomes [5] students were encouraged to work in groups in their assignments. The key idea is to encourage the students to discuss the topic with peers, rationalize their reasoning and come to a joint conclusion of the questions and problems stated. The students can freely choose which platform ever to use for their mutual communication – Facebook, Moodle, Skype, WhatsApp etc. According to the survey results peer work outside classroom turned out to be somewhat difficult for the adult learners. The number of students studying alone was 11 (44 %) out of 25. Main reasons were: "I didn't have time" (42 %), "I wasn't active in group formation" (33 %), "I prefer to work alone" (25 %) and "I didn't know other students" (17 %).

Finally, the students were asked if they would recommend a more wide-spread use of the asynchronous

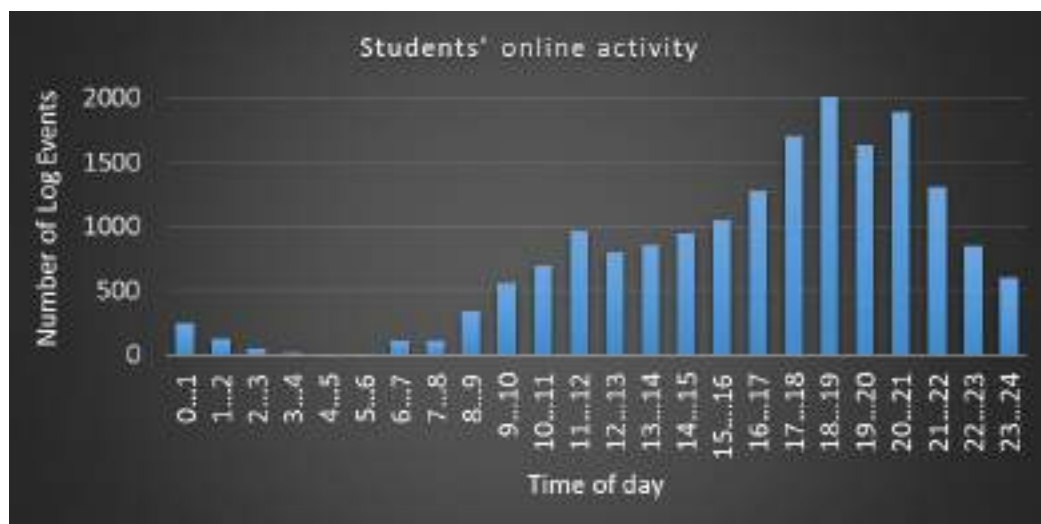


Figure 8: The total online activity as a function of time of day.

online method for the teachers. There were 23 answer to this question, of which 22 (96 %) recommended this asynchronous online courses (Figure 9). Also majority of the students (88%) would choose online learning instead of classroom teaching if both options were available.

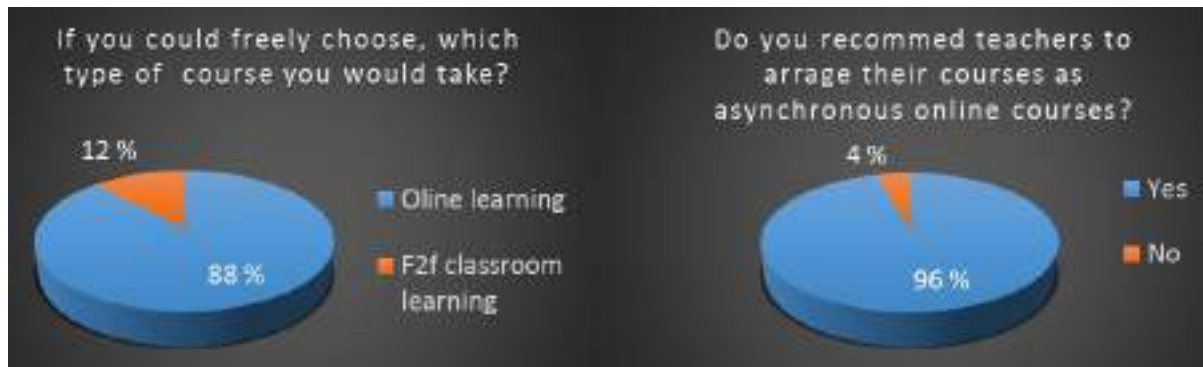


Figure 9: Answers to choose between classroom teaching and online learning (left) and recommendations to increase the amount of asynchronous studying (right).

6. Conclusion

The simplest way of online education is to stream classroom teaching online. However, this study shows that it is not the most suitable method for adult learners. It only transfers the face-to-face methods to a new environment, and it doesn't actually fully utilize the opportunities provided by the internet and online world. Instead, it rather suffers from the drawbacks like connection lags and interruptions. Therefore, it is recommended that in the future the availability of genuinely asynchronous, online courses should be enhanced – remembering that even in asynchronous learning the teacher's accessibility and presence are very important, together with frequent personal feedback to students.

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Science Writing Resources for Learning (ScWRL): A Suite of Open Teaching and Learning Science Writing Resources

Meghan Aubé

The University of British Columbia, Canada
meghan.aube@ubc.ca

Thomas Deane

The University of British Columbia, Canada
deaneth@tcd.iel

Eric Jandciu

The University of British Columbia, Canada
jandciu@science.ubc.ca

Jaclyn Stewart

The University of British Columbia, Canada
jstewart@chem.ubc.ca

Abstract

Traditional science, technology, engineering and mathematics (STEM) education often provides little or no opportunity for students to improve their scientific writing and argumentation skills. In fact, through surveys, focus groups, and interviews, undergraduate students told us they are expected to write papers and present orally in their science classes, but are rarely taught how. We also have data suggesting that faculty recognize the importance of writing in undergraduate classes, but feel implementation is challenging. Furthermore, while there are many excellent general online writing resources, we found no comprehensive examples tailored to science writing. In response, a multi-year collaboration between the Faculty of Science and Centre for Writing and Scholarly Communication at the University of British Columbia (UBC) led to the development of Science Writing Resources for Learning (<http://scwrl.ubc.ca/>), a suite of open science-specific writing resources. For students, there are informative worksheets, videos, examples, and practice quizzes. For instructors there are tips for incorporating writing into the classroom, including sample lesson plans and activities for blended classrooms. While originally developed for use in our courses, the resources are freely available under a Creative Commons license. All resources can be downloaded in an editable format so they can be tailored to specific needs. We are currently promoting the resources through Twitter, Facebook, and other channels. This interactive presentation will provide participants with an overview of the process we used to develop the open educational resources: assessing the needs, planning, developing, online hosting, licensing, testing, revising, using in class, and promoting.

Keywords: Open educational resources, Blended learning, Science writing, Communication skills

1. Introduction

1.1 Motivation: the importance and relevance of communication skills in science education

Communication skills are an important part of being a scientist. Science couldn't progress if it wasn't communicated. Scientists write research articles to share ideas and results. They also present their research at conferences. They author research proposals, review papers, and books. In addition, scientists have a crucial role in communicating their work to broader, non-expert audiences. A scientifically literate society is one that is able to meaningfully participate in decisions that are fundamental to the well-being of future generations.

Therefore, science, technology, engineering and mathematics (STEM) students need to learn how to communicate with both scientific and general audiences. This learning goal is a priority for future employers, who encourage communication skills training during undergraduate degrees. In a recent survey of 318 employers, 80% said that written and oral communication need more emphasis in the undergraduate curriculum (Hart Research Associates, 2013).

But communication skills are not only important because the scientific process and employers demand them. Integrating scientific writing into undergraduate studies improves writing skills, but it also improves scientific literacy, reasoning, conceptual understanding, and scientific argumentation (Libarkin & Ording, 2012; Stout, 2011; Takao & Kelly, 2003), all of which are characteristics of being a successful scientist or science student (Libarkin & Ording, 2012; Pearson, Moje, & Greenleaf, 2010; Pritchard & Thomas, 2010). In other words, research has shown that writing practice helps students learn the writing genre of the discipline, but also strengthens their understanding of the subject matter (Pelger & Nilsson, 2015; Kuh, 2008; Ellis, 2004; Berland & Reiser, 2009; Driver, Newton, & Osborne, 2000; Osborne, 2010).

However, communication skills instruction is often missing from the undergraduate science curriculum (Smith, 2016). Despite the importance of strong scientific communication skills (Stout, 2011), opportunities for students to develop and improve their scientific writing and argumentation skills in science curricula are rare (Motavalli, Patton, & Miles, 2007; Stout, 2011). When present, these skills are usually learned outside of STEM courses. For instance, a typical arts communication course in the science curriculum might focus more on writing about literature, and it may be difficult for students to transfer these skills to argumentative writing in science. If communication activities are present within a scientific discipline, the scope is often very narrow, such as in lab reports, and with little opportunity to incorporate feedback (McClure, 2009; Miele, 2010). Writing may also not be the focus of assessment of these reports. Instead the instructors or teaching assistants may only grade the discipline-specific content, not how it is communicated.

Scientists are being asked to do a better job of communicating both the meaning and the nature of their work (Leshner, 2012). This challenge is making its way to the science classroom, where there is general agreement that broad communication skills (locating, evaluating, synthesizing, organizing, and disseminating information) are critical (Ananiadou & Claro, 2009).

1.2 Science communication courses at UBC

Communication skills are included in the learning outcomes of the science curriculum at the University of British Columbia (UBC),¹²⁶ but science students said in a survey that they felt they lacked opportunities to develop their communication skills. Students indicated that although both written and oral communication skills are expected during their degree, their science courses rarely included instruction on these topics. For example, 40-50% of students felt their first- and second-year courses had little emphasis on writing (Birol & Yurk, 2009). Students feel they are expected to develop these skills on their own.

As one way to start addressing these perceived deficiencies, the Faculty of Science introduced both the First-Year Seminar in Science (SCIE 113) and Communicating Science (SCIE 300) in 2010. A detailed description of the process used to develop these courses has been published elsewhere (Jandciu et al., 2015). Students in SCIE 113 explore scientific argumentation, science as a way of knowing, and science in society. The course emphasizes effective science communication through evidence-based argumentation skills. In SCIE 113, students develop their writing skills via in-class worksheets, peer review, and iterative argumentative essay writing. Students in SCIE 300 learn to communicate scientific information to both expert and non-expert audiences through writing a scientific paper, blogging, oral presentations, creating videos, and creating podcasts. In SCIE 300, students develop their writing skills via hands-on writing classes, online homework, and course assignments. In 2015, the Department of Chemistry began its own version of the Communicating Science course called Communicating Chemistry (CHEM 300). These courses offer small-class experiences with class sizes capped at 25–30 students.

1.3 Lack of suitable existing science writing resources

During the design of these courses, we discovered a lack of instructional resources to help students learn communication skills in the context of science. We investigated whether science-specific writing resources existed on campus. Consulting with the UBC Centre for Writing and Scholarly Communication (CWSC),¹²⁷ the English Language Institute (ELI),¹²⁸ and Centre for Teaching, Learning and Technology,¹²⁹ we found that existing content and programs did not meet our needs. While the ELI is an excellent resource for English-language learners, the training is not discipline-specific. The CWSC's non-credit, continuing education *Scientific Writing* course is geared towards faculty and graduate students writing articles for academic journals. We also explored writing resources outside of UBC including Purdue University's Online Writing Lab.¹³⁰ These resources are high quality, but the activities and examples are not specific to science.

¹²⁶ The University of British Columbia (UBC) is a public institution with about 51,000 undergraduate and 10,000 graduate students. It is a research-intensive university with \$600 million in research funding annually. The Faculty of Science at UBC has approximately 7,400 undergraduate science majors. The nine departments in the Faculty of Science are Botany; Chemistry; Computer Science; Earth, Ocean and Atmospheric Sciences; Mathematics; Microbiology and Immunology; Physics and Astronomy; Statistics; and Zoology.

¹²⁷ <http://learningcommons.ubc.ca/tutoring-studying/writing/> (previously known as the UBC Writing Centre)

¹²⁸ <https://eli.ubc.ca/>

¹²⁹ <http://ctl.ubc.ca/>

¹³⁰ <http://owl.english.purdue.edu/>

To our knowledge, there were no existing resources we could directly adopt for our student population. Therefore, in early offerings of SCIE 300, we used a generic online writing skills homework system from a major publisher. We knew that this was not a long-term solution, however. We wanted to avoid reinforcing potentially counter-productive stereotypes that scientists are poor communicators or that scientists don't need to be able to write well. The use of writing resources from non-science disciplines reinforces both of these stereotypes. Learning writing skills in the context of science has the potential to be motivating and engaging for our students.

2. Science writing resources for class use

Given the lack of suitable existing resources, we developed science-specific writing resources to support the learning objectives for the courses in a multi-year collaboration between the Faculty of Science and the CWSC. Science Writing Resources for Learning (ScWRL)¹³¹ is a suite of open science-specific writing resources. For students, there are informative worksheets, videos, examples, and practice quizzes. For instructors there are tips for incorporating writing into the classroom, including sample lesson plans and activities for blended classrooms. While originally developed for use in our courses, the resources are now freely available under a Creative Commons license from our website and have expanded to topics that span far beyond the course learning objectives. All resources can be freely downloaded in an editable format, making them flexible and adaptable; they can be tailored to the specific needs of an instructor. We also provide resources to help instructors incorporate writing into their classes and have introduced podcasts and a guest blog to the site.

2.1 Open science writing resources

UNESCO defines open educational resources (OERs) as "The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes" (UNESCO, 2002, p. 24). Generally, it has been shown that students achieve the same learning outcomes when using open educational resources compared to a textbook, while saving money (Hilton, 2016). Reduces the amount of labour involved for faculty to create their own open educational resources (Herron, 2016). Some institutions have even begun strategically identifying courses that are best suited to open educational resources (Davis, Cochran, Fagerheim & Thoms, 2016).

As mentioned, early offerings of SCIE 300 used an online writing homework system produced by a major publisher. Although we believe the publisher's online homework system may be useful in some contexts, the development of custom, open resources allowed us to eliminate the cost to our students and to ensure that our students get communication education that is tailored to their discipline-specific needs. Also, we wanted our science writing resources to be freely and openly available to anyone.

Apart from the YouTube videos, the science writing resources we had developed were housed within our learning management system (LMS). But after obtaining student feedback and refining the resources based on that feedback, we felt it was time to make the resources available to a broader audience. Since then, the

¹³¹ <http://scwrl.ubc.ca/>

resources have moved from the closed LMS to a freely accessible website. The resources have also expanded to include topics beyond those originally envisioned for the communication courses and now include extensive science writing resources for educators as well as learners.

The ScWRL activities allow for flexible, multi-mode delivery (low-technology and high-technology options). Separate learning activities were developed for first- and third-year classes, but we feel they can be adapted for use at any undergraduate (and even some graduate) level. The learning activities are mostly highly interactive in-class worksheets and homework activities. They include specific tasks such as revising and editing, multiple-choice questions, open-ended writing prompts, peer-review activities, and term writing projects.

All resources are available under a Creative Commons license and can be downloaded in an editable format (a Microsoft Word file), meaning that instructors can choose the resources that work for them and use them in an order that is logical for their context. This also gives instructors the ability to augment the resources with their own examples or with readings or other content that are relevant to their discipline. We hope providing a suite of resources as a starting point frees up instructor time for interacting with students and providing high-quality feedback. Sample lesson plans incorporating the resources are provided and scoring keys and rubrics are available for each activity.

2.2 Flipped classroom model

We also knew that we wanted our resources to support active learning instructional approaches, such as those made possible by using a flipped classroom. More and more examples of using a flipped classroom approach in STEM education are appearing in the literature (Bergmann and Sams, 2012). In this approach, delivery of course content typically happens outside of the scheduled class time. For example, students may be asked to read a chapter or watch a video before coming to class. This frees up the class time for in-class activities, such as working on problems either individually or in small groups. Often there are also post-class activities that reinforce the concepts just practiced, challenge students to apply the concepts, and help students transition to a new course topic. There is evidence that students prefer this type of learning environment (McNally, 2016) and that it promotes a more inclusive learning environment (Lage, Platt & Treglia, 2000). Instructional approaches using active learning have been shown to positively impact student performance (Freeman et al., 2014).

We kept the flipped classroom model in mind while developing our science-specific writing resources. Pre-class activities include readings, quizzes, and worksheets students complete in advance of class. For some classes, the pre-class activities include watching short, animated videos featuring the character Grammar Squirrel (the UBC campus is home to many squirrels). These short videos explain and demonstrate discipline-specific writing concepts and skills using science-specific examples and humour. Each video focuses on a different aspect of science writing that is known to be difficult for students to master. For example, there are videos provide hints and explanations to students on: using comparisons in their writing, using the active and passive voice appropriately, writing with clarity, distinguishing between primary, secondary and tertiary sources, and using hyphens correctly. These videos act as the “hook” in SCIE 300, and students watch them before they come to class to discuss the topic in more depth. Class time is spent expanding on and applying the content covered in the pre-class activities in the form of writing

practice, peer review, analysis of example pieces, and discussions. All this happens with the instructor and teaching assistant present instead of asking students to do these activities as homework, during which it would be more difficult to get support. The in-class portion is followed-up with a related post-class activity or an assignment that makes use of the skills just practiced.

2.3 Resource topics

The initial topics for these class-specific resources were based on the course learning objectives, but also considered student input. For example, student surveys after the pilot offering of SCIE 300 asked about the communication topics that had been covered and topics that weren't covered, but students would like to see. We also kept track of common challenges our students had with their writing. The initial set of topics covered plus the topics we have since expanded to for both students and educators are summarized in Table 1 and 2, respectively.

Table 1: Science writing resources for students

Broad topic	Specific topics
Communicating science	• Communicating uncertainty • Different formats • How does science differ from other disciplines • Producing effective tables and figures* • Using comparisons and descriptions*
Finding, integrating, and citing sources	• Finding sources and literature searches • Identifying different types of sources • Integrating and citing sources*
Grammar and style	• Active versus passive voice* • Clarity and simple language* • Grammar • Mechanics and punctuation • Numbers and units
Developing an effective writing process	• Avoiding plagiarism • Creating and using writing outlines • Editing, succinctness and dealing with jargon* • Organizing* • Researching and drafting
Learning strategies for communicating science	• How to approach instructors • How to give and receive effective feedback • Making the most of tutorial sessions • Self-assessment

* Indicates the one of the initial resources developed

Table 2: Educator resources

Broad topic	Specific topics
Strategies for teaching writing	Choosing a writing assignment Choosing and using sample texts Communication learning objectives Effective versus ineffective writing prompts How to offer strategic feedback Using peer review
Lesson plans, activities, and assignments	Active vs. passive voice Communicating science Developing an effective writing process Grammar Identifying and citing sources Many other topics...
Grading techniques	How to identify students who need help Creating and using good rubrics
Podcasts	Peer review Grading and providing feedback Tutoring Designing effective writing assignments

2.4 Resource development process

Funding for the project comes from the UBC Teaching and Learning Enhancement Fund, an internal grant for innovative teaching and learning projects that is financed through a small portion of student tuition fees. Multiple years of funding has allowed us to hire a part-time science writing specialist and both graduate and undergraduate student assistants. The team also includes science faculty, an educational strategist from the Science Centre for Learning and Teaching,¹³² writing education professionals, writing tutors, and educational technology consultants.

The process we use to develop new resources is shown in Figure 1. The ScWRL team first brainstormed topics and ideas on ways to best support each topic. The science writer would then draft the resource and circulate it for feedback from the team. Once ready, we would show the resource to course instructors and implement any further feedback. At that point we relied on student team members to format and upload the resources to the website.

¹³² <https://sclt.science.ubc.ca/>

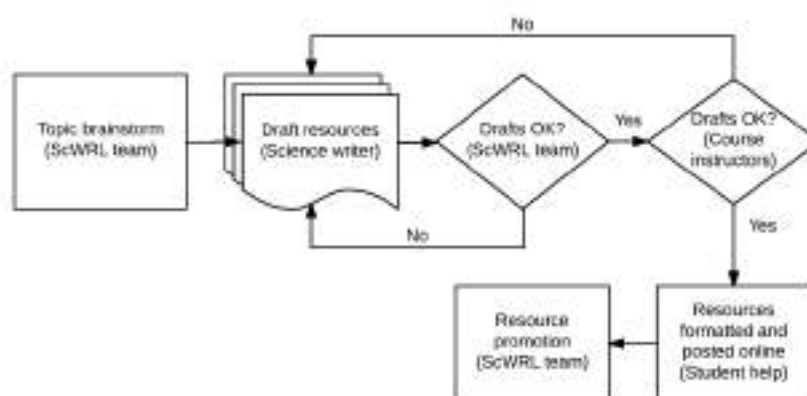


Figure 1: Our resource development process

2.5 Evaluation

We evaluated the outputs and outcomes of our project to ensure quality and to meet the requirements of our grant. It is easy to determine whether some of our goals were met, such as creating specific numbers of student and educator resources, videos, and guidance documents and hosting them online. It is much more challenging to assess the impact of ScWRL resources on curriculum and student learning.

We incorporated formative feedback from students and educators into earlier drafts of many of the resources. The feedback from students was collected formally through course surveys. The feedback from our colleagues was obtained informally, over email and in face-to-face discussions. Student feedback was generally positive, but some students told us they would prefer the pre-, in-, and post-class activities to be shorter overall, and to go over the pre-class assignment during class. In a survey that had a 24% response rate for the class, 85% of respondents said they agreed or strongly agreed that the hands-on writing classes were useful and 69% that they were a good use of class time. Unfortunately, 31% agreed or strongly agreed that the hands-on writing classes were boring. Our goal of using science examples may not have reached all students. As is common in the flipped classroom model, (He, Holton, Farkas & Warschauer, 2016) some students expressed discomfort with having to learn something on their own ahead of class, even if the marks associated with their performance on the pre-class assignments were very minimal. Some students indicated the tasks could be more challenging, but the teaching team hesitates to make them more difficult since we are trying to address issues we observe in student writing.

Once the resources were available online, we informally polled colleagues about their ability to navigate the website and incorporated their feedback. Starting in April 2015, we activated Google Analytics so we could track site usage. Since then, 8705 users have visited the site with a bounce rate of 71% (bounce rate is the percent of visitors who enter the site and leave without viewing additional pages). About 50% of sessions are from users in the US, 33% are unknown, 4% are from Great Britain, and 4% are from Canada. We have had 28,400 page views and 27% of all sessions are from returning users. We are happy with these results, although we hope to increase the popularity of the site through promotion on Facebook and twitter.

3. Expansion and maintenance

To keep the ScWRL project top of mind with science faculty and to keep the website active and fresh, we have initiated additional sub-projects, which are summarized in Table 3, together with other key project milestones.

Table 3: Timeline of project components

Project component	Date initiated
Science-specific writing resources for students and educators on course learning management system	September 2012
Science writing videos featuring the character Grammar Squirrel	May 2013
Science-specific writing resources for students and educators on scwrl.ubc.ca	December 2014
Writing across the curriculum	June 2015
Twitter and Facebook	August 2015
Podcasts	September 2015
Guest blog	January 2016

3.1 Writing across the curriculum

Polling about 50 science faculty revealed that some have barriers to incorporating writing assignments into their classes. They voiced concerns about the time it takes to mark assignments, ability to offer useful formative feedback, and ability to maximize limited teaching assistant resources. Faculty members have therefore indicated that they need additional support in getting started with or support in improving writing activities in their classes.

Therefore, to complement the science writing resources we developed, we initiated a Writing Across the Curriculum (WAC) program in the UBC Faculty of Science. It is estimated that roughly 50% of US higher learning institutions have a WAC program (Thaiss & Porter, 2010). WAC programs support the teaching and learning of writing outside of composition classrooms, with an emphasis on writing to learn and teaching students to write within specific disciplines. Our WAC program supports faculty who are already integrating writing into their courses, as well as encourage faculty who are not currently including writing to use it as a learning tool. This project addresses specific requests, such as sample feedback, a forum for sharing advice and best practices, instructions for teaching writing, and information how various types of writing assignments can be used in science courses. The core components of the program will be workshop development and facilitation, resource development, TA training, and one-on-one consultations where needed. The workshops offered so far are:

- Giving effective feedback (offered four times)
- Strategies for student success (offered twice)
- Assignment and assessment design (offered twice)
- Teaching succinct and jargon-free writing (offered four times)

Resources from the workshops are stored on the ScWRL website and can be freely accessed. We also intend to create flexible resources, such as recorded webinars and workshops that can be easily accessed as-is or customized to an audience's specific needs.

In our first year of the WAC program, roughly 140 faculty and teaching assistants attended workshops (nearly 100 of these unique). We also held a six "lunch and learn" community of practice sessions. These typically attracted at most six participants.

Our second and current year of the program, which we have rebranded Writing Across the Curriculum+ (WAC+), goes beyond supporting instructors and teaching assistants using writing assignments in their science courses by also supporting non-traditional communication assignments, such as blogging, producing podcasts and videos, and writing press releases. It will also expand to include support for implementing oral presentations or oral exams in classes.

3.2 ScWRL podcasts

To further augment resources available to faculty and teaching assistants, we have produced podcasts¹³³ on topics relevant to implementing science writing in the classroom. Each podcast features general discussion and tailored tips that can be applied in different teaching scenarios. To bring a variety of viewpoints and expertise to podcasts, we have interviewed instructors, tutors and science writing specialists. All of our podcasts are hosted on the ScWRL SoundCloud channel, but also embedded on the ScWRL website. Additionally, we have designed complementary resources, such as PowerPoint presentations, student handouts, and tip sheets to accompany each podcast.

3.3 ScWRL social media: guest blog, YouTube, Facebook, and Twitter

We recently added a guest blog¹³⁴ feature to our site where we have regular contributions from people engaged in teaching science communication or doing science communication in some way. For example, we have had posts on writing about science for young children, using a press release assignment in a large-enrollment biology class, giving effective conference presentations, creating an undergraduate microbiology research journal, and many more.

As mentioned earlier, the Grammar Squirrel science writing videos are housed on our YouTube channel,¹³⁵ but also embedded on the ScWRL website. The YouTube channel has 840 subscribers. Active and passive voice is our most popular video with over 150,000 views. In addition, we promote our blog posts, videos, podcasts, and other resources and events, using both Facebook,¹³⁶ where we have about 100 "Likes," and Twitter,¹³⁷ where we currently have about 160 followers.

¹³³ <http://scwrl.ubc.ca/educator-resources/podcasts/>

¹³⁴ <http://scwrl.ubc.ca/guest-blog/>

¹³⁵ https://www.youtube.com/channel/UCvynvmsn_NTIS9lc8cH-OFw

¹³⁶ <https://www.facebook.com/scwrl.ubc.ca>

¹³⁷ https://twitter.com/scwrl_ubc

3.4 Challenges

Having adequate resources to develop open educational resources is one challenge. Our funding allowed us to hire a part-time science writer and student assistance during the development phase of the project. However, sustainability of the project also requires resources. There will inevitably be changes required to the website, new content to be uploaded, and inquiries to be answered. These are not things that can simply be added to a faculty member's workload. Currently, it appears that maintenance and promotion of the ScWRL website will be handled by the Centre for Writing and Scholarly Communication.

Another challenge has been restrictions to technology we can use. UBC supports only certain learning technologies free of charge. With a very limited budget, we were limited to using those resources. In terms of web design, we relied mostly on the skills and abilities of our team. We did not, for example, have a budget to hire a professional web designer.

Finally, we have not been able to include evaluation as a large component of our budget, although we would like to do more of it.

3.5 Tips

Every open educational resource project will have its own set of challenges and restrictions, but these are general tips that we think are universally applicable.

- Make as easy as possible for future instructors to use the resources in their own course context.
- Similarly, ensure it is clear to students how they should engage with the resources.
- Look for existing open educational resources that can be used or adapted – there is no need to reinvent the wheel.
- Start simple to test the concept. If possible, verify the accuracy and fit of the content. For example, we were able to first use the resources in a small classroom setting before making them publicly available.
- Work collaboratively and ask experienced colleagues for help.
- Be prepared to work iteratively.

4. Future work

The WAC+ program's second year focuses on non-traditional forms of science communication as well as oral communication. Therefore, resources related to these topics will be added to the ScWRL website.

To date, our resources have mostly targeted the undergraduate teaching experience. A funding proposal is already underway to expand our website to include resources more relevant to graduate students.

We also hope to keep the guest blog active and produce more podcasts.

Finally, a critical ongoing part of this project is to aggressively promote our resources and events so that they are used more extensively by students and educators not only at UBC, but around the world. We are also very open to feedback, suggestions for improvement, contributions, and collaborations.

5. Acknowledgements

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Daring to do differently – Innovative experiences in teaching & learning methods

Gilda Van-zeller

ESTeSL - IPL, Portugal

gribeirocunhaestel@gmail.com

Abstract

Can we learn how to think and perceive reality differently? Can we become co-active in work and life? Can we just be who we already are?

We can find today, in different schools and countries, the expression of the philosophers and educators perspectives like Rudolph Steiner, Alfred Whitehead, Jiddu Krishnamurti, Sri Aurobindo, John Dewey, Maria Montessori, Jack Mezirow or Jean Jacques Rousseau. With all their contributions we can consider two main kinds of educational systems; alternative and conventional. The last one mainly focus on knowledge acquisition, cognitive skills development and individual achievement had the influence of John Locke.

Integral approach synthesized on the AQAL model (All Quadrants, All Lines) with its five elements (quadrants, levels, lines, states and types) “facilitates the ability to engage in any topic of study, dialog, experience, more intelligently” (Chris Lindquist).

In Portugal we can see at least two educational experiences in higher education, of Integral Education in practice: The UBUNTU Academy and the Master in Health Technologies Assessment & Quality Management (HTA&QM). Some practices present in each of this two experiences include embodied reading, engaged reading, presence, reflective dialogue, shadow work, inquiry, perspective taking, self authorship, witnessing, meditation.

Integrating and transcending the best conventional and alternative approaches to education, inspired by Ken Wilber and his Integral approach and AQAL model, I believe we can say YES to the three first questions.

Key-words: Education; AQAL model; UBUNTU Academy; Master HTA&QM; Integration; Leadership; entrepreneurship

1. Introduction

We can see in our countries, year after year, students who give up on school and students with great potential and intelligence(s) to be unsuccessful. Why does this upend for so long and it seems that this situation it is not better in the present. Several authors study this subject along the past twenty, thirty years. Most of them present this as the major reasons:

- They believe that school is unrelated to their lives and therefore has nothing to offer them.
- They dislike of the school due to the interpersonal experiences they have encountered there, like bullying, ridicule from others, and sometimes from teachers, when they try to learn and they ask questions.
- They have feelings of inadequacy; I don't belong here, why should one try?
- They don't see failure as a chance to learn and so they have fear of failure.
- They don't find in school their passion, The school does not help us to find their passion, their “element” (K.Robinson, 2009) and often their most important capabilities and skills, remain unknown to them and to society.

(Behavioradvisor 2016), (K.Robinson 2010)

All of us have a major challenge to overcome in what concern Education.

In 1862, Abraham Lincoln¹³⁸ said, in his Annual Message to Congress in 1862, “ The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew and act anew” (A. Lincoln 1862).

Marshall Goldsmith¹³⁹ in 2008, wright a book whose title was “What got you here want get you there” (Goldsmith, 2008).

How can we learn to think and act in a way that we can respond to the present challenges that work, family, environment, society, political or economic organizations asking for?

How can educators, teachers, mothers, fathers, all of us be *agents of change* and perceive reality in its complexity?

Many people want to know how to answer these questions.

Different people, different approaches nevertheless the same idea; all starts in Education. We need to look at the Education System in a different way. We need to look at it in a revolutionary way. But what does that mean in practice?

In this paper I will present some ideas from educators, teachers and scientists who have think about it, who have discussed the subject and who have put into practice different ways to do changes in our actual education system.

Then I will present, briefly, the AQAL model (All Quadrants, All Lines), which can be applied to the education system. From this model it seems to become easier to identify where we can innovate and/or improve and/or change. (K.Wilber T. A., 2008), (Esbjorn-Hargens, 2007)

Finally I present some educational experiences that take place in Portugal in which are present the main proposals made by the AQAL model.

2. Some perspectives on the education system

2.1 Sugata Mitra

It is in 2007 that for the first time Sugata Mitra reveals the results of an idea he had; how could he provide learning to children from India without access to any education system?

He put "wall computers" in some slums. The kids who live there had never seen or been with computers. The computers had several subjects such as mathematics, physics, biology, geography, English, among others. Sugata wait about two months to see what happens to those kids. After this time he realizes that their *curiosity* triggers the *desire for learning*. (S Mitra 2007)

In 2010 Sugata extends its experience to the global gathering in England learning system (grandparents available to support) and India (children who want to learn without ever having had a teacher). He realizes and become aware that children can indeed lead their own learning process. (S Mitra 2010)

More recently, and after several experiments performed with many kids in different social conditions, he concludes that what we need is a "revolution" in the education system. He say that if we accept that kids can learn in different and unexpected ways, we can make use of new technologies and make them allies and inclusive in this matter. (S Mitra 2013)

¹³⁸ 16th President of the United States of America (March 1861 – April 1865)

¹³⁹ American leadership coach and author

2.2 Ramsey Musallam

"3 rules to spark learning" is how Ramsey shows the contribution to an education system attractive and effective: (R Musallam 2013)

- Arouse *curiosity* comes first. Encourage the kids to ask questions is crucial.
- *Embrace the mess* of the learning process, which often leads to many trials and many errors.
- *Reflect on the practice* and the results, encouraging a *critical sense* and reducing the *fear of failure*.

2.3 Angela L. Duckworth

Angela, after many studies and observation, concludes that the most determining factors of successful learning are *passion and perseverance*. How can the education system help the kids how to find and develop these skills and competencies? Creativity will lead the kids to discover *motivation* and *purpose*. These factors will lead the kids to discover passion and perseverance and having a learning process in which they find pleasure and have success. (A.L.Duckworth 2013)

2.4 Ken Robinson

According to this author and educator schools kill creativity (K.Robinson 2006), (K.Robinson, 2009). Rather than an evolution in the education system, it should be carried out a *revolution* (K.Robinson 2013). He also argues that the educational system is an *organic system* and so, for something to flourish should be governed by this principles (K.Robinson, 2013):

- *Diversity* instead of conformity
- *Curiosity* rather than submission
- *Creativity* instead of standardization

3. AQAL model – all quadrants, all lines

"The word integral means comprehensive, inclusive, non-marginalizing, embracing. Integral approaches to any field attempt to be exactly that: to include as many perspectives, styles, and methodologies as possible within a coherent view of the topic. In a certain sense, integral approaches are "meta-paradigms," or ways to draw together an already existing number of separate paradigms into an interrelated network of approaches that are mutually enriching." (K.Wilber, 2001)

The integral model applied to Education provides a template to design pedagogy, classroom activities, evaluations, courses, and curriculum.

With its 5 elements **Quadrants** that reveal the different perspectives in which I can see and act in the world, **Levels** of development attitude, **Lines** of psychological development, **States** of awareness and **Types** of approaches to learners, Integral Approach to Education include twenty different aspects, four aspects per each element.

This article presents, for the two examples of educational experiences in higher education in Portugal, how they take into account the twenty commitments of Integral Education.

The presentation will be based on Quadrants as they as defined by Ken Wilber (Esbjorn-Hargens, 2007)

3.1 Quadrants

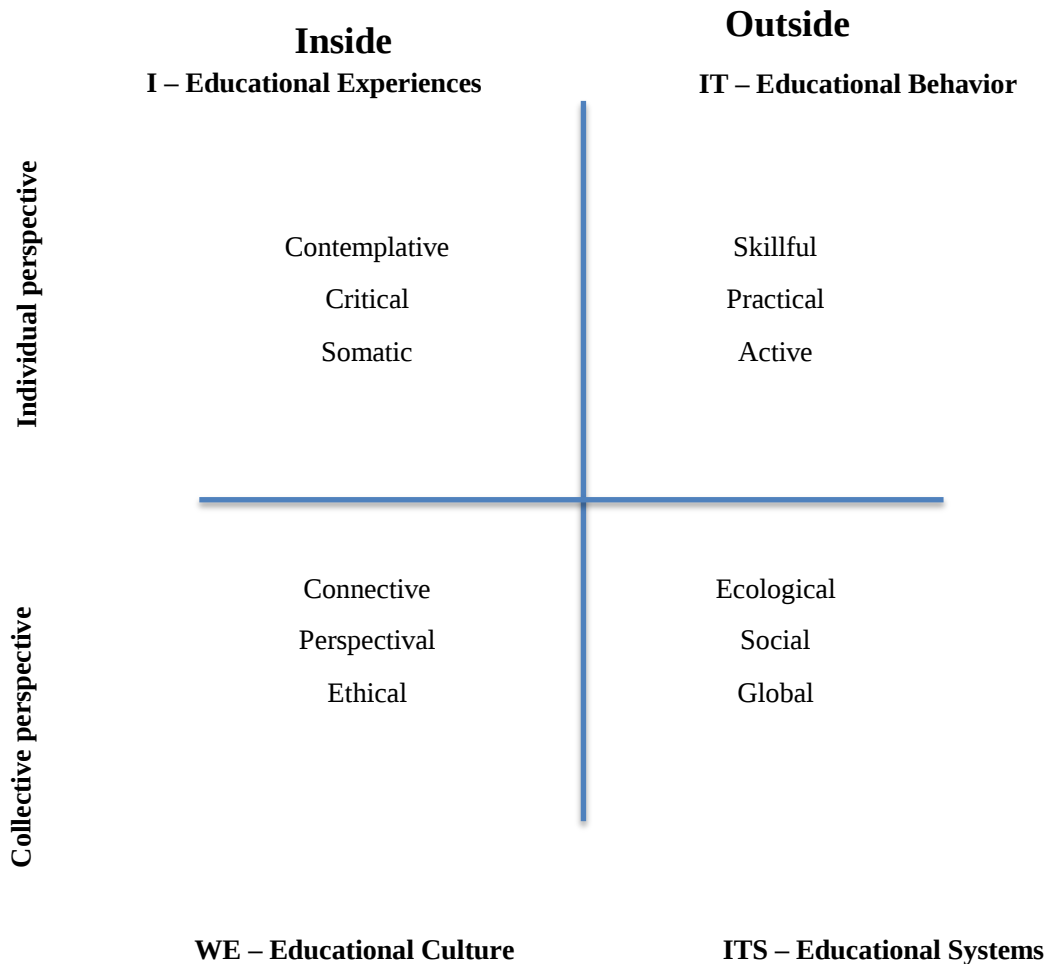


Figure 1: Twelve commitments of Integral Education (adapt from (Esbjorn-Hargens, 2007))

4. Educational experiences in Portugal; non formal and formal education

4.1 Ubuntu Academy

Academia Ubuntu is a non-formal education project that aims to train people from 18 to 35 years old with high leadership potential, coming from contexts of social exclusion. The main objective of the project is to empower participant's leadership to foster the creation and development of an innovative project responding to social needs of their community. Being a non-formal education project, Academia Ubuntu program may vary from: Seminars with guest speakers, Conferences about leadership and social entrepreneurship, Workshops, Residential weekends, Special initiatives and, if possible, Final trip (South Africa).

In this project there are no teachers. In this project there are facilitators and participants. The activities are held a fortnightly basis. Different teams of facilitators are responsible for preparing and streamline each session.

During two years the participants are invited to live a set of experiences.

During the 1st year the sessions are dedicated to "look inside" from observing outside themselves.

At the end of this first year participants are invited to submit their "*life history*" in public and having 15 minutes each. This experience allows them to revisit their life history and in it find new meanings and purposes, leading them to hope and to desire to make a difference in their own community or country.

During the 2nd year of training participants, supported by consultants and the facilitators, develop a social entrepreneurship project that addresses the specific needs of their community.

The main reference of the project is the African philosophy "Ubuntu" meaning "I am because you are" and the life examples of leaders such as Nelson Mandela, Martin Luther King, Desmond Tutu, Mahatma Gandhi and Aung San Suu Kyi.

Ubuntu is synonymous of hospitality, respect, mutual support, sharing, community, care, trust and generosity. Ubuntu philosophy challenges all of us to be more aware, more responsible, and more pro active in the world.

Academia Ubuntu was developed by IPAV a non-profit organization, founded in 2005, with the particular call for reflection and action in the areas of migration and intercultural dialogue, social innovation and trends. Below there are some photos of activities carried out during training in Ubuntu Academy.



Figure 2: Working with police forces – see from the other side



Figure 3: Workshop – music, ecology, creativity & leadership

They were asked to make their own mailbox and put it at the wall. They were then challenged to write letters, or short messages, to their companions. This dynamic allowed them to create stronger ties and make inclusion effective. No one was forgotten.



Figure 4: residential weekend – the mailbox project



Figure 5: Ubuntu got talent- creativity in action



Figure 6: Facilitator's team feedback and evaluation at the end of the day

Academia Ubuntu is now in its 4th edition and following the ambition of taking this project further and make it reach more people we created three groups: one in Lisbon, another one in O Porto (second biggest city in the north of Portugal), and another one in Africa – Guinea. With a total of 160 participants that we hope at the end of the project will make the difference and spread the Ubuntu Philosophy in their own communities. In January 2017 it will start a new Ubuntu Academy also in Africa – Mozambique. (IPAV 2010)

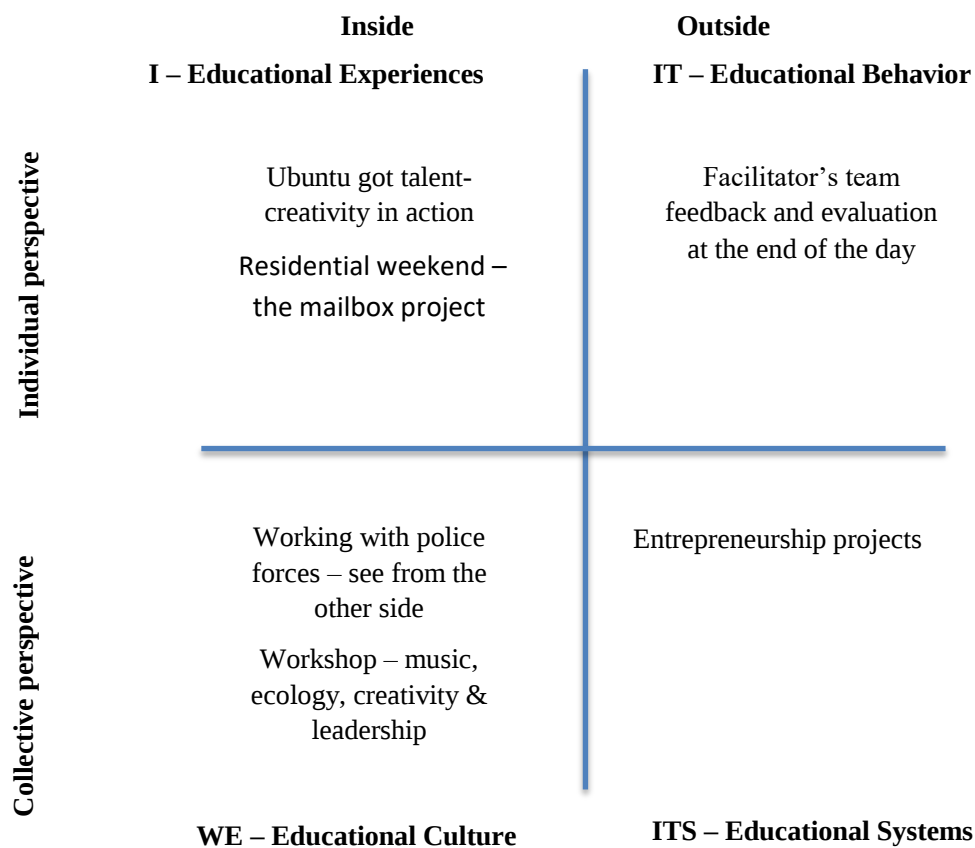


Figure 7: Ubuntu Academia and AQAL model Quadrants

4.2 Master in Health Technologies Assessment & Quality Management (MHTA&QM)

Health Technology Assessment & Quality Management (HTA&QM) is a multi-disciplinary field that studies the medical, social, ethical, and economic implications of development, diffusion, and use of health technology.

Its main purpose is to inform technology-related policy-making in health care, and thus improve the uptake of cost-effective new technologies and prevent the uptake of technologies that are of doubtful value for the health system.

The main aims are to manage technological change in health care through the implementation of HTA findings. This concentration combines the skill sets of health technology assessment and health management and policy development.

This Master's develops its curriculum around three relevant areas; Health Technology Assessment, Health Management and Quality in Healthcare, with reference to national and international guidelines and legal framework.

This master bet on applied training focus on market needs and on developing skills with direct impact on the professional and academic performance and is oriented to new approaches for the optimization of health resources, based on case studies and benchmarking (MHTA&QM 2016).

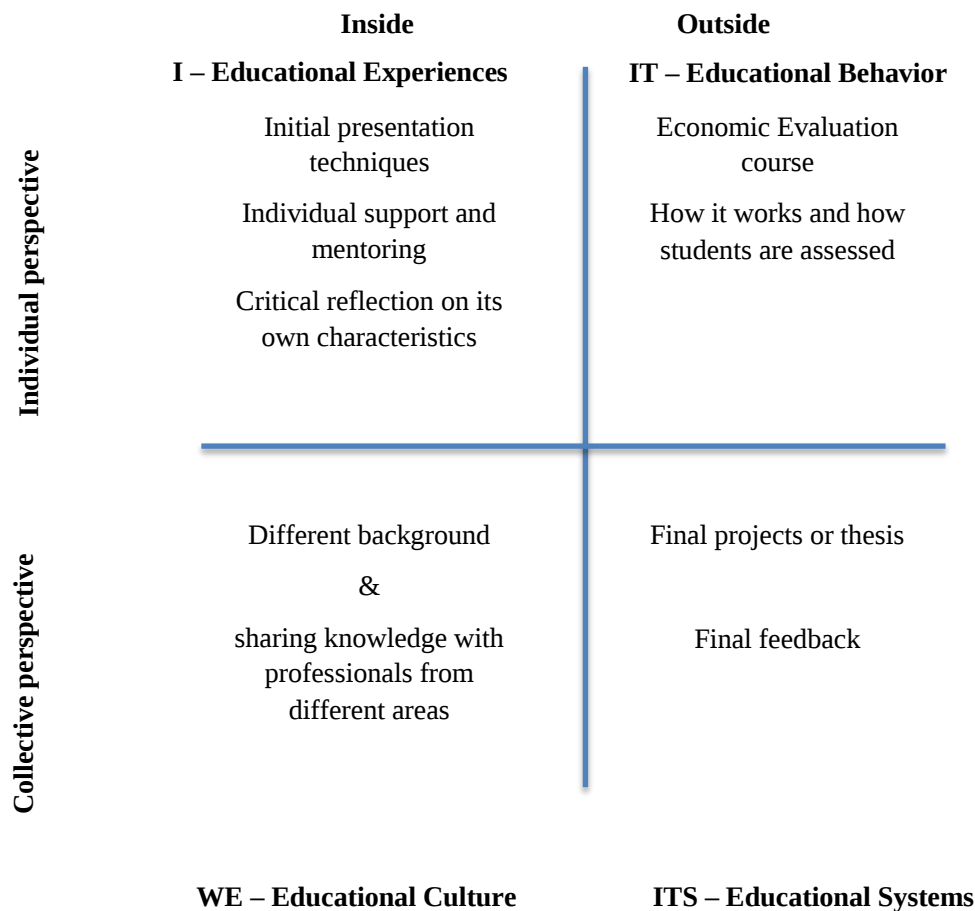


Figure 8: MHTS&QM and AQAL model Quadrants

“We are intelligent in different ways, but if we evaluate a fish by its ability to climb a tree it will spend their whole life believing it is stupid.” Albert Einstein¹⁴⁰

Quadrant (IT)

In the Economic Evaluation course, students are divided into working groups and choose one of the topics of the curriculum to present. The oral presentation is evaluated through various topics in order to aloud them train and improve their communication skills too. The assessment in this course result from the following items:

- i) Self-assessment 20%
- ii) Evaluation by peers (20%)
- iii) Participation in class; active presence (10%)
- iv) Evaluation assigned by the teacher (50%)

Quadrant (ITS)

Students are encouraged to choose applied final projects, focus on solve real professional cases.

At the end of the course students are asked to give feedback about the Master Course. Students are encouraged to do it in different and creative ways. Below there are a group of students giving feedback through "wall newspapers". It was a very humorous and assertive feedback.



Figure 9: Feedback from students about de MHTAQM – journals in action

Quadrant (WE)

Seminars and workshops with professional experts are organized in each topic covered by the Master Course. These experiences mobilize students, capturing their attention and participation.

Quadrant (I)

At the beginning of the master students are proposed to present themselves in different forms. They are also challenge to sign their own expectations and be aware of their own starting point.

¹⁴⁰ Albert Einstein was a German theoretical physicist (1879-1955). He developed the general theory of relativity, one of the two pillars of modern physics. Einstein's work is also known for its influence on the philosophy of science



Figure 10: Presentation and expectations through cards with pictures and words



Figure 11: Using a coaching tool - know their own starting point

5. Conclusion

"After all what would be the *passion for knowledge* if it result only in a certain amount of knowledgeableness and not, in way or another and to the extent possible, in the knower's straying afield of themselves? There are times in life when *the question of knowing*, if one can think differently than one thinks and perceive differently than one sees, *is absolutely necessary if ones is to go on looking and reflecting at all*" (M.Foucault, 1985).

Rolf Satller in his final message for educators and educational institutions says:

"Each school, college and university should incorporate into its teaching programs Wilber's Integral life practice using the *Integral Live Starter Kit* (Wilber's Integral Institute, 2006) . Integral life practice addresses body, mind and spirit in science, art, culture, nature, self and morals. Its practice would lead to enhanced

health and balance in individuals and society. Teaching “perspectivism” and complementarity is also of fundamental importance and would lead to far greater tolerance and peace.” (R.Sattler, 2008)

As John Henry Newman¹⁴¹ affirm “To live is to change, and to be perfect is to have changed often.”

From this inspiring words I really believe we can say YES to the three questions presented in the beginning of this paper: YES we can learn how to think and perceive reality differently, YES we can become co-active in work and life, YES we can just be who we already are.

It is only necessary that we *dare to do differently*.

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¹⁴¹ Catholic cardinal and theologian who was an important figure in the religious history of England in the 19th century

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The blended learning model for degree courses and initial teacher training: the University of Foggia experience

Pierpaolo Limone

University of Foggia, Italy
pierpaolo.limone@unifg.it

Anna Dipace

University of Foggia, Italy
anna.dipace@unifg.it

Abstract

This essay aims at presenting the model adopted by the University of Foggia to design blended learning courses. This model includes the development of educational paths within curricular courses, as well as paths for initial teacher training. Specifically, constitutive elements of supplied courses will be described with the intent of outlining the constants within the design:

1. a balance between online and face-to-face interaction/activities,
2. a planning schedule for the courses (activities, resources, teaching interactions), and
3. the role of scaffolding figures, such as instructors, tutors or coaches.

The description of these elements allows us to consider wider aspects linked to online education, such as re-designing traditional face-to-face courses (academic teaching); defining certification and acknowledgment for online activities; and organising teaching activities for specific situations: from teacher training to meeting the needs of first-year students. For this reason, examples taken from our experiences of design and development conducted by the University of Foggia will be provided in two areas: blended courses for initial teacher training, and courses for students currently enrolled at the University of Foggia. Lastly, scenarios and future perspectives of development will be proposed, including micro-experiences of participatory design with users, and tracking systems able to inform a continuous evidence-based revision of the same courses.

Keywords: blended learning, higher education, teacher training, teaching/learning innovation

1. Introduction

To this day, implementing new ICTs and innovative instruments constitutes one of the greatest challenges for universities and public institutions in their path towards modernisation. Over the past three decades, digital technologies have had an incredible impact on work, leisure time, and learning; the field of education in particular has had to rethink the whole formative process.

The academic community is currently witnessing the progress of knowledge technology aimed at shaping the learning material, thus modifying the whole learning process (Laurillard, 2014). Nowadays, in order to meet the challenges of a global context, universities can no longer limit their educational offer to on-site courses. To maintain their prestigious positions they need to design their own online higher education

environments, by using new technologies strategically. Following this new orientation, several countries are encouraging technological development aimed at education policies, whether from governments or from university associations (Cantoni et al., 2004). Training and development agencies are increasingly requested to provide flexible and personalised learning environments. The strategic combination of various learning/teaching approaches is a chance to respond to the students' different preferences and learning needs. One such possible solution to these necessities is the "blended learning" model, which combines a number of different mutually-enriching media, thus promoting teaching strategies based on individualising and sharing experiences (Dipace et al., 2014).

In this multitude of approaches, what emerges is the need to re-define the concept of literacy in order to embrace the digital skills required in daily life (Unsworth, 2001). After all, ICTs are capable of offering new, strategic possibilities to help students develop the necessary competences to deal with this new, important role.

In this sense, once the skills to promote have been identified, ICTs can represent the key means through which to acquire and develop them. This form of ubiquitous learning encourages the integration between mobility and the learning environment: while the students carry around their laptops, the system dynamically supports their learning process through ICTs (Ogata & Yano, 2004). New technologies therefore help develop a wide relational and social range, which effectively contributes to efficient, significant learning, because the form is dynamic, constructive, intentional, authentic, and cooperative (Howland et al., 2012).

In the light of what has emerged, blended learning can combine all of these necessities without overlooking the needs of the user (Singh, 2003). Its hybrid nature gives the individual the opportunity to acquire both technical and methodological skills (Trinchero, 2002).

The former comprise of basic ICT skills, and knowledge of how to build and produce content; the latter aid in experimenting with different learning methods. In this way the learning environment allows storage of information online, access to data and personalised exploration, immediacy in the search for answers and solutions, widespread interaction, and the opportunity for synchronous and asynchronous communication. Reflecting on didactic models, and on the characteristics of the learning environment therefore shows the need for an interdisciplinary outlook, and an analysis which combines methodological studies with teaching instruments and organisational models (Limone, 2012). The teaching environment resulting from this experimentation is a blended network environment: the classroom is metaphorically open, and made up of spaces ranging from the real world to the web (Dipace & Limone, 2014).

2. Latest developments in the field

The introduction of ICTs in the context of higher education requires a constant, efficient transformation of the didactic setting, through the promotion of diversified methodologies and teaching resource strategies (including of course assessment techniques), thus encouraging a re-thinking of the teaching resources. The physical space of the learning context is implemented and re-designed in synergy with the virtual space, also thanks to innovative methods such as learning-by-doing, problem-based learning, cooperative learning, action research, metacognitive approaches.

Planning *ad hoc* digital spaces capable of responding to the users' needs, and integrating them into educational contexts such as universities, represents one of the most important innovations, and one of the most significant challenges in contemporary didactic organisation. It is a challenge which the Erid Lab at the

University of Foggia has accepted, intertwining knowledge, skills, and methodologies to design blended courses aimed at a more integrated and integral training of the individual.

The 2013-2015 plan of action for the improvement of student services at the University of Foggia includes the fundamental belief in recognising the institute as a democratic training community, which guarantees strong literacy, and unites the cultural axis of the humanities with the scientific and technological one. For a number of years the Erid Lab research programme has developed activities and interventions in the ICT field, with the specific aim of planning prototypes of learning environments. From the Mediaevo project (Limone, 2012) to the development of social learning platforms in Living Lab projects (Pace, Dipace, 2014), to the creation of a community of practices among operators of the tourism field (Sonetto project), the *fil rouge* of the experiences was the use of methodologies specific to design-based research (Brown, 1992; Collins, 1992). The characterising elements of these experiences are: working in interdisciplinary teams, prolonged times for experimentation, stakeholder involvement, the use of participatory planning techniques and instruments for ethnographic enquiry. Alongside theoretical research, empirical research aimed at designing and prototyping multimodal didactic resources was developed, as well as complex learning paths and material, and areas for social- and peer-learning. The development was fuelled by the reflection upon teaching models able to support the use of such resources in individual contexts and along the same planning methods, alternating iterative cycles of design and experimentation (Limone & Pace, 2015).

3. The blended learning design model

When planning blended courses in the context of a degree in education studies and of early teacher trainings, the goal was a systemic integration of new technologies within a carefully-defined and designed pedagogical-didactic project (Bastiaens, 2012). The platform presents itself as an authentic learning environment, with the aim of training professionals capable of using the acquired skills in a real-world context. The learning environment was inspired by this approach, presenting a systematic and integrated combination of media, contexts, and methodologies aimed at engaging teachers and students in order to enhance the development of strategic skills both within the degree in education studies and the initial teacher training. By re-designing traditional teaching methods it was possible to consider the advantages offered by the new technologies, combining the ability to improve autonomous, active, self-regulated learning with a view of developing expert skills. Such an approach is clearly socio-constructivist, as Reiser notes (2001); its aim is to render the learners responsible for defining and planning their own education. In this way the students are more motivated, independent, and meta-cognitively responsible of their learning. To make up for the diversified learning necessities and for the individual preferences of each student, the platform is designed to offer a strategic combination of different teaching/learning approaches, in order to obtain a flexible and fully personalisable environment. The «blended learning» model is perfect for this necessity, since it combines different channels and vehicles of communication and didactic styles, thus promoting learning and teaching based on gaining individual experiences and sharing them.

The blended learning method is a winning strategy in building and sharing knowledge, thanks to its efficaciousness, the immediate availability of time and place, and the single user's personalisation.

Fine-tuning this model has entailed activity-planning according to a pattern made up of six main categories: interactivity, flexibility, equal collaboration, self-learning, teacher as facilitator, planning authentic assessment activities.

- *Interactivity*. Blended learning enabled students to interact with the group through technological devices, in different learning environments. Knowledge is the fruit of experiential interaction between the individual and his/her life environment; it is therefore configured as a form of shared intelligence, situated yet spread out.
- *Flexibility*. Blended learning offers a structuring of learning time and space, which varies according to the needs of the learners, who can decide when and where to follow the video-lessons or use the available material. The information is therefore immediately accessible. As opposed to distance learning, in blended learning courses the students can organise the time they dedicate to their studies, while always having physical access to their university and the opportunity to meet their lecturers and fellow-students. This prevents any potential for isolation.
- *Equal collaboration*. In planning the blended course it was important to resort to collaborative learning forms, characterised by three distinctive traits: learning through others, learning from others, and learning with others. Discussion was made possible both in the physical and virtual classroom, through interactive media and specific teaching methods which promote collaboration and co-planning among the users. The objective of the project was to create a platform that could represent a physical and virtual space for the community, a learning resource, a place for dialogue between teachers and students, an activator of authorial processes.
- *Self-learning*. Self-learning activities are essential in blended learning. Learners were given exercises and tests at the end of each unit. In this way, each student had the chance to actively develop problem-solving, reflexive, and self-evaluation skills. Meta-cognition is in fact the ability to take a position, be aware, critically review one's own work, and learn from one's mistakes.
- *Teacher as facilitator*. In blended learning, the traditional view of the teacher as a mere transmitter of information changes. In this new version, the teacher applies scaffolding methods thanks to strategic use of technological devices, and specific actions and processes with the aim to develop a "culture of participation", leading to attitudes and approaches characterised by curiosity, creativity, and exploration (Limone, 2012).
- *Planning authentic assessment activities*. Especially during initial and subsequent teacher training, a considerable part was dedicated to reflection on assessment practices and processes. Micro-experiences conducted with teachers have confirmed the need to refer to assessment tools and methods that could emphasise on the collaborative dimension and on the use of e-portfolios as assessment tools in order to improve overall knowledge and skills within an innovative online learning environment (Chang, et al., 2012).

4. Methodology

To plan the blended course in the BA in education studies it was necessary to divide the hours of traditional teaching with those of online teaching, themselves divided into lectures and interactive sessions according to ANVUR's¹⁴² recommendations and the "Guidelines for the periodic accreditation of telematic universities and online courses".

In this context, ANVUR distinguishes between:

¹⁴² Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca www.anvur.it

- telematic (or “online”) courses: when delivered by telematic universities or when teaching is backed by Information Communication Technology for over 75% of the overall course credits;
- blended (or hybrid) courses: when teaching entails the support of Information Communication Technology for over 30% and no more than 75% of the overall course credits.

The guidelines take into consideration online or blended courses, through a designed platform on a Learning Management System, and divide the teaching into lectures and interactive classes.

By lectures we refer to all classroom teaching activities, focused on the lecturer presenting and illustrating content (e.g. through audio-video recordings, web conferences, pre-formulated courseware, etc.)

By interactive classes we refer to all teaching activities in the form of demonstrations or explanations present in faqs, mailing lists, or web fora (e.g. suggestions about how to solve a problem, an exercise, or similar); brief interaction between students (e.g. in contexts in which discussion or collaboration is possible, such as web fora, blogs, wiki). Also structured individual or collective e-tivities in the form of reports, tests, case studies, problem solving, web quests, projects, student production of artefacts, with related feedback; or typical forms of academic assessment in the form of questionnaires or tests *in itinere*.

In line with the ANVUR Guidelines, and on the basis of Erid’s learning design model for the creation of MOOCs within the EduOpen¹⁴³ project, alongside the teachers of every subject new shared planning documents should be created. Specifically, lecturers are asked to create a macro-planning scheme to guide them in defining the didactic approach in the choice of themes and in outlining the course. A micro-planning scheme is also being implemented, as a guide for the elaboration of a “storyboard” connected to the individual educational moments of the learning curve (Limone et al., 2015).

4.1 Planning assessments for the learning process

Furthermore, particular attention is given to planning assessments for the learning process. This is a key phase in the education system, particularly in continuing education regarding adult learning, updating, and requalification in order to support various professional choices and greater autonomy in prefiguring career paths and mobility. Thanks to new media, technologies, and web tools, it was possible to offer students authentic learning experiences, based on experimentation and action. As David Hung (2002) pointed out, learning occurs when someone tries to solve a problem, since it explores real or plausible life situations. As claimed by Willis and Cifuentes (2005), instruction should take place in an authentic context to enrich the learning process through real experiences that facilitate the so-called “transfer of learning” (Perkins, Salomon, 1992).

The value of learning that takes place through authentic activities, when emphasis is on iterative relationships between theory and practice, is linked with an instructional design that refers to the experiential learning theorized by David Kolb (1984). More specifically, according to Kolb, learning begins with a concrete experience, followed by data collection and observations which reflect on that experience. The latter can be implemented in real life or in a virtual environment. At the stage of abstract conceptualisation, students do not make generalisations: they draw conclusions, and make assumptions

¹⁴³ The University of Foggia is currently leading a consortium of universities in a MIUR-funded project, aimed at building an Italian Mooc platform. Since April 2016 the platform is online, and available at www.eduopen.org

about the experience that leads to new knowledge. In the final stage, the students verify these hypotheses and ideas through active experimentation in new circumstances. The model emphasises the continuous nature of learning, as well as the appropriate and immediate feedback which is the basis for continuous goal-directed action.

The concept of feedback is strongly linked to the whole design of the summative and formative assessment of a learning path. Formative assessment is the process by which, through feedback, it is possible for both teachers and learners to regulate teaching and learning in progress, and it aims at achieving the expected results for the students (Messina et al., 2015).

Instructional Design for Competence-based Learning and the design of assessment activities are the upstream processes for the definition of our digital learning environments.

Therefore, alongside multiple-choice tests to improve self-assessment, a series of peer-assessment activities have actively engaged the users through discussions, interaction, and communicative activities playing a key role in the online learning environment. Interaction and peer-communication have been key to establish collaborative learning practices.

During peer-assessment activities, users have exchanged ideas, provided clarifications, shared multiple perspectives, and participated in different types of discussions.

4.2 Technological support

A number of different methodologies and technological instruments were used in the blended learning model developed for the degree course in education studies and initial teacher training, in order to satisfy the characteristics and particularities of the learning design.

Moodle was a key platform, with a personalisable graphic layout defining a learning environment in which support material and prepared content could be collected and used interactively, together with the products and projects created by the students, various means of communication, assessment sheets, and personal spaces for students. This was fundamental to individual, autonomous meta-reflection on the learning path. In this workspace the various members meet, discuss, produce teaching material, and co-build knowledge.

The e-learning platform used by Unifg is made up of various sections, each dedicated to:

- degree courses;
- education courses;
- perfecting courses and e-learning master degrees;
- doctorate schools;
- teacher training.

Specifically, the degree course in education studies is divided into three sections (Fig. 1), each corresponding to a course year. Each section includes the courses planned for that academic year. For each specific course (Fig. 2), thematic forum encourage the interaction amongst lecturer and students.

The structure of the learning path for teachers is similar to that of the BA, with the addition in every course of specific self- and peer-assessment activities for every topic.



Figure 1: elearning.unifg.it courses homepage



Figure 2: elearning.unifg.it course example

5. Results and discussion

The resulting e-learning platform represents a smart environment which aims to support active, deep learning through collaborative practices. The focus of this environment is on the possibility to create virtual educational communities with an emphasis on creation rather than consumption, and on the decentralisation of content and control. The main goal of the designed learning model is to create a strategic environment to support and monitor student learning.

One of the key elements of the experiment was the role of co-designing activities with the teachers and students involved. In fact, the shared and collaborative creation of contents, and the co-designing of teaching activities, put the students in an especially central position, at the centre of a circular, reflexive process encouraging self-awareness of their learning, thus empowering them.

The users, much like in a real-world context, are encouraged to interact with objects, observe the effects of their interventions, and build their own interpretations of the phenomena and of the results of the

interaction, sharing these experiences with colleagues. When planning this complex e-learning model aimed at a wide audience of users/teachers, we thought it best to re-think technology as a mediator for learning, and therefore to use it as a «cognitive instrument» with a view of generating significant experiences. The aim was to favour the transferring of skills and knowledge acquired in the virtual classroom into the real world. The objective of the project was to use technology with an anthropocentric approach, with the full awareness that knowledge is not an object which can be simply transferred through a medium, whether technological or analogue. Knowledge is a complex process which develops, and is co-built through negotiable and symbolic activities, by individuals involved in a significant relationship.

The singularity of the blended learning design, developed within the degree course in education studies and initial teacher training, is apparent thanks to the co-presence of three fundamental constants: a balance between online and face-to-face interaction/activities; a planning schedule for the courses (activities, resources, teaching interaction), and the role of scaffolding-figures, such as instructors, tutors, or coaches. Furthermore, co-building learning paths through documents of micro- and macro-planning has allowed the courses to be structured in such a way that it guided the teachers in defining the didactic approach, choosing core themes, and articulating the course.

This model is giving life to a collaborative planning protocol which helps delineate a procedural framework, with the view of defining the stages of co-planning during the advanced experimentation stage within the EduOpen platform.

6. Conclusion

The designed blended learning model has offered the opportunity to respond to the needs of both users, and educational quality of the service. The graphical interface, the platform's user-friendliness, and the clarity of the lessons enabled access to the contents of individual courses with the greatest ease. The very nature of the blended courses offered the possibility of a meta-reflexive approach to help users design their own learning process, personalising the courses in a form of self-regulated learning. The conclusions we can draw from analysing the data show an increase in the users' interest, and in intrinsic motivation thanks to the personalisation of the self-learning process. Experimenting with the blended learning model has proved a rise in learning-by-doing; discussion within forum showed greater propensity to problem-solving, and a development of cooperative learning strategies.

These results allow us to further our understanding and knowledge about the possibilities offered by integrating the media into the learning processes, and especially to work on strategies to replicate the model.

In fact, the same teaching method is about to be adopted by the Law Faculty of the University of Foggia for the academic year 2016-2017, for a BA in investigative studies.

In conclusion, the University of Foggia is successfully experimenting with a blended learning model embracing a number of different teaching theories and methods, which help achieve quality education beyond the classic product-process approach, and move towards a view of teaching as a science to plan and build pedagogical models, with the aim of learning with technology (Laurillard, 2014).

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Improvement of the Teacher Training Quality

Oleinik Tatyana

H. S. Skovoroda Kharkiv National Pedagogical University, Ukraine
Tatyana.Oleinik@hnpu.edu.ua

Prokopenko Andrey

H. S. Skovoroda Kharkiv National Pedagogical University, Ukraine
Andrew72@meta.ua

Beregna Svetlana

H. S. Skovoroda Kharkiv National Pedagogical University, Ukraine
BeregnaSv@Gmail.Com

Shcheblykina Tamila

H. S. Skovoroda Kharkiv National Pedagogical University, Ukraine
Tamila.Shcheblykina@hnpu.edu.ua

Abstract

The e-learning project offers main results and perspective in further collaboration in European community. Our primary task is to prepare prospective educators, which are able to solve complex problems of digital citizenship. They will be inventive individuals, socially responsible, proficient in ICT using, capable to implement student-centered approach in adaptive environment. No doubt it refers to the formation of educators' research-oriented attitude, which was based on open educational resources (OER).

To ensure the quality of education we tend to build an information system of education at the LMS Moodle, which will at the same time create a flexible personal learning environment for each student. However, the implementation of innovative e-learning models and the need for facilities to meet modern approaches, confirms a complexity of quality assurance process. In addition, the necessity for systematic rethinking of approaches and methods of professional standards development as well as key competences will depend upon the resources educators choose to use, to and to integrate into educational activities.

So, we have identified the following issues to be solved concerning OER: to develop assessment skills; to collect, to adapt and to reconcile; to resort organizational support in order to develop skills in working; to participate in the relevant communities of experience; to engage students; to work up own OER and to provide assistance to the wide dissemination; to ensure feedback, provide information on the use of existing OER; to expand knowledge in the field of intellectual property rights, copyright and privacy policy.

Keywords: teacher's training, blended learning, student-centered learning, competence, OER

1. Introduction

The world experience of education researches requires a systematic rethinking of its developmental models that promotes creativity and collaboration of co-authors to create content, a variety of digital products under the conditions of open educational information space formation. According to experts, open education is connected with the context and the promotion of different approaches to removing the

barriers against open access, under what we understand not only licensing or technological aspects, but also the inherent cultural, social and institutional barriers that increase access to the best practices of open education (OER, 2015, UNESCO, 2013), open educational resources (OER) acquire special significance.

Open access to scientific information is an important component of research quality in modern globalized world, the key to the further development of science and education, integration into the global academic community. Broad concept of open education is closely associated with the active use of modern digital technologies in education and research. Open education includes (i) providing open access to educational and training materials, research results, (ii) increased opportunities for collaboration in the educational process at the level of teacher-student and between peers, teachers and professors of higher education institutions, (iii) qualitative management of the educational process, opening up new opportunities for increasing both public awareness about the situation in education and the efficiency of the educational system at all levels significantly.

One of the complicated questions facing educators today is how to increase the efficiency of distance educational process provoked by globalization and the limited budget, the trend towards openness and availability of higher education. The experience of most key experts in the higher education institutions confirms a growing neediness in pedagogical, technological and institutional perspectives online training by MOOCs (Massive Open Online Courses). We can see the similar results from experts of the United States, Australia and Canada higher education institutions as well as from experts of European Union resources (OpenedUp, HOME, EMPOWER, E-xellence Projects etc.)¹⁴⁴.

Features of implementation of the course on distance education organization for graduates of pedagogical universities are caused by the need to meet the requirements of modern education, namely the creation of conditions for the effective use of LMS Moodle for student support in shaping the culture of innovative (successful) learning. Particular attention is paid to the formation of three core competencies of future teachers, including the ability to work with (i) advanced knowledge, technology and information (Bykov, 2010; Zhaldak, 2012, Spirin, 2011), (ii) with other people, (iii) with society, which are able to solve complex problems of digital citizenship, firstly, personal and social inclusion. A certain place in the curriculum is devoted to the problems of quality education provision (Brown, 2015, Zakharchenko, 2014, Yuan, 2013, Prokopenko, 2008), including designing of personal learning environment (PLE) based on open educational resources, social networks and more. The aim of each session is a real cooperation and interaction of all

¹⁴⁴ EADTU - European Association of Distance Teaching Universities, eadtu.eu

ICDE - the International Council for Open and Distance Education, www.icde.org

Class Central, www.class-central.com

The International Review of Research in Open and Distributed Learning, www.irrodl.org

Emma European Moocs, platform.europeanmoocs.eu

Online & e-Learning Asia Summit, www.onlineandelearningasia.com

MOOC in UA, mooc.in.ua

participants of distance learning process (teachers and students, and students with each other), free choice of individual tasks, Internet and media resources, and implementation of formative evaluation.

2. Main Material of the Research

Defining change in shaping digital society allowed us to spotlight on the implementation of Master curriculum to prepare future teachers (UNESCO, 2013, Dobko, 2014, Zakharchenko, 2014), who are able to interact effectively in the communities of practitioners and critical evaluation of the educational process. The main purpose of these programs is to train a functional educated teacher-leader(Fullan, 1993) headed at well-balanced solving problems of virtual community, capable of responsible attitude to socially significant events, reasoned response to non standard situations and so on. To be more precise, understanding of such teacher's social role, his belief in the purposefulness of new approaches, flexibility in integration digital technologies with the motivated and conscientious student learning become the subject of special concern (UNESCO, 2011, Henderikx, 2015).

The requirement for continuous improvement of pedagogical staff necessitated the creation at the H. S. Skovoroda KhNPU transparent and accessible educational system based on Moodle, implementing technology blended learning (traditional, e-learning, distance and mobile ones), which primarily focus on maintaining the autonomy of the student (the deliberate planning, organization, assessment, regulate their own learning activities), the development of communities of practice for learning (partnership between teacher and student and between students themselves). At the same time have been developed distance education courses not only for students but also for faculties towards the use of open multimedia resources, innovative (formative) assessment, formation ability (successfully) to learn and collaborate in projects and studies.

We're interested in a significant advantage of study approach that is getting familiarized with models of learning design and the peculiarities of tutor activity. It's no doubt that valuable learning design is a result of team work with e-learning strategies in innovative areas that is created by enthusiastic authors that propose interactive and impressive e-learning content, emphasizing on behavioral students' changes, and confirming a significant increase. At the same time tutor's activity should facilitate overcoming their uncertainty when they consider innovative ways of training (like gamification, mobile learning, blended learning, localization etc according to a revised taxonomy of Bloom)¹⁴⁵ (Fig.5). Besides one of the important factor of success is the teacher flexibility that has combined innovative learning design and care for conscious and motivated teaching students based on their (students) own convictions in the expediency of imposed change.

Preparation for predicting effects and accelerated response to the innovative educational tools

We pay considerable attention to MOOC as a mean of continuous professional education as well as innovative business models of education. At the same time, we have taken into account the recommendations to experimental learning design (Kommers, 2013, Ossiannilsson, 2015). To be more

¹⁴⁵ Or, for example, Alan Karlington's Padagogy Wheel V.4.1 (PW Poster English bit.ly/pwenglish)

precise, such technologies as social media and simulation games open the way to a more fundamental discussion of what type of training is more valuable and more important than the others. This approach aims to encourage teachers to study signs of "quality education", a critical observation of the parameters of blended learning, which provides a reflection of the practical needs. It is important to acquire the ability to find and secure the correct balance in order to keep improving the pedagogical work of the teacher with ICT integration.

A certain place in the curricula was given to the problems of ensuring the education quality that due to the need to use innovative models and frameworks that can help guide technology integration in the classroom, such as (Kommers, 2013, UNESCO, 2011) TPACK¹⁴⁶ and Framework¹⁴⁷ for 21st Century Learning. TPACK model has 3D expansion one (TPC3D [Fig.2] adds the domains of "beliefs" and a "practices") that symbolizes that beliefs are a fundamental layer (beliefs shape practices below the conscious level for most people). Framework for 21st Century Learning [Fig.1] was developed with input from teachers, education experts to define and illustrate the skills and knowledge students need to succeed in work, life and citizenship [Fig.3], as well as the support systems necessary for 21st century learning outcomes, that has been used by thousands of educators and hundreds of schools to put 21st century skills [Fig.4] at the center of learning.

2.1 Key role of Student's Portfolio in Quality Training

One of the main advantages of our approach in solving the problems of socio-psychological adaptation of graduates to enter the labor market is a model of personal learning environment with a focus on the technology of e-portfolios and the development of critical thinking of the student. Our approach contributes to the mindful formation of students' readiness to independently solve a range of complex pedagogical tasks associated with the formation of their self-educational competence and digital literacy. According to the recommendations of UNESCO (UNESCO's ICT Competency Framework for Teachers) special attention is paid to the use of network resources (personal learning network) to increase the motivation for social self-realization and continuous improvement of educators.

The difficulty of entering college graduates in the labor market, the impact of occupational stress due to the mismatch of university training of young professionals in the labor market. In accordance with the priorities of the modern market (graduates understanding of their objectives, the ability to work in a team and have the necessary expertise, the ability to self, the possession of effective strategies for behavior in the labor market and to have a plan for professional growth), we pay special attention to educational technology critical thinking development (Oleinik, 2002).

¹⁴⁶ See <http://www.edutopia.org/blog/integrate-tech-keeps-changing-todd-finley> (How to Integrate Tech When It Keeps Changing: Read about models and frameworks that can help guide technology integration in the classroom, including TPACK and SAMR. (Edutopia, 2014))

¹⁴⁷ See <http://www.edutopia.org/blog/integrate-tech-keeps-changing-todd-finley> (Information, Media, and Technology Skills: Review functional and critical thinking skills related to information, media, and technology within the Framework for 21st Century Learning. (Partnership for 21st Century Learning))

There's no doubt that portfolio technology demands considerable attention. Portfolio technology is viewed as a productive tool (Oleinik, 2013, Shcheblykina, 2014) for the research of laws of students' educational achievement growth including ability to solve complex problems of digital citizenship as well as critical thinking development. These laws foresee open educational process (transparency of monitoring procedures and equal possibilities for achieving educational objectives). They also help students as the subjects of educational activity to solve the tasks of self-determination, self-control, self-realization, that certainly affects employment and success.

In our research we used the following portfolio types, depending on the year and form of study (full-time or part-time). The types of portfolio are: a portfolio of career ladder (in the second year), the portfolio of employment (graduation years) and methodological portfolio or portfolio of innovation (for distance learning).

The main criteria for evaluating and preparing successful portfolio were determined as those which reflect the processes of personal and professional attitude (critical realization of personal educational needs, reflection on pedagogical experience, criteria of self-evaluation, goal-setting, innovation implementation, peculiarities of digital technologies, particularly free open resources such as MOOCs. It should be pointed out that students show special concern for such courses in creative subjects (humanities and arts) for representatives of the creative sector who want to increase their potential of innovations, design, music production, literature activity and journalism, photography.

Used for the realization of the relative model, portfolio encourages complex informational, organizational and methodological support of student's individual educational trajectory, formation of his readiness for finding independent solutions for the whole range of important and complex pedagogical tasks, connected with professional and personal development. Thus, students' activity on creating a portfolio is realized in the process of observation, analysis, design, collecting information in some particular subject area and its processing as well as setting new goals.

Our experience (Prokopenko, 2015) confirm that implementation various forms of formative assessment and self-assessment for comprehensive monitoring of the results of educational activities. Besides among primary innovation of discipline "Information technology in education and science" we have determined additional key points. It's necessary (a) to evaluate the quality of modern ICT according to their needs and the needs of the target audience, (b) to modernize curricula and courses based on a rethinking of teaching approaches and methods aimed at creating new ways of intellectual activity and interaction in virtual reality, (c) learning design of a personalized learning environment depend on the needs of the target audience; d) to distribute resources among students and technology productive independent work (including modern methods metacognition and research activity) as well as alternative methods of education.

According to this we pay special attention to digital literacy as well as knowledge deepening and knowledge creation, in particular, policy understanding, complex problem solving, knowledge application, formation of collaborative groups, self management. Teacher as learner: his/her position as part of the learning community, not as the expert in the room, both physically and through his/her interactions that make his/her own thinking process visible. Mainly our objective is selecting variety of ways to maintain the

students' enthusiasm and the desire to continue course study that is productive for self realization as well as for community transformation directed to learning organization. Taking into account the statements of experts, most of the stress of today's young professionals to stick to their interest in the opportunity to try out a professional field, acquiring the necessary skills and the availability of high expectations from work (Aysmontas, 2013), we promote a combination of innovative methods to support students' progress that is often named "environment for success" for personal and social inclusion.

Among pedagogical techniques which provide in-depth development of training material and training cooperation, pedagogy of cooperation, project work, entrepreneur activity (Gibb, 2007). They learn to select and effectively implement technological innovations (mind maps, social services, communication in professional communities, virtual classes, open educational resources, SMART-lab). They continuously discuss contemporary problems of digital literacy for a wealthy life in the society (e-Society), special attention is paid to peculiarities of e-learning realization, using electronic books (e-Books) and libraries (e-Libraries).

Implementation e-portfolio showed its pedagogical effectiveness in the professional teachers training (pre-service and in-service), because it opens the way to alternative assessment in their educational, professional achievements and personal qualities. Pedagogical technology portfolio contributes to the formation of students' reflective culture that creates opportunities for everyone to change their own educational trajectory.

2.2 Implementation of Educational Innovations in e-Learning

Of course, the development of innovative approaches to training future teachers to use modern tools in teaching activities simultaneously with the educational component should include also research one, due to the formation of the teacher-researcher who is interested in the introduction of innovative ICT.

The selection of content is due to the overall objectives of the master's training, assuming reliance on the study and synthesis of the available knowledge at a higher level on the role of digital technologies and their impact on the further development of learning models (in the modern system of scientific knowledge, the problems and the main directions of the development of open learning environment, the basic laws of the global digitalization process on the main types of information resources and its strategic role for the development of the society).

The leading idea of our realization of blended training aimed at implementing student-centered learning and competence-based approaches, which consist of conscious students' mastering modern approaches to increase efficiency methods of productive independent and group work, objective measurement of educational achievements, designing personalized information environments, quality evaluation of modern ICT according to their needs and the needs of the target audience, the integration of innovative ICT curriculum, using the most effective tools and open educational resources for the posing and solving problems of competence development, critical understanding of media resources etc.

Besides the selection of content is due to educational research of scientists of KhNPU according to innovative reforms Ministry of Education and Science of Ukraine, for example, works of Information Technology Department are devoted a deep problems of digital literacy and citizenship, including

integration OER and social media for critical thinking development of school educators as well as University ones (6-year project from 1998 year in collaboration with International Reading Association, IRF etc.). There are the list of means (educational websites, media resources and social services) for fun learning, communication, plausible reasoning, facilitating discovery and problem solving. Besides e-portfolio is a subject of our special attention last 10 years that supports different ways of future pre-school teacher' career planning (Oleinik, 2014), employability and lifelong learning, as well as in-service teacher' professional development and realization of innovation (for Bachelors and Masters levels).

Exceptional attention we pay pre-school teachers' training for the formation of kids' personal learning environment (PLE) that is main objective of our courseware on using information technologies at the university pre-service and in-service teachers' training. PLE consists of a digital toolkit for the life needs of the 21-st century people according to the purpose modernization of educational system. The methodology of our curriculum is based on group work, discussion methods, e-portfolio, study projects that directed on pre-school student's digital literacy, critical thinking, curiosity and group collaboration. We facilitate students for using open educational resources (e-libraries) and free digital toolkit for working out learning design of PLE and improvement of educational interaction in professional community (Kommers, 2013, ECSM2016, ATEE, 2013) for available and willing to support, share, connect, inspire and challenge thinking in social media. In course on using information technologies and social services for pre-school teacher' of Bachelor and Master Degree we propose topics for STEM and Arts¹⁴⁸ resources, problems of the pupils' information safety (Spirin, 2011), modeling competencies (Kaiser, 2006) and researches of quality teaching and learning technologies (ATEE, 2013), improvement of psychology-pedagogical aspects of education of disabled kids with dyslexia, dyscalculia etc.

We use different preferably open resources that allow students to produce their ideas by infographics, intellect-cards, tools of design thinking, geometry construction, science museums, games. In process of construction the knowledge, students can invite others, and use virtual as well as interactive tools: to add their content to common wall, to result in a joint creative product, to share the result in social networks, to embed it into other sites.

Research works of some Departments of deep problems (multicultural, critical and media educational literacy, educators' professional culture development) based on the draft of the National Standards for Bachelors and Masters of Preschool and Primary Education¹⁴⁹. Especially we should underline active participation of our faculties (Yuryeva, 2015) in realization project of multicultural literacy supported by OSCE¹⁵⁰ Ministry of Education and Science of Ukraine, Institute for International Cooperation of the German Association of People's Universities (DVV International) represented by offices in Ukraine and Information

¹⁴⁸ Project on Teachers' Design Training for Digital Citizenships (Poster) <http://www.inaea.org/post/2014/06/11/Art-Education-and-Digital-Technologies-Virtual-World-Conference.aspx>

¹⁴⁹ Yurieva, K., Griniova, V., Tanko, T., Oleinik, T. Project of the National Standards for Bachelors and Masters of Preschool and Primary Education (In Publishing)

¹⁵⁰ See <http://www.osce.org/hcnm> (The OSCE – the Organization for Security and Co-operation in Europe)

Research Center "Integration and Development", supported by the Ministry of Foreign Affairs of Germany¹⁵¹, UNITED for Intercultural Action (Netherlands)¹⁵², Open Society Institute (Hungary) etc.

Members of the Foreign Languages Department participate in the joint Project of the British Council Ukraine and the Ministry of Education and Science Ukraine "New Generation School Teacher" on digital technologies integration in English language training for students¹⁵³ (task-based sessions, interactive lectures, seminars, discussions, self study, case study, guided reading) with regular University teachers' workshops and monitoring by experts from Great Britain. According to its key recommendations and needs about modified National language teacher education standards for Bachelor and new standards for Master degrees, core national curriculum for methodology, methodology component as a priority in teacher education, updated and new content as well as modes of delivery, students should acquire a strong working understanding of the advantages and challenges of using learning technologies in the EFL classroom.

It's no doubt that digital technologies are changing the types of skill people need in the workplace, youth and adults need support in acquiring new skills and managing the physical, mental and emotional demands of the labour market. According to this state of affairs our educators discuss optimal decisions of solving teacher career problems in numerous scientific and practical conferences and workshops at KhNPU and partners, the subject of this meetings is studying problems of competence-based approach, innovative pedagogy, life-long learning, digital technologies and modernization of science and studies, e-learning, quality assurance systems etc. For example, the Institute of Informatization (Prokopenko, 2015) confer problems and benefits of distance learning including MOOCs as tool of deepen professional skills on various fields, the Department of Economics¹⁵⁴ discuss problems of training modern teachers as entrepreneurs, the Departments of Correctional Education¹⁵⁵ and Science confer problems of training educators for using health saving technologies including adaptive environment, the Department of History¹⁵⁶ research of historical-cultural aspects humans. Besides researchers of KhNPU Departments of Psychology¹⁵⁷, Pedagogy

¹⁵¹ See site: <http://www.integration.org.ua/> (Information Research Center "Integration and Development", supported by the Ministry of Foreign Affairs of Germany)

¹⁵² See site: www.unitedagainstracism.org (UNITED for Intercultural Action is European network against nationalism, racism, fascism and in support of migrants and refugees)

¹⁵³ See site: <http://ngschoolteacher.wix.com/ngscht> (Project "New Generation School Teacher")

¹⁵⁴ Modernization of Economics Education Structure and Content based on Competence approach: Proceedings of the science and methodical workshop of Economics Department of H.S.Skovoroda Kharkiv National Pedagogical University (2016). Kharkiv, KhNPU (Not translated into English)

¹⁵⁵ Pedagogy of Health: Proceedings of the 6th International science and practical conf. (Kharkiv, April, 27-28, 2016) – Kharkiv : H.S.Skovoroda Kharkiv National Pedagogical University. – 2016. 732 p. (Not translated into English)

¹⁵⁶ Holocaust in Ukraine: Academic, Commemorative and Educational Aspects of Materials Ukrainian scientific-practical conference dedicated to the 75th anniversary of the Babyn Yar. – Kharkiv, 2016. – 120 p. (Not translated into English)

¹⁵⁷ Cognitive, emotional and behavioral factors full functioning of the person: cultural and historical approach. Proceedings of the 2nd International science and practical conf. (Kharkiv, October, 23-24, 2015) (Not translated into English)

and Professional Development¹⁵⁸, Comparative Studies and Social Pedagogy¹⁵⁹ discuss a lot of problems of inclusive and knowledge society development of regional and national as well as global levels.

3. Tables and figures

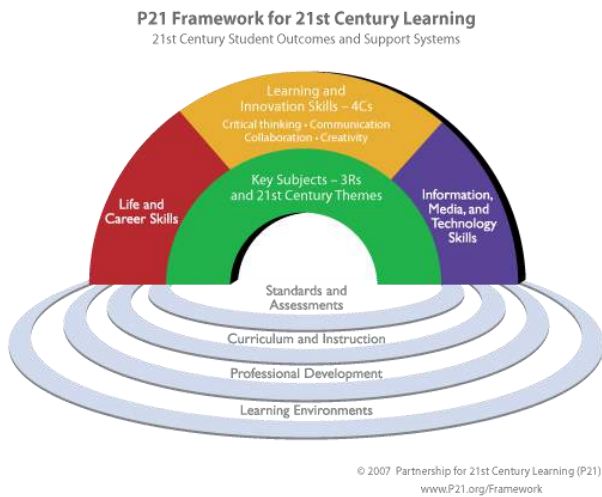


Figure 1: Framework for 21st Century Learning

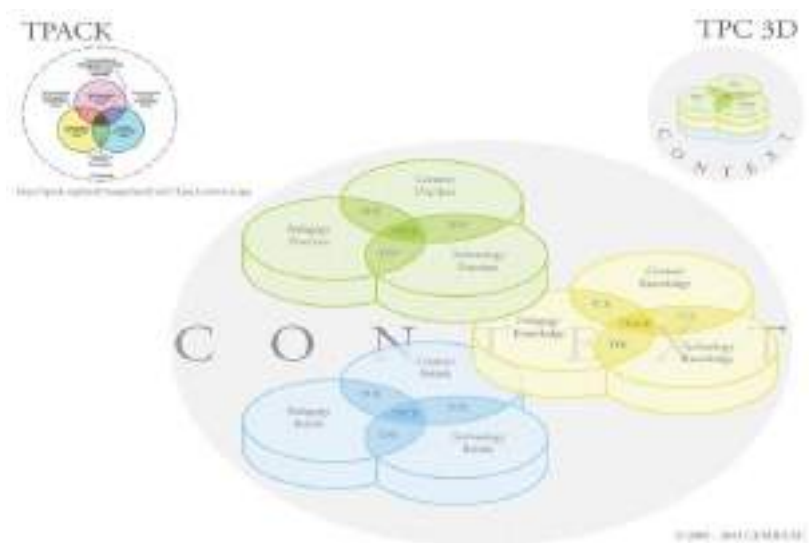


Figure 2: TPC3D: 3D expansion of TPACK model

¹⁵⁸ Higher and Secondary School in Contemporary Challenges: Proceedings of the International science and practical conf. (Kharkiv, May, 17, 2016) / Ministry of Education and Science of Ukraine, H.S.Skovoroda Kharkiv National Pedagogical University, Rzeszow University (Poland). – Kharkiv "Striped Typonrafiya", 2016. – 296 p. (Not translated into English)

¹⁵⁹ Preparation of the social teacher based on partnership (2015): Proceedings of the science and practical conference (Kharkiv, November, 24, 2015). – Kharkiv : H.S.Skovoroda Kharkiv National Pedagogical University. – 144 p.



Figure 3: Poster of Project Results

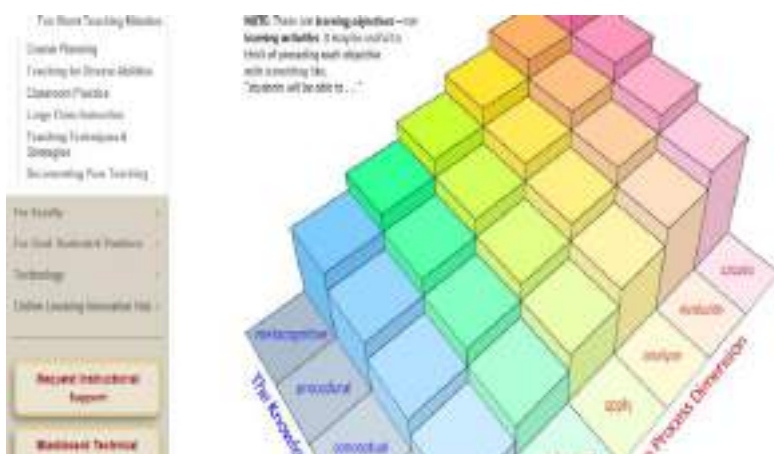


Figure 4: Interactive 3D expansion of Blum's Taxonomy



Figure 5: Revised Blum's Taxonomy

4. Conclusion

One of the main tasks of higher education is to develop innovative approaches to create optimal conditions in the formation of students' readiness for productive collaboration to find innovative approaches and bold decisions according to UN Sustainable Development Goals. At the same time, fostering innovations in education systems lead to continuous professional growth of educators because it requires their new social roles (researcher, designer, constructor, manager, curator, tutor, facilitator in the digital educational environment). Besides essential for the modern business person acquire cloud computing technology, in particular, a variety of social services (tools create multimedia content and information visualization), which is reflected in the content of training courses on the use of ICT.

In addressing this problem, we rely on the concept of educational technology portfolio, which focuses on supporting the student in determining the most appropriate to his interests and abilities, taking into account the scope of services (received in high school). We realize portfolio technology that is based on the principles of formative assessment and competent approach to education, it's a collection of miscellaneous information about academic and professional competence of students, the most advantageous to the employer that has been formed in the learning process or acquired on the basis of their own experience by themselves. Through a long time we convinced that portfolio supports to prevent obvious causes of acute stress of a young teacher in the graduate period, in particular, the small prestige of the teaching profession, the low salary, and the inability to meet the requirements of the modern school transformations to new educational standards.

Thus, the effective implementation of innovative educational technologies with the use of electronic resources play an important role of social and psychological adaptation of future teachers for the knowledge society, which leads to the formation of a specialist not only with specific qualifications, but also with developed business and social activity. In our experience of using the arsenal of information processing means (PLE) a significant role play, naturally, their applications in the organization of information cause the improvement of students' thinking and design activity as well as enhancement of social interaction (peer to peer) that has revealed their key role in shaping the skills of designing new models of information activities.

No doubt in the Ukraine recently intensified research and extensive discussions on a radical restructuring of education in which the teacher that collaborates with other changes in the system of education, is a key figure in the solution of complex problems of preparing young people for the digital citizenship. So modernization of teacher training should focus on overcoming the contradictions between social challenges and existing programs of vocational training of students of pedagogical universities on the integration of ICT in education. we are very interested in the development and implementation of master programs (such as "educational technologist" according to Slavic and European educational traditions) for the preparation of future teachers who are capable of effective interaction between communities of practitioners and critical review of the educational process and predict the consequences and accelerated response associated with the new generation of teachers to responsible use of digital technology space.

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Blended Degree Development and Operation: The Model of Uninettuno University

Kyriakos Kouveliotis

Professor International Telematic University Uninettuno, Italy; Provost City Unity College Greece Cyprus

Email: k.kouveliotis@uninettunouniversity.net

Abstract

The technological innovations of the last 15 years have not just been used only as methodological tools in higher education but also, at a different level, they have created a completely new methodology of learning. This new spectrum of learning methodologies has forced the existing educational institutions to seek and develop new norms and models of didactics away from the two traditional systems of vis-à-vis or distance learning. The most successful and innovative new norm is Blended Learning.

This paper endeavors to present, as a case study, the development, formulation and operation of this new educational structure and mode in the form of the Blended Degree Programs that the International Telematic University Uninettuno has created to jointly run with other partner institutions. In this framework, the paper presents the methodology of how on campus education is blended with e-learning and at a parallel level, how flexibility and multicultural diversity are enhanced.

More specifically, the historical evolution, the institutional framework, the psycho- didactic model and the logistics of this effort are extensively analyzed and prescribed. As a case study, the paper also qualifies to serve as a pivotal example and also as a template for similar international cooperation projects.

Following this reference and on a second layer, tools and instruments such as the use of WEB 3.0 applications, virtual learning and e-learning are also integrated into the context, whereas, the multi-language support and the strengthening of open education are also highlighted.

Keywords: blended degree, blended learning, flexible learning, distance learning, e-learning, on campus education.

Introduction

It is commonly accepted today that the evolution of technology together with all the innovations and research developments have generated themselves new methodologies in education.

Therefore, we should not just perceive them only as methodological tools in higher education but also, at a different level, as a new educational norm since they have created a completely new methodology of learning. This new spectrum of learning methodologies has forced the existing educational institutions to seek and develop new theories and models of didactics away from the two traditional systems of vis-à-vis or distance learning. In this framework, the most successful and innovative new norm that has been evolved recently is Blended Learning.

Following this reference, this paper will present, as a case study, the development, formulation and operation of this new educational structure and mode in the form of the Blended Degree Programs that the International Telematic University Uninettuno has created to jointly run with other partner institutions. At a first level the Uninettuno methodology and psycho-pedagogic model is extensively presented and analyzed and at a second level the focus is upon the Blended Learning Model and its application as a result of a joined international cooperation project.

The International Telematic University Uninettuno

The International Telematic University Uninettuno, established by the decree of the 15th April 2005 of the Italian Ministry of Education, University and Research, delivers academic titles having a legal value in Italy, Europe and in the Mediterranean Countries, for first-cycle (bachelor) degrees, specialization degrees (master), doctor's degrees and master's degrees. In the International Telematic University Uninettuno distinguished lecturers of important universities worldwide deliver their courses in the Internet-based real and virtual spaces in Italian, Arabic, English and French.

A dream that has come true: with the Uninettuno a student can attend the University programs from wherever he is with no more limits of space and time (Uninettuno University, 2016a).

History

Uninettuno takes origin from the training model of NETTUNO - Network per l'Università Ovunque, a consortium of 43 Italian and foreign universities with which, since 1992, thousands of Italian and foreign students obtained a distance university degree thanks to television and the Internet. At present, many of these universities put at Uninettuno's disposal physical facilities such as laboratories for conducting research work and training activities, libraries, halls equipped with PCs and classrooms to organize face-to-face exams sessions for the students. Uninettuno takes origin also from the international success of Med Net'U (Mediterranean Network of Universities) Project, funded by the European Commission in the framework of the EUMEDIS Program, aimed at realizing a Euro-Mediterranean Distance University.

With Med Net'U it was established a network of 31 universities of 11 countries of the Euro-Mediterranean Area (Algeria, Egypt, France, Jordan, Greece, Italy, Lebanon, Morocco, Syria, Tunisia and Turkey). The development of Med Net'U from project to system was supported by the Governments of the partner countries. Actually, on the 29th January 2006, in the framework of the Catania 3 Conference for the realization of a "Euro-Mediterranean Area of Higher Education and Research", 14 Ministers of Higher Education of several Mediterranean countries, undersigned a joint declaration by which they stated their goal of strengthening the distance learning system of the Mediterranean countries, by expanding the results attained through the Med Net'U Project.

The strength and the process of growth of Uninettuno are unquestionably represented by the fact that it rapidly succeeded in acquiring a significant role at international level by concluding agreements with the countries of Europe, the United States, Latin America, China, Russia, Georgia and Iraq. Very important agreements were undersigned with countries of the Mediterranean area, in particular with Egypt, Morocco, Syria and Tunisia (Uninettuno University, 2016a).

Network structure

International Coordination Centre

Uninettuno's organizational structure appears as "network" structure: a Coordination Centre and Technological Poles and Production Centers, located on the national and international territories, interconnected by computer-based networks and also through transmitting and receiving satellite dishes. At present, Uninettuno can rely on the Technological Poles already set up in Italy as well as on the facilities and technologies of 31 Technological Poles and 9 Production centers, set up at the universities' campuses and vocational training centers of the Med Net'U Project partners and based in 11 countries of the Euro-Mediterranean area (Uninettuno University, 2016a).

Technological Poles

They are training structures equipped with new information and communication technologies (ICTs) dislocated on the national and international territories which make available to the students all the technologies they need to follow the courses by distance mode, participate in the training activities by videoconferencing and take the exams.

The Technological Poles, situated both in Italy and abroad, are structures which are available to the students and equipped with all the technologies to follow distance-learning courses, to participate in didactic activities via video-conference as well as being a real meeting point to host the carried out of exams person, not to mention meetings and seminars with the teachers and tutors.

The Technological Poles make available to students technologies, didactic course material, and pc and rapid access to the Internet. Various Technological Poles are now active both in Italy and abroad, with interconnections with receiving and transmitting satellite antennas

The Technological Poles offer the student a physical meeting place for overcoming the isolation in which the distance learner can often find himself. They are breeding grounds of innovation in traditional universities and can also be set up in companies for carrying out staff training and updating services.

In particular, the Technological Pole:

- Promotes and coordinates design, relation and development activities within the territorial framework of its competence;
- Is in charge of the Distance Learning Office, at disposal of all the students enrolled;
- Activates multi-medial positions and provides for the upkeep of the network and technological plants;
- Implements and coordinates the local web site and updates it continuously, according to the specific needs of the students;
- Coordinates and plans the promotion and orientation activities, also those on-line, locally based (Uninettuno University, 2016a).

Production Centers

They are structures supplied with all the equipment needed to produce Internet-based multimedia educational contents, available on the didactic portal, which is the first distance teaching portal in the world that was realized in six languages: Arabic, English, French, Polish, Greek and Italian (Uninettuno University, 2016a).

Faculties

Faculties have institutional tasks envisaged by the Statute and promote the development of research programs (Uninettuno University, 2016a).

Degree Courses

Degree courses have the task of defining the Study Program, the modes for carrying on practice exercises and exams, the quality assessment of the educational materials realized by the Production Centers located on the national and international territories; the coordination of the tutoring activities, the quality assessment of all educational services delivered by means of the new technologies (Uninettuno University, 2016a).

How to study

The entire teaching and learning process takes place on the Internet. In the portal www.uninettunouniversity.net there is a dedicated area: the Didactic Cyberspace, where teaching and learning take place in six languages: Italian, Arabic, English, French, Polish and Greek. The Internet-based learning environment transfers directly to the student's desk: lessons, multimedia products, databases, exercises, evaluation and self-evaluation systems, online tutoring, forums, chats, thematic wikis (Uninettuno University, 2016a).

Learning environment

In the Appointed Teaching Professor's Page and in the Tutor's Page are included the Learning Environments where students can find the Educational Materials that represent the course contents:



(Uninettuno University, 2016a).

Video Library

The digitized videolessons are the starting-point of the learning process. Each digitized videolesson is structured into several issues and is indexed in order to enable the student to follow the whole videolesson or to select the issue he wants to study more depth. Each subject is linked in an hypertextual and multimedia way to essays, books, exercise texts, virtual libraries, lists of websites (links to websites related to the subject that were selected by the professors and tutors) (Uninettuno University, 2016a).

Online exercises

This section includes online interactive exercises linked to the topics treated in the videolessons (Uninettuno University, 2016a).

Virtual laboratory

It is an environment in which the student integrates theory with practice through a “learning-by-doing” process (Uninettuno University, 2016a).

Teaching staff

As already provided for by art. 15 of the Statute and as stated in the University General Regulations, approved by MIUR on the 16th March 2013, in CHAPTER III “Didactics and Teaching Body”, art. 17 “Teaching Body and Researchers”, paragraph 3 and following ones:

“The teaching staff, referred to in article 15 of the Statute, who carries on didactic and research functions in accordance with the course delivery models of the Telematic Universities through telematic and satellite networks (Internet, television and videoconferencing systems) is divided according to the following typologies”:

Area Professors who coordinate the didactic activities for each subject Area

Professors authors of the contents who realize the videolessons and design contents and the materials to be included into the learning environments of the didactic portal;

Tutors who check the students’ learning progress using the technologies (Uninettuno University, 2016a).

Enrolment

Enrolments can be made only on the Internet, in the area devoted to the Administrative Secretariat of the portal www.uninettunouniversity.net. Payments can be made online by credit card or bank transfer or postal service (Uninettuno University, 2016a).

Technologies

The applied technologies include: the Internet, satellite television and videoconferencing systems. Transmitting and receiving satellite dishes allowed realizing a technological network that connects not only Rome International Centre with the Technological Poles located in Italy, Europe and the Mediterranean countries, but, thanks to wide-band Internet also via satellite, this enables all partners to connect and share, produce and transmit knowledge. Thanks to UNINETTUNOUNIVERSITY.TV satellite television channel, broadcasting lectures for free 24 hours a day thanks to HotBird 13° East satellite, broadcast by EUTELSAT, covering Europe's whole territory, North Africa and the Middle East, the access to knowledge is democratized. In Italy it is possible to watch UNINETTUNOUNIVERSITY.TV tuning in to SKY 812 channel or to RAI SAT 702 channel (Uninettuno University, 2016a).

Research Activities

The University research activities are aimed at developing studies on technology applied to learning process. They involve international-level scientists, expert in different disciplines (technologists, computer scientists, experts in various languages). This research work is based on a strong interaction among theoretical and experimental, pure and applied activities.

The results of these research activities allowed identifying new modes for realizing teaching-learning processes and by now have affected in significant way the theories concerning learning processes, teaching methodologies, distance interaction relations. In economic terms, these results have been a starting-point for developing new models for managing distance universities and new models of e-learning.

The research activities at the Faculty level are researches related to topics which are peculiar of each given Faculty. The Faculties have created special structures, also jointly with research departments of traditional universities, with Italian or foreign, public or private research centers. This allows Uninettuno Faculties to have at their disposal advanced laboratories to carry on research work in specific field of interest (Uninettuno University, 2016a).

The Psycho-didactic Model of Uninettuno University

The student of Uninettuno distance teaching University is at the center of the educational process, being guided by the new profile professor-tutor who has the task of supplying him with the tools that are best suited to make the web-based learning and communication process easier. The psycho-pedagogic and didactic model was born from the results achieved by 25 years of international research programs, and was realized by Uninettuno's Rector, Prof. M. A. Garito and by her research team (Uninettuno University, 2016b).

In this framework, the main educational tool of the International Telematic University Uninettuno is the Internet-based learning environment where teaching and learning are carried on in 6 languages—Italian, English, French, Arabic, Greek, Polish—and it allows implementing a new psycho-pedagogic model that is characterized by the shift:

- From teacher's central role to the student's central role;
- From knowledge transfer to knowledge creation;
- From integration between practice and theory;
- From a passive and competitive learning to active and collaborative learning.

This psycho-pedagogic model is characterized by the highest degree of flexibility for the student. By this model, the student can build his own learning path in function of his educational needs and of his skill-level. A learning environment developed in such a way does not limit itself to offer rigidly pre-established courses, but it offers dynamic contents that can be enriched by other contents existing on the Web.

Actually, in the International Telematic University Uninettuno, the student is at the center of the educational process; however he is guided by the new profile of the professor/telematic tutor who has the task of

supplying the tools needed to facilitate the networked learning and communication process in a synchronic and diachronic way.

In the Didactic Cyberspace, the students actively participate in the creation of their own learning paths being guided by expert teachers/tutors. This guided path leads the learner into the various virtual places that were designed and in each of them it is possible to implement a training session based on a specific model of communication:

- Through the digitized video lessons, the student uses a linear learning mode which is still linked to a classical teaching mode, but thanks to the modular structure of the contents, the student can exploit the hypertextual modes to study and consult books related to the issues being treated:
- In the virtual laboratory, the student can check and enhance his knowledge according to a “learning-by-doing” mode, being supported “in itinere” by a tutoring system;
- Through the systems of chats, forums, wikis and with the web-based virtual classrooms and on second Life, finally, the student can carry out collaborative learning sharing the phases of the learning process with other students coming from different linguistic and social settings through a web-based meeting.

In each learning environment, it is possible to integrate each single learning mode with the other ones simultaneously and enrich them with various possibilities. The multimedia term is intended in its widest meaning and the learning activity is structured in such a way as to avoid wasting time and confusion and promote the spreading of knowledge through various means:

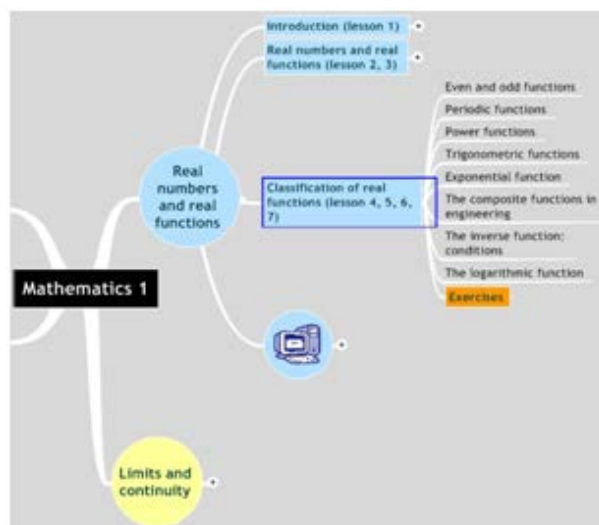
- From simple to complex (video lesson and intelligent library);
- From theory to application projection (learning by doing in the virtual laboratory);
- From guided exercises to research on the World Wide Web (the Internet);
- From individual study to interactive dialogue between professors and students (collaborative learning through synchronic and diachronic communication and sharing tools)

(Uninettuno University, 2016b)

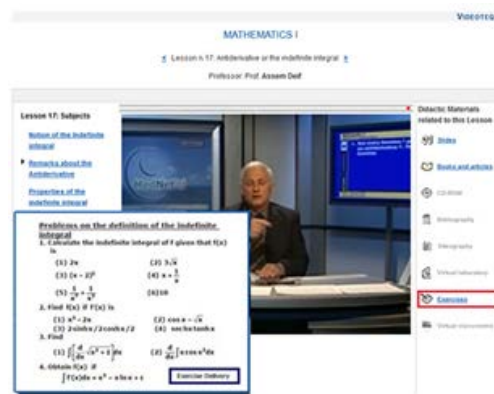
The Didactic Cyberspace

The main didactic tool is the Internet-based learning environment www.uninettunouniversity.net. In the didactic cyberspace can access various learning environments.

For each delivered course, the student has at his disposal a conceptual map (Fig. 1), a graphical, two-dimension and hypertextual representation, in which the macro-issues included into each course, the lessons included into each macro-issue; clicking on each single lesson, the student can see the issues it contains and what the materials associated to the whole lesson or each single macro-issue that are treated in it.



(Fig. 1)

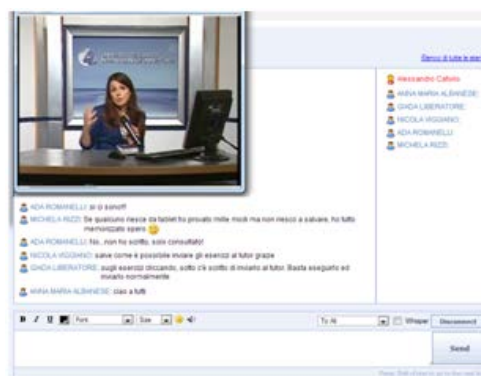


(Fig.2)

(Uninettuno University, 2016b).

In Uninettuno psycho-pedagogic model, the videolessons play a major role; they are recorded by professors coming from the best universities of Italy and of the world; then, they are digitized and posted online on an interface allowing a hypermedia use. The student can watch the videolessons according to a linear sequence, or decide to control the teaching process by pausing, going backwards or moving along the time-line of a lesson as he likes; and he can use the tools made available on Uninettuno portal: by means of the interface designed by Uninettuno, the student can surf among the videolessons, moving from one to another, within the same videolessons, using the indexing option that allows him to select a specific sub-issue treated by the video professor and play the video to the second in which the professor starts to treat that specific issue or among the more-in-depth materials related to that specific video lesson, by means of the box at the right of it.

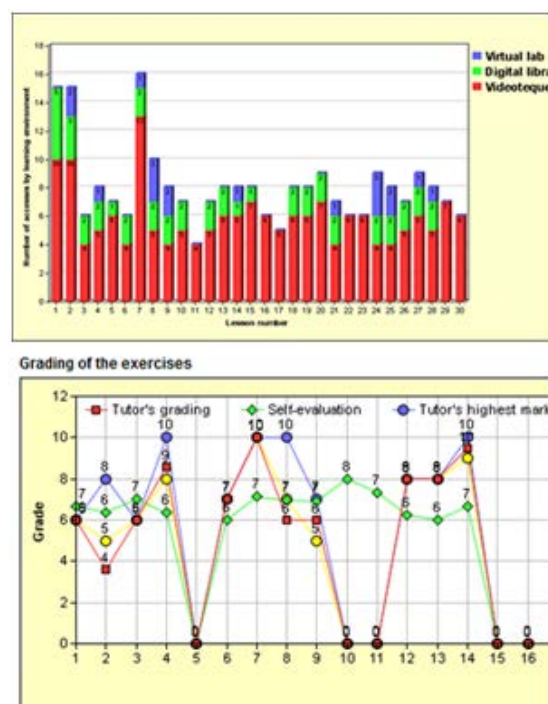
In addition, in some specific moments, a bookmark (Fig. 2), a lighting signal highlights or one of the types of more-in-depth study materials listed in the box at the right of the video, indicates to the student that a specific more-in-depth study material associated to what the professor is speaking about in that specific moment of the videolessons. Through this way, the learning process becomes an hypermedia process: the student can access more-in-depth contents suggested in real time by hypermedia bookmarks structured by professors and researchers that allow him directly access to books and articles, that is to say texts, lecture notes, produced essays, selected and made available by professors and tutors, CD-ROMs, multimedia materials, photo galleries, films associated to videolessons; bibliographical references and selected lists of websites, collections of references to external materials validated by professors and tutors experts of each single course in scientific terms; exercises and virtual laboratories.



(Fig. 3)

(Uninettuno University, 2016b).

Through exercises and virtual labs, the students have at their disposal materials that will allow them to put into practice the knowledge learnt through the study of training materials described above. The goal is to create a powerful synergy in the virtual laboratory so that theoretical learning and practical problem-solving co-exist in the correct ratio and fully integrate each other: the student will be able to think about his experiences in the learning environment, and the abstract principles described by the teacher become motivated, are made operative and can be committed to memory thanks to the problem-solving activities. The exercises available for each course; the self-evaluation exercises allow the student to get an independent feedback, lesson by lesson, on which is the comprehension level gained on the specific subjects that he studied. The progress-check exercises, to be submitted to the professor/tutor through the portal, are assessed by professors who, so doing, will give their feedback and a direct comment on which is the learning progress achieved by the students on the macro-issues for which he is assessed. In the Laboratories, the students can utilize online simulations for benefitting from tools that would be accessed only from excellence research centers, as well as use theoretical knowledge learnt in learning-by-doing activities on materials otherwise not accessible; the professor/tutor supervises and monitors the student's activities, who, once he completes his experience, automatically sends the sheet with the results of his work to his own tutor.



(Fig. 4)

(Uninettuno University, 2016b).

The International Telematic University Uninettuno learning environment gives the student an absolutely active role; all the training materials are made available for this purpose. The student is not left alone, but he is guided by an expert tutor. This is the reason why the portal has a special area called online tutoring. On the Forums, and Wikis, professors, tutors and students discuss about the issues proposed by the professors, they further analyze specific issues, ask questions on key points of the subject being studied. In addition, Professors and Tutors plan synchronic meetings on regular basis in Uninettuno virtual classrooms (Fig. 3) in which the students can exchange views with their own colleagues and their professors via chat, video streaming on the Web live or in the virtual classrooms in the Uninettuno Island of knowledge on Second Life.

The student's whole learning process is continuously monitored by the professors and tutors. The students are organized in classes, with a number varying from 20 to 30 students for each class. The organization in classes allows tracing course attendance and the learning progress of each student in quantitative as well as in qualitative terms. In quantitative terms, the tracing system of Uninettuno portal (Fig. 4) supplies reports and statistical data on the individual study activities of each student: accesses to the materials of each

course, time of use of the videolessons, time spent by each student in studying the texts and training materials associated to the issues treated in the videolessons. In qualitative terms, the teacher/tutor has the task of checking the students' learning progress through exercises as well as during meetings taking place in the Virtual Classroom during which the teacher/tutor ask the students questions on the issues dealt in the videolessons and check their comprehension and mastery level of these issues for each student and including their assessments on a qualitative assessment sheet for each single student.

These data, beside populating the student's sheet that is used by the teacher to decide the admission or not to the exam of the individual student who is required to have attended the course, having watched the videolessons, having taken part to the tutoring activities to be admitted to the final exam, are aggregated and represent a tool for having a feedback on the progress of the whole class. By means of data that are aggregate per class, the teacher-tutor can immediately see whether there any problems shared by the whole class on specific course issues; once he identifies a common problem, he can take measures "in itinere", during the same course delivery period, supplying more-in-depth study texts, moderating a discussion on a forum or planning some meetings on the virtual classroom meant to fill the gap that this feedback system allowed highlights.

The model of interaction between teacher/tutor and students applies the Socratic pedagogical theories, which are based on the fundamental assumption that involves not one-way teacher-to-student teaching, but an active participation of the learner in his/her learning process; the teacher leads the students to a personalized learning continually encouraging them to participate actively in the construction of his/her knowledge. This construction is made of continuous and dense dialogue, exchange of questions and answers, that allow a direct comparison between opposing views. The art of "maieutic", the Socratic method, based on the dialectic, is a method of an active and interactive learning. Socrates supports, motivates, and encourages his pupil to never stop learning, enhancing his/her work where it is worthy of praise and stimulating him/her when he/she encounters difficulties. The interactivity develops in a dialectic manner: the teacher against the student, the teacher together with the student with a single goal: the knowledge conquest.

The teacher/tutor offers topics and presents his/her thesis on forums, talks with students in the virtual classroom, determines the objectives to be achieved; the students study, analyze, reinterpret, revitalize and enrich the content with new ideas, new knowledge, create new topics of study that become the topics of discussion in the next interactive virtual classrooms. Students become active builders of new knowledge (Uninettuno University, 2016b).

"One to one" scenario (learning in single mode)

In this scenario by means of meetings in chat and video chat, the teacher/tutor assists the individual student in the exploration process of different environments, providing a continuous assessment of the realized learning path whenever the student requests it. In this phase the teacher/tutor, through interactive dialogues in the Socratic style, helps the student to examine his/her reasoning and to discover and correct both the errors and the causes that determined them (Uninettuno University, 2016b).

"One-to-many" scenario (learning in collaborative mode)

In this scenario, by means of forums, wiki, and synchronous appointments in the Virtual Classrooms on the Web and on the Island of Knowledge on Second Life, the teacher/tutor organizes and structures the sessions of collaborative learning to foster moments of interaction among different actors of the learning process. The teacher/tutor intervenes in the work of the groups in order to guide their work (Uninettuno University, 2016b).

The Blended Learning Method

Blended courses (also known as hybrid or mixed-mode courses) are classes where **a portion of the traditional face-to-face instruction is replaced by web-based online learning** (University of Central Florida, 2016).

The definition of **blended learning** is a formal education program in which a student learns:

at least in part through online learning, with some element of student control over time, place, path, and/or pace;

at least in part in a supervised brick-and-mortar location away from home;

and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

The majority of blended-learning programs resemble one of four models: Rotation, Flex, A La Carte, and Enriched Virtual. The Rotation model includes four sub-models: Station Rotation, Lab Rotation, Flipped Classroom, and Individual Rotation.

1. Rotation model — a course or subject in which students rotate on a fixed schedule or at the teacher's discretion between learning modalities, at least one of which is online learning. Other modalities might include activities such as small-group or full-class instruction, group projects, individual tutoring, and pencil-and-paper assignments. The students learn mostly on the brick-and-mortar campus, except for any homework assignments.

a. Station Rotation — a course or subject in which students experience the Rotation model within a contained classroom or group of classrooms. The Station Rotation model differs from the Individual Rotation model because students rotate through all of the stations, not only those on their custom schedules.

b. Lab Rotation — a course or subject in which students rotate to a computer lab for the online-learning station.

c. Flipped Classroom — a course or subject in which students participate in online learning off-site in place of traditional homework and then attend the brick-and-mortar school for face-to-face, teacher-guided practice or projects. The primary delivery of content and instruction is online, which differentiates a Flipped Classroom from students who are merely doing homework practice online at night.

d. Individual Rotation — a course or subject in which each student has an individualized playlist and does not necessarily rotate to each available station or modality. An algorithm or teacher(s) sets individual student schedules.

2. Flex model — a course or subject in which online learning is the backbone of student learning, even if it directs students to offline activities at times. Students move on an individually customized, fluid schedule among learning modalities. The teacher of record is on-site, and students learn mostly on the brick-and-mortar campus, except for any homework assignments. The teacher of record or other adults provide face-to-face support on a flexible and adaptive as-needed basis through activities such as small-group instruction, group projects, and individual tutoring. Some implementations have substantial face-to-face support, whereas others have minimal support. For example, some Flex models may have face-to-face certified teachers who supplement the online learning on a daily basis, whereas others may provide little face-to-face enrichment. Still others may have different staffing combinations. These variations are useful modifiers to describe a particular Flex model.

3. A La Carte model — a course that a student takes entirely online to accompany other experiences that the student is having at a brick-and-mortar school or learning center. The teacher of record for the A La Carte

course is the online teacher. Students may take the A La Carte course either on the brick-and-mortar campus or off-site. This differs from full-time online learning because it is not a whole-school experience. Students take some courses A La Carte and others face-to-face at a brick-and-mortar campus.

4. Enriched Virtual model — a course or subject in which students have required face-to-face learning sessions with their teacher of record and then are free to complete their remaining coursework remote from the face-to-face teacher. Online learning is the backbone of student learning when the students are located remotely. The same person generally serves as both the online and face-to-face teacher. Many Enriched Virtual programs began as full-time online schools and then developed blended programs to provide students with brick-and-mortar school experiences. The Enriched Virtual model differs from the Flipped Classroom because in Enriched Virtual programs, students seldom meet face-to-face with their teachers every weekday. It differs from a fully online course because face-to-face learning sessions are more than optional office hours or social events; they are required. (Source: Horn Michael B. and Staker Heather, 2014).

At Uninettuno University, international students are given the opportunity to study for a European degree in their own country without the hassle of obtaining a visa, finding accommodation or being concerned about health care. In the last five years, the University has seen the growth in their international students rise to over 30% of its student body with enrolments from 130 countries in the world. The number of degree courses in foreign languages at both undergraduate and postgraduate levels is rapidly increasing with a particular emphasis on English but also individual academic modules are available in Arabic, French and Greek.

On Blended Learning programmes, students can complete their studies studying online on Uninettuno platform and on campus at the local campus of the partner and obtain local credits and degree issued by the Partner as well as European credits and degree issued by Uninettuno.

Regarding Blended Learning, as it is mentioned in the Guidelines and Procedures for Partnerships Handbook of the Uninettuno International Affairs Office, teaching is shared between Uninettuno and individual Universities or Colleges by special agreement. Degree certificate has reference to the partner institution. The university retains responsibility for overseeing the quality assurance and for the granting of the degree programme (Uninettuno International Affairs Office, 2016:9).

Case Study: Uninettuno Blended Learning Method Application at City Unity College Greece

The International Telematic University Uninettuno represents Italy in the most important associations of the university and technological sectors. The network, that was built until now, allows the Uninettuno, its students and teachers to become part of a global network performed in the following areas: scientific research, development and implementation of activities and services for students, participation in the most important international events in the field of e-learning, participation in decision-making processes and implementation of new policy in the most important European and international political institutions.

International cooperation is a key element in Uninettuno philosophy with students from 140 countries and academic agreements with Governments Ministries and Universities throughout the world to create, harmonies and share curriculum.

There are specific agreements with Universities in Europe, the United States, Latin America, China, Russia, Georgia and Iraq, which enables students to acquire a degree, which is valid in their country of origin, in Italy, Europe and the Arab world.

All of degree courses follow the guidelines arising from the Bologna and Sorbonne process for the organization of the study levels, and on the ECTS (European Credit Transfer System) for the structuring of degrees (Uninettuno International Affairs Office (2016:8).

In this framework, the University has signed an agreement with City Unity College Educational Group - Athens Greece in order to apply its Blended Learning Model to specific programs. These programs will be offered in Greece at City Unity College premises starting from the academic year 2016-2017. The didactic content of all the programs will be divided between online learning by using the Uninettuno platform and face-to-face teaching.

City Unity College Profile

City Unity College (former City University of Seattle in Athens) is one of the most contemporary Colleges in Athens. It was established in 1999 as an official branch (teaching location) of City University of Seattle (USA), an American Accredited University with more than 25 teaching locations worldwide.

Since then, not only has the size of the student body increased to more than 1250 undergraduate and graduate students, but the number of degree programs that are available for students has also expanded.

Currently, City Unity College has expanded its academic partnerships and offers a wide range of Undergraduate and Postgraduate programs in the fields of Business Administration, Hospitality & Tourism Management, Technology, Psychology, Education, Maritime, Sport Sciences, Graphic Arts and Interior Design.

City Unity College's Academic faculty consists of instructors and professionals that are all distinguished in their field. Students study in a multicultural environment, due to the fact that the college is a member of a Students Exchange International Network.

City Unity College always remains firm to its Students' Centered Philosophy by providing contemporary academic programs and education that are result-oriented and focused on the student, yielding in each graduate becoming a distinguished and expert professional.

The strategic development of City Unity College is represented by the joint venture it has concluded with Epsilon Net Group, a company listed with the Athens Exchange Stock market. Through this joint venture City Unity College students benefit from the opportunities offered by the Greek & European labour markets.

The qualitative education in combination with the flexible ways of studying, offered by City Unity College, leads to the award of academic degrees and college certificates of high value in the international employment market.

City Unity College operates in 3 campus buildings and a residence hall. Two of the campuses and the residence hall are located in the historic downtown area of Athens which also serves as the commercial center of the capital, while the third campus is an operating hotel located in Glyfada, an attractive coastal suburb of Athens. The hotel serves as a residence hall for students and a laboratory where students receive practical classes in hotel management and culinary.

City Unity College cooperates with the following accredited universities:

- o Cardiff Metropolitan University (United Kingdom)
- o City University of Seattle (USA)
- o University of Strasbourg (France)
- o Universitatea Din Bucuresti (Romania)
- o Liverpool John Moores University (United Kingdom)
- o International Telematic University Uninettuno (Italy)
- o Educons University (Serbia)
- o City Unity College is also an Approved Centre of Edexcel, UK.

Vision & Mission

City Unity's mission is to provide modern academic programmes that are result-oriented and focus on the student's needs, so that every graduate may aspire to become a competent and qualified professional in today's rapidly changing environment. City Unity College was one of the first Colleges in Greece to focus both on the needs of young students and on the needs of working adults by offering continuing education programmes.

Philosophy of City Unity College

The philosophy of the College is based on the following core values and principles:

- **Access to education:** Opportunity to learn should be open to anyone and anywhere and education should be affordable and accessible to all
- **Global Approach:** Education should not only be tailored to local labour market needs, but also to the needs of the growing global markets.
- **Flexibility:** Tailor-made programs and services that address the students' needs
- **Innovation:** Education that breaks down the barriers of time and place and is based on best modern practices.
- **Results:** Education that leads to the development of critical thinking and continuing personal growth so that graduates are competent members of the professional community.

Location & Campuses

City Unity College operates in Athens, Cyprus and Rhodes. In Athens it operates in two buildings both located in downtown Athens and has its own student dorms located in a walking distance from its main premises. Students of the Hospitality & Tourism Management Studies attend theoretical classes at the premises of City Unity College and they do their practice courses in a real hotel campus, where students are 'customers' and employees at the same time. Three floors of the hotel are used as halls of residence, but it is also the students who operate the hotel as part of their practical duties and classes. Student involvement in the management of the hotel grows with year level of studies, with level 1 students acting as line employees, level 2 as supervisors and level 3 as managers.

Quality Assurance

City Unity College is committed to offering high academic and operational quality standards that ensure a robust and productive learning and teaching environment.

City Unity's quality assurance system has been designed to ensure that students receive quality education and training, consistently across all programmes and levels of study, and in accordance to the standards set by franchising and validating institutions.

City Unity College focuses on maintaining a high-quality teaching and learning environment according to the standards set by the validating institutions. This includes adopting mechanisms that control and evaluate every stage of the teaching and learning experience such as teaching methods, assessment procedures and regulations, student feedback mechanisms, staff development opportunities etc.

In addition to the formal quality assurance mechanisms used for recording student feedback and monitoring academic and operational standards, academic quality is ensured by regular meetings of the various Boards and Committees (City Unity College, 2016).

The Uninettuno Blended Learning Programs at City Unity College

Under the cooperation agreement with Uninettuno University the following 11 Programs will be delivered with the Blended Learning method:

- BA BUSINESS MANAGEMENT
- BA FINANCIAL MANAGEMENT
- BACHELOR IN ENGINEERING
- BACHELOR IN COMMUNICATION MEDIA AND ADVERTISING
- MASTER IN EUROPEAN LAW AND POLICIES
- MASTER IN GLOBAL JOURNALISM
- LAUREA MAGISTRALE IN BUSINESS MANAGEMENT AND DIGITAL ECONOMY (General program and / or one of the pathways: Accounting, Health Management, Hospitality and Tourism and Public Administration)
- 1yr Primo Livello MBA - PATHWAY IN ACCOUNTING (independent program same with the relevant LM 2nd year pathway)
- 1yr Primo Livello MBA - PATHWAY IN HEALTH MANAGEMENT (independent program same with the relevant LM 2nd year pathway)
- 1yr Primo Livello MBA - PATHWAY IN HOSPITALITY AND TOURISM (independent program same with the relevant LM 2nd year pathway)
- 1yr Primo Livello MBA - PATHWAY IN PUBLIC ADMINISTRATION (independent program same with the relevant LM 2nd year pathway)

All Programs are subject to the same quality assurance control and inspection as UTIU Programs in Italy. In addition, the relevant quality assurance department / group of the University will monitor, evaluate and access all activities on a constant basis. The above Programs will be delivered through the model of blended learning: 50% of the Modules will be taught via the UTIU platform and 50% of the Modules will be taught face-to-face by CITYU faculty. For the online modules students will attend the learning process through the UTIU's educational portal at [http:// www.uninettunouniversity.net](http://www.uninettunouniversity.net). The learning processes and the exams of the face-to-face taught modules will take place with the physical presence of the student at CITYU's premises and will be supervised by UTIU's Exams Commission including both UTIU's and local professors.

Instructional Strategies

The 11 programs will be realized by using the following instructional strategies:

- ✓ Authentic cases and scenario-learning
- ✓ Coaching and mentoring
- ✓ Problem-based learning
- ✓ Self-paced learning
- ✓ Virtual team collaboration and problem-solving
- ✓ Simulations or gaming
- ✓ Guided learning
- ✓ Modeling of the solution process
- ✓ Exploration and discovery discussion
- ✓ Lecturing and instructor-directed activities
- ✓ Debates and role play
- ✓ Socratic questioning

Online / technology Based Tools for Blended Learning

Finally, the following online/ technology based tools for Blended Learning will be applied:

- Web 3.0 learning tools
- Uninettuno virtual campus at *Second Life*

- Knowledge management tools
- Digital libraries and content Repositories
- Webcasting and video streaming
- Online simulation
- Mobile and Handheld technologies
- Wireless technologies
- Electronic books
- Wikis
- Language training and support tools

Conclusion

Blended Learning is a huge development in higher education. Its rationale matches perfectly the Uninettuno psycho-pedagogic model which, as it has been noted, is characterized by the shift:

- From teacher's central role to the student's central role;
- From knowledge transfer to knowledge creation;
- From integration between practice and theory;
- From a passive and competitive learning to active and collaborative learning.

Additionally, one of the many benefits of educating through innovative methods, by using also the latest technological innovations, is that students are treated as individuals which allows them to learn at their own timetable and comfort level. It gives to all people at all ages the opportunity to study at their own pace with no restrictions of time and place. It literally abolishes borders in education. Blended Learning in essence allows students to successfully enjoy simultaneously the benefits of both e-learning and face-to-face teaching. In this framework, this paper presented, as a case study, the development, formulation and operation of this new educational norm in the form of the Blended Degree Programs that the International Telematic University Uninettuno has created to jointly run with other partner institutions. Following this reference, the paper examined the methodology of how on campus education is blended with e-learning and at a parallel level, how flexibility and multicultural diversity has been enhanced.

Above all, new innovative educational models such as Blended Learning can definitely make the difference in our complex contemporary world. Above all, education is the domain where humankind bases its future.

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Performance Evaluation in Virtual Lab Training

Vasilis Zafeiropoulos

Hellenic Open University, Greece
vasiliszaf@eap.gr

Dimitris Kalles

Hellenic Open University, Greece
kalles@eap.gr

Abstract

Universities deal constantly with the problem of training their natural/physical sciences and engineering students in how to make proper use of their laboratories and successfully conduct experiments, eliminating the risk of accidents and damages to the equipment. This problem becomes even greater when concerning distance students who visit the laboratory facilities considerably less often. The Hellenic Open University, in its quest to open-up its admissions to an as-wide-as-possible audience, has been recently researching the extent to which a 3D game-like virtual laboratory can be a valuable supplement to conventional laboratory training. Our virtual laboratory, called Onlabs, allows students to learn by interacting with virtual lab instruments and by performing virtual experiments, before actually travelling to university premises to carry out the experiments live. While the basic operation allows for a straightforward simulation, we are currently expanding it to include a scoring mechanism. The scoring mechanism is based on the formulation of the experiment to be carried out as a sequence of steps and the subsequent weighted accumulation of credit and penalty points to capture the effectiveness and efficiency aspects of the experimentation. While scoring in virtual labs is not a substitute for scoring by an instructor, just like the virtual experiment is no substitute for the actual live session, our scoring mechanism allows student to gauge their familiarization with the equipment and the experiment. We are currently working on attempting to formulate scoring in terms of exemplary experiments carried out by a tutor.

Keywords: Serious Games, Virtual Worlds, Biology Laboratory, Distance Learning, Evaluation, Assessment

1. Introduction

Science and Technology Universities are permanently confronted with the task of teaching new incoming students how to make proper use of lab equipment and training them in safely carrying out experiments. In several cases, the laboratory equipment is sensitive and expensive; therefore, it is not affordable for trainees to have the opportunity to make improper use and learn by “trial-and-error” – rather they are instructed what to do and what not to do and, usually, this does not result in the best learning outcome. The problem is becoming even harder when the number of trainees is large and their training takes place simultaneously at the same lab, where the chances of causing damages and accidents are high but, also, the learning result is most of the time not the desired one. Thus, a virtual world providing with an interactive simulation environment of the lab in which the trainee is allowed to experiment and make an unlimited number of mistakes in order to learn, where no time or space restrictions exist, would absolutely help the trainees prepare themselves before they make use of the on-site laboratory.

2. Background and Related Work

Scoring in computer games, that is, embedded mechanisms for the evaluation of the user's performance, has been present since the first arcade games in the history of personal computers. Since then, the classical 2D arcade computer games have evolved into state-of-the-art 3D multi-player ones, and along with them, scoring has diversified into more abstract measures like "experience points" and "skill points" (*Score (game)*, n.d.). However, while computer games have also evolved into serious games and educational virtual worlds, the evaluation of the performance of the various users in them is mainly done externally by their tutors and not by hard-coded scoring algorithms (Bellotti, Kapralos, Lee, Moreno-Ger, & Berta, 2013). In fact, explicit evaluation mechanisms in serious games have been proposed as a major research direction (Bellotti, Berta, & De Gloria, 2010). As Kevin Corti of PIXELearning has put it, "[Serious games] will not grow as an industry unless the learning experience is definable, quantifiable and measurable. Assessment is the future of serious games" (Ritterfield, Cody, & Vorderer, 2009).

An innovating method for explicit evaluation in non-educational virtual worlds has been the measurement of "virtual wealth", meaning the ability to acquire virtual goods in them. By taking the accordingly-introduced measure of Gross Virtual Product (GVP) into consideration, the virtual world participants are guided in identifying the virtual world's health and therefore, take correct courses of actions in terms of virtual finance and commerce and avoid possible risks (Guo & Gong, 2011).

Another pioneering method for the explicit evaluation of users' performance in games (yet not in serious ones either) has been developed with Dynamic Logic Programming (DynLoP). With the use of DynLoP, world states can be assessed in adventure and role-playing games and accordingly, determine how close a player is in finishing a particular quest. DynLoP's declarative nature provides it with strong descriptive capabilities and renders it suitable for such a task (Siska, 2006; Turcek, 2007).

Scoring mechanisms like the afore-mentioned ones are most likely to be incorporated by Business Games, which consist of a major category of serious games. Such games are *INNOV8*, *Virtonomics*, *Shark World*, *Virtual Leader*, *eRepublik* and *Wall Street Survival* (Blazic & Arh, 2013).

On the other hand, there is a quite opposite evaluation method, that of the evaluation of the performance of a computer agent (that is a non-playable character) by a human expert, developed on *Sophie's Kitchen* platform. In this, the agent representing a robot called Sophie tries to make a cake by combining the necessary ingredients and baking it. As the expert's goal is to teach Sophie how to properly prepare a cake, they provide her with various feedbacks during each training session concerning what to do or not which are taken into account by Sophie with the use of reinforcement learning. As soon as the cake is ready, the goal is considered to be accomplished (Thomaz, A., L. & Breazeal, C., 2008).

Onlabs's design resembles the one of an adventure game, and thus a declarative approach in the scoring assessment is suitable to some extent. Nevertheless, as there are plenty of tools and instruments in the game whose internal states are in numerous cases defined arithmetically, a more quantitative approach has been adopted.

3. Conceptual Design of the Virtual World

As mentioned above, Onlabs follows the design and interaction guidelines of a standard adventure game; that is the virtual lab is perceived as a discrete environment, meaning that the *objects* (or *entities*, in a broader sense) in it are perceived separately from one another (Amir & Doyle, 2002). The *agent*, controlled by the human user, interacts with the various entities of the environment by performing a finite set of

actions on them and changes their states in a deterministic fashion according to their previous state and the specific action that has just taken place (Russel & Norvig, 2007).

There are plenty of instruments and other kind of objects that have been simulated and imported in the virtual lab, such as the microscope, the beaker, the glass bottles, the electrical scale, the acid jars, the magnetic stirrer, the electronic pipette etc. In the initial Onlabs ontology, there had been some sort of classification of kindred entities into classes, or, inversely, the instantiation of classes into particular instances. However, in the implementation phase, for various reasons, that design was not fully-adopted; instead, almost every object corresponded exclusively to its own programming script. Thus, while in the initial conceptual design was a class called *vessel* and several instances of it like *glass_water_bottle* and *10X_TBE_bottle*, the latter were dealt with as completely different entities, referring to a separate script each. The evaluation mechanism that we have implemented in Onlabs doesn't take the initial design into consideration at all; thus, it has been purposely omitted in this paper. If the reader is nevertheless interested, they may find more about the broader ontology in other pieces of our work. (Zafeiropoulos, Kalles, & Sgourou, 2016; Zafeiropoulos, Kalles, & Sgourou, 2014)

Despite the afore-mentioned simplification, in order that Onlabs's evaluation mechanism is thoroughly illustrated and easily understood, there is still the need of casting some light on our implementation's design. One of the most important design abstractions that have been adopted in Onlabs is that each entity in our virtual world contains several, yet specific, *features*. The features are either numeric or alphanumeric depending on the type of values they can take. For example, the *content* feature of the *pipette* entity is alphanumeric as it may have the value of "nothing" (if empty) or "distilled_water" (if containing distilled water); on the other hand, the *position* feature of the *light_intensity_knob* entity is numeric and its value range between 1 and 24. A special case of numeric features, conventionally called "Boolean", has also been introduced in our design; for example, the *state* feature of the *AC_switch* entity can obviously be either 1 (on) or 0 (off).

An entity called *ego*, representing the human agent controlled by the user, is also present in the design, containing, among others, its own features.

As mentioned in the introduction, the experimental procedures that the user can undertake in Onlabs and are those of the microscoping of a testing specimen and the production of a 10X TBE solution.

The testing specimen microscoping first of all includes the setting or testing of the various parts of the microscope; starting with plugging in it in the socket and turning the AC switch on, the user then needs to configure the light intensity to 18, open the iris diaphragm by turning the aperture knob to the most leftward position, lift the condenser lens to its highest point, set the objective lens with the smallest magnification (4X that is) as active, successively test the coarse focus knob, the fine focus knob and the x-axis and y-axis knobs of the microscope's stage. All these steps made, everything is ready for proceeding into creating a test specimen using a slide, a wet piece of paper and a slide cover and putting it on the microscope's stage, looking through the ocular lenses and zoom with all objective lenses (4X, 10X, 40X and 100X) in a row. All the afore-mentioned actions must be performed in this specific order (none of them is considered to be more abstract or more general than the other ones) and the evaluation, therefore, of the overall user's performance for the microscoping procedure is said to be "flat".

Concerning the 10X solution production, however, we use a "hierarchical" evaluation approach. In order to do that, instead of considering a set of separate actions executed in a specific order like before, we divide the overall solution production procedure into sub-procedures (those of scaling the trizma base and boric acid powders with the electrical scale, stirring the solution prepared with them with the magnetic stirrer and mixing several other liquids with the stirred one with the use of the electronic pipette); in turn, each of those sub-procedures is split into lesser ones and so on, until no further split can take place.

Due to its clearer and flatter structure as well as its compatibility with our current development platform, the *microscoping* procedure has got its evaluation “encoded” in the implementation so far, while the one for the modular *10X_TBE_solution_production* procedure has been conceptually designed and is planned to be deployed soon, too.

In Onlabs’s versions prior to 2.3, *ego’s state* feature stored the state (phase) concerning the microscoping procedure that the user was at each time in the course of the game (“beginning”, “microscope_connected”, “light_turned_on”, “light_intensity_set_to_18”, etc.). However, that model did not suffice for this particular entity, as the representation through this of all the possible transitions was practically impossible and the user couldn’t therefore be properly evaluated for their course in the game unless they performed a particular set of actions and in the correct order, too (first connecting the microscope to the socket, next turning the light on, then setting the light intensity to 18, etc.); in any other case (for example, first turning the light on and then connecting the microscope to the socket), their course was considered to be a failure.

In order that this obstacle is overcome and a broader evaluation is achieved, a separate algorithm concerning the state that the user is at any time was designed and implemented. In this, the states of the objects’ various features being involved in the microscoping procedure are taken into account.

4. Design of the Evaluation Algorithm

4.1. Flat Evaluation: the case of Microscoping

The *microscoping* procedure, as described in the laboratory manual, consists of specific actions that the user must make, each of which corresponds to a specific feature of a specific entity to take a specific value. The following list enumerates the actions that need to be made as well as the corresponding value assignments in the respective entities’ features:

1. Connect the microscope to the socket: *socket’s connected_to* feature takes “microscope” as its value.
2. Turn microscope’s light on: *AC_switch’s position* feature becomes 1.
3. Set the light intensity to the 3 4ths of its maximum: *light_intensity_knob’s position* feature becomes 18.
4. Open the iris diaphragm to its highest extent: *aperture_knob’s position* becomes 39.
5. Lift the condenser to its highest point: *condenser’s height* feature becomes 0.035119.
6. Set the 4X objective lens to be the active one: *revolving_nosepiece’s active_focus_significance* feature becomes 1.
7. Lift the microscope stage up and down with the coarse focus knob: *coarse_focus_knob’s tested* feature becomes 1.
8. Lift the microscope stage up and down with fine focus knob: *coarse_focus_knob’s tested* feature becomes 1.
9. Move the microscope stage back and forth: *y_axis_knob’s tested* feature becomes 1.
10. Move the microscope specimen holder left and right: *x_axis_knob’s tested* feature becomes 1.
11. Create a testing microscoping concoction and place it on the microscope stage: *stage’s concoction* feature takes “test_concoction” as its value.
12. Enter microscoping mode: *ocular’s mode* feature takes “microscoping” as its value.
13. Zoom with the 4X lens: *microscoping’s blur_final* feature becomes 404274 (as long as 4X is the active lens).

14. Zoom with the 10X lens: *microscoping's blur_final* feature becomes 1000000 (as long as 10X is the active lens).
15. Zoom with the 40X lens: *microscoping's blur_final* feature becomes 1000000 (as long as 40X is the active lens).
16. Zoom with the 100X lens: *microscoping's blur_final* feature becomes 1000000 (as long as 100X is the active lens).

One sees that the steps 1, 11 and 12, in contrary to the rest, concern alphanumeric values: (a) the “socket” value of the *microscope's connected_to* feature, (b) the “test_concoction” value of the *stage's concoction* feature, and (c) the “microscoping” value of the *ocular's mode* feature. In order for those to be elaborated by the scoring algorithm, a sort of “quantification” is performed on them: (a) “socket” is quantified into 1 while its alternative value (“nothing” that is, being the value that the *connected_to* feature is initialized to) is quantified into 1, (b) “test_concoction” is in the same way transformed into 1 and its alternative value (“nothing”) into 0, and lastly, (c) “microscoping” is transformed into 1 and its alternative value (“navigation”) into 0. The rest of the steps deal with values which are either numeric from the beginning (e.g. *light_intensity_knob's position* values, *condenser's height* values etc.) or “Boolean”, that is 1 (true) or 0 (false) (e.g. *AC_switch's state* values, *coarse_focus_knob's tested* values etc.).

Next comes the “normalization” of the values of some of the features based on the principle that *the initial values of all the features taken into account must be 0* while their optimal values (that is the values that those features will have when the mircoscoping procedure has been completed) must be maximum (to be explained why later on). For example, the *light_intensity_knob's position* feature ranges between 1 and 24, with the initial value being 1 and the optimal one being 18, therefore the normalization is achieved through the following function:

$$f(x) = 17 - |18 - x| \quad (1)$$

where x is the knob's position and $f(1)=0$ (1 is the initial as well as lowest value of x) and $f(18)=17$ (18 is the maximum-optimal value of x).

Similarly, the *condenser's height* ranges between 0.011400 and 0.035119, the latter being the optimal value as it corresponds (in pixels) to the maximum height that the condenser can be raised at, while the initial value is 0.031000; however, as we want the initial value to be 0 and the optimal one to be maximum, we subtract 0.03100 from each value while for the sake of facilitating the calculations, we multiply it by 10000, achieving the *height's* range between -19600 and 4119 with 0 being its initial value.

The values of the *microscoping's blur_final* feature have also been normalized in the same fashion for each one of the 4 objective lenses.

In figure 2, one sees the diagrammatic representation of the afore-mentioned procedure after the quantification and the normalization of the respective values; each stack consists of the quantified and normalized values that the respective feature can take while the arrow going through some specific values of them suggests the optimal sequence of actions for the successful completion of the microscoping procedure.

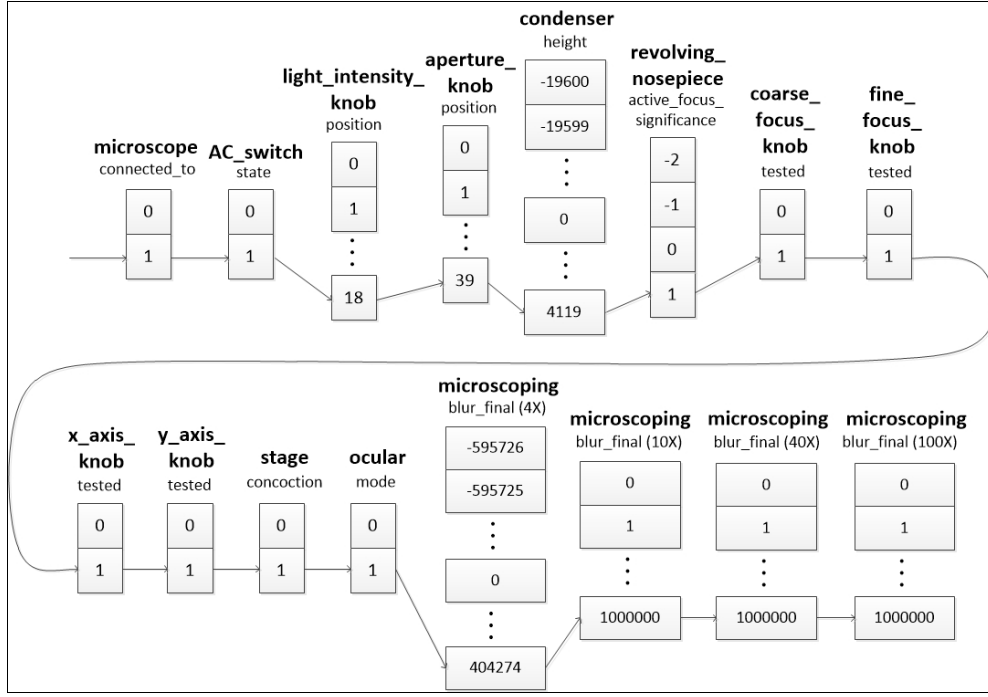


Figure 2: Diagram for the various entities' features concerning the microscoping procedure

Next comes an array called *optimal_action*, which contains the optimal values (or the numeric quantities corresponding to them, in the case of alphanumeric values), being the values that those features have provided the microscoping procedure has been successfully completed, and another array of the same size called *action*, where the features' current values are stored. For example, the first place in the *optimal_action* array, concerning whether the microscope is connected to the socket or not, contains the value of 1, meaning that the microscope's being connected to the socket, while the respective place in the *action* array starts with the value of 0, that is the microscope not being connected to the socket, which however becomes 1 when the user makes the connection. In figure 3, one sees the values of those two arrays at the beginning of the game.

For each change of value taking place in the *action* array, that is after the user's performing of an i -indexed action which changes the i -th value in this array, the *success_rate* is being computed with the use of a specific metric distance; the latter is defined as the "distance percentage" between *action* and *optimal_action* arrays and is in fact the sum of the particular distance percentages between each pair of respective values of those two arrays. In detail, the metric distance defined is the following weighted average percentage:

$$success_rate \leftarrow \frac{\sum_{i=1}^n w_i \frac{action_i}{optimal_action_i}}{\sum_{i=1}^n w_i} \cdot 100 \quad (2)$$

where n is the length of the *action* array or, in other words, the number of the actions required for the completion of the microscoping procedure (16 in this case), and w_i the predefined weight concerning all the possible i -indexed actions. Apparently, this metric distance guarantees that the result does not exceed the value of 100%.

	<u>action</u>	<u>optimal_action</u>
microscope.connected_to	0	1
AC_switch.state	0	1
light_intensity_knob.position	0	18
aperture_knob.position	0	39
condenser.height	0	4119
revolving_nosepiece.active_focus_significance	0	1
coarse_focus_knob.tested	0	1
fine_focus_knob.tested	0	1
x_axis_knob.tested	0	1
y_axis_knob.tested	0	1
stage.concoction	0	1
ocular.mode	0	1
microscoping.blur_final (4X)	0	404274
microscoping.blur_final (10X)	0	1000000
microscoping.blur_final (40X)	0	1000000
microscoping.blur_final (100X)	0	1000000

Figure 3: The action and optimal_action arrays at the beginning of the game

Next, a check is being performed whether the values at the preceding places of the i -th one in the *action* array are the same with the respective values in *optimal_action*; if for a value the check gives a positive answer, that means that the respective required action has preceded the i -th action and nothing is done; otherwise, a particular penalty value is assigned. The formula according to which a penalty value after an i -indexed action, $penalty_i$, is calculated is the following:

$$penalty_i \leftarrow old_penalty + \sum_{k=1}^i effect(k,i) \cdot w_k \cdot (optimal_action_k - action_k) \quad (3)$$

where *old_penalty* is the sum of all the penalties been assigned so far. Moreover, the *effect(k,i)* function produces in fact an additional weight on the i -indexed action given that the k -th element of the *action* array doesn't have its optimal value, or, in other words, it increases the penalty on the i -th action in case the k -th action hasn't been made.

For example, $effect(2,12)=200$ by definition, meaning that if the value of *ocular's mode* feature changes without *AC_switch's state* having got the optimal value before, that is if the user tries to see through the ocular lenses without having turned on the microscope light, the penalty that will be assigned for that will multiplied by 200, as that error is considered to be a serious mistake from an educational point of view. On the other hand, $effect(8,11)=1$, that is if the user places the concoction on the microscope stage without

having tested the fine focus knob before, the penalty will be affected only by the w_g weight (which is set to be equal to 5).

The algorithm described above was programmed in Onlabs version 2.3 and modified and enhanced in version 2.4. Those two versions include the demonstration in real time of three measures which concern at what extent and in which order the microscoping procedure has been completed and whose values are calculated according to this algorithm: the *success_rate* and the *penalty* which were mentioned above, and the *aggregate_score* whose value is the *success_rate* itself, yet weighted by the accumulated *penalty*:

$$aggregate_score \leftarrow e^{-\frac{penalty}{1000}} \cdot success_rate \quad (4)$$

One sees from the following formula, among others, that *aggregate_score*, exactly like *success_rate*, can't exceed 100%.

When user running Onlabs, *success_rate* and *penalty* appear on the right-top corner of the screen (figure 2) while by pressing the Space bar key, those two measures along with *aggregate_score* appear on a pop-up table (figure 4).



Figure 4: By pressing the Spacebar, *success_rate* (% completed) and *penalty* (penalty points) as well as current *aggregate_score* show up in a pop-up table.

Another thing that needs to be mentioned is that *success_rate*, while secured that it can't exceed the value of 100%, yet it can take negative values if one or more elements in the *action* array get negative values themselves (which is, as we have already seen, not impossible to happen for some of *action*'s elements). In that case, *success_rate* automatically changes to 0% preventing that way the display of a negative result which would possibly confuse the user instead of helping them. The same change in case of negative values applies to *aggregate_score*, too.

4.2. Hierarchical Evaluation: the case of 10X TBE Solution Production

The microscoping procedure evaluation algorithm, albeit efficient for that particular case, has the drawback of being "flat", meaning that the various actions concerning it are registered and examined as equal to one another. However, in more complex procedures like the one of the *10X TBE solution production*, flat evaluation is hard to be designed and implemented while on the other hand its usefulness is rather minimal.

For this purpose, and using the *10X TBE solution production* process as our testing pattern, the evaluation algorithm was modified in such a way that it could cover composite procedures as well.

A basic property of the modified evaluation algorithm is the fragmentation of a procedure into sub-procedures, which in turn are being divided into even more rudimentary sub-procedures etc. In our illustration, focus will be laid on the *magnetic stirring* procedure, which, as mentioned in the beginning, is a sub-procedure of the *10X TBE solution preparation* one.

The very first thing to do is to split *magnetic stirring* into the sub-procedures of *setting-up* of the magnetic stirrer with the liquid to be stirred on and the *activation* of the former. The *setting-up* sub-procedure is in its turn being split into the ones of the *solution preparation*, the *solution placement* on the magnetic stirrer and the *magnet insertion* into the bottle of liquid for stirring.

Having done the division of the main procedure into the next-in-the-hierarchy ones etc., one reaches a point at which they just have elementary sub-procedures and no further fragmentation is possible; then, for every elementary sub-procedure, the features of those entities affecting and determining the completion scale of the latter are being defined. In our case, the *solution preparation* is determined by the *content* feature of the *glass water bottle* entity (that is, the bottle with water which the solution is to be prepared in) and specifically the *grams of boric acid*, the *grams of trizma base* και the *ml of water* that exists in the solution; the *solution placement* on the magnetic stirrer is defined by the *place* feature of the *glass water bottle* (that is, if the latter has the value of “magnetic stirrer hot plate”, or, in simple words, if the bottle is placed on the hot plate of the magnetic stirrer); the *magnet insertion* in the bottle is similarly defined by the *place* feature of the *magnet* entity (that is, if it has the “glass water bottle” value, or, in human terms, is placed in the bottle with the solution); lastly, the *activation* of the magnetic stirrer depends on the *state* feature of the *ON/OFF button* (that is, its ON/OFF button is pressed or not) and on the *position* of each of the *temperature knob* και *RPM knob* components of it (that is, what are the positions of the knobs configuring the temperature and the stirring frequency of the solution).

The magnetic stirring separation into sub-processed described above is depicted in figure 5.

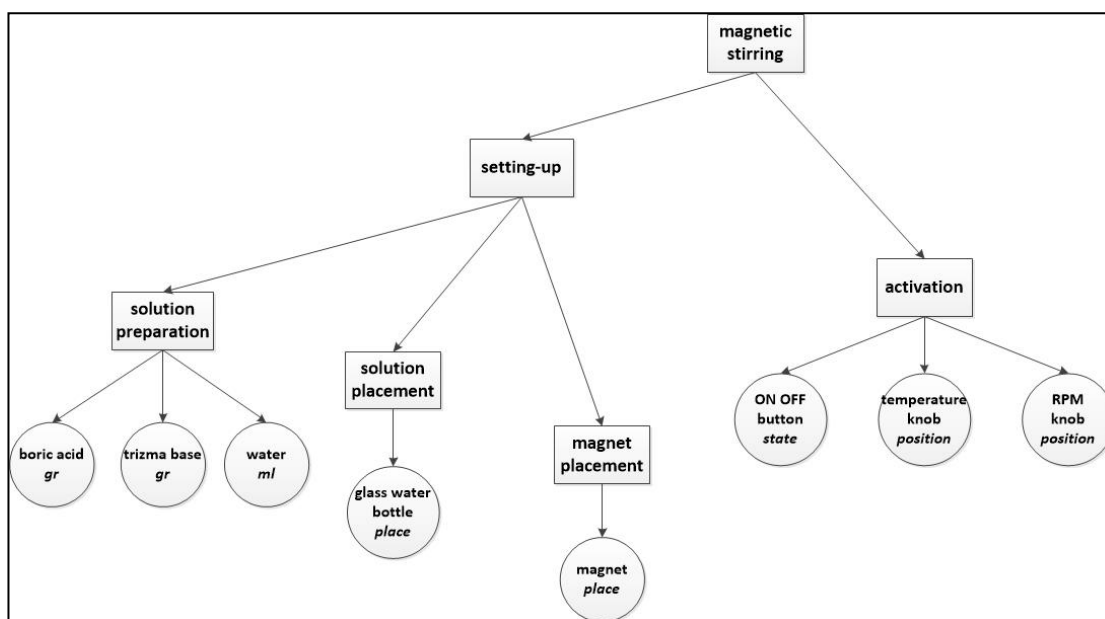


Figure 5. Separation of the magnetic stirring procedure in sub-procedures.

In case a procedure is defined by one single feature, as for example the *solution placement* on the magnetic stirrer is defined only by the *place* feature of the *glass water bottle*, then its success rate is calculated with the use of a quotient similar to the ones in the “flat” evaluation described in the previous sub-section. In this case, the *solution_placement* quotient (named after the respective sub-procedure) will be:

$$solution_placement \leftarrow \frac{glass_water_bottle_place}{glass_water_bottle_place_0} \quad (5)$$

where *glass_water_bottle_place* is the quantified value of the glass water bottle’s *place* alphanumeric feature while *glass_water_bottle_place₀* being the respective optimal one. Following the same guidelines as in the evaluation algorithm for the microscoping procedure, the numerator is 0 in case the *place* alphanumeric feature doesn’t have the value of “magnetic_stirrer_hot_plate” and 1 in case it has it while the denominator is always 1. As a consequence, when the bottle is placed on the stirrer’s base, *solution_placement* becomes 1 while in any other case it is 0. The *magnet_placement* success rate is defined in the same fashion.

Things become more complicated when more than one features affect a sub-procedure, as for example in the case of magnetic stirrer’s *activation*.

In this case, the success rate is defined as the product of the quotients corresponding to the particular features. For example, *activation* is defined as:

$$activation \leftarrow \frac{ON_OFF_button_state}{ON_OFF_button_state_0} \cdot \frac{temperature_knob_position}{temperature_knob_position_0} \cdot \frac{RPM_knob_position}{RPM_knob_position_0} \quad (6)$$

In the equation above, the left-most quotient, which concerns *ON/OFF button’s state* feature, follows the same guidelines as *glass_water_bottle_place* that was mentioned before, as its numerator can be 0 or 1 and its denominator is always 1. Nevertheless, the denominators of the other two quotients, which concern the *position* features of *temperature knob* και *RPM knob* entities, are not 1, and especially in the case of the *temperature knob*, the optimal value is 200 (°C) while the maximum one is 300 (°C), meaning that the quotient can easily take a value greater than 1 which is non-desirable as we are dealing with success rates. Consequently, the quotient symbol is merely conventional for those two cases and in fact the following function is made use of:

$$f(v) = \frac{1}{1+c(v_0-v)^2} \quad (7)$$

where *v* is the quantified value of the particular feature, *v₀* is the respective optimal one and *c* is a constant which defines how steeply the *f* function varies. As seen in its graph for the particular case that *v₀*=3 and *c*=20 depicted in figure 6, it takes its maximum value of 1 when *v*=*v₀*.

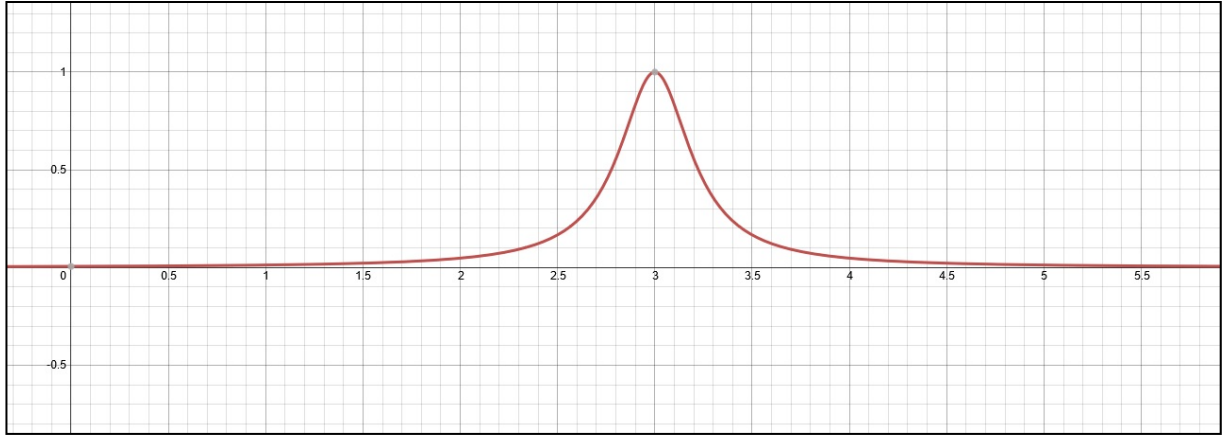


Figure 6: The graph of $f(v) = \frac{1}{1+c(v_0-v)^2}$ function for the particular case that $v_0=3$ and $c=20$.

In our example dealing with the temperature of the magnetic stirrer hot plate which is configured with the respective temperature knob, if the optimal temperature for the stirring process is perceived to be 200 (°C) and we set $c=0.001$, for a temperature of 150 (°C), the resulting success rate would be 0.29.

In turn, the success rates of more complex sub-procedures shown in picture 5, which are not directly reduced to features but to other sub-procedures, are defined in the same way of forming products of quotients. For example, the magnetic stirring *setting-up* is recursively defined as:

$$setting_up \leftarrow \frac{solution_preparation}{solution_preparation_0} \cdot \frac{solution_placement}{solution_placement_0} \cdot \frac{magnet_placement}{magnet_placement_0} \quad (8)$$

Correspondingly, the success rate of the basic procedure of magnetic stirring is:

$$magnetic_stirring \leftarrow \frac{setting_up}{setting_up_0} \cdot \frac{activation}{activation_0} \quad (9)$$

Moreover, as one also notices in figure 6, the various sub-procedures that are “children” of the same paternal (sub-)procedure “stand” in different heights. The reason is no other than the order that any of those should, optimally, be executed; that is, from the “highest” to the “lowest”. As in the “flat” evaluation algorithm concerning the microscoping procedure, the sub-procedures execution order doesn’t affect the success rate; instead, it assigns penalty points separately to each one of them. The penalty assignments are identical to those within the “flat” algorithm described in the equations (3) in the previous sub-section.

Magnetic stirring, nevertheless, is not considered to be a stand-alone process; instead, as mentioned in the beginning, it’s an organic part of the *10X TBE solution production*. Thus, magnetic stirring’s success rate and accumulated penalty points are sent as input to the latter, which, taking also into account the feedback from its other sub-procedures, produces the overall success-rate and aggregate score.

5. Conclusion & Future Work

In this paper, starting from explaining the fundamentals of the architecture and design of Onlabs educational game, we demonstrated the scoring algorithm that we developed for the user’s performance evaluation in it. So far, the algorithm concerns the processes of *microscoping* of a testing specimen and the *10X TBE solution production*.

Microscoping was dealt with a flat variation of our evaluation algorithm while *10X TBE solution production* used a hierarchical version of it provided with a modular way of handling of the various actions. In the latter, more general actions consisting of simpler ones that the user can instantly perform have been conceived and new measures have been created and assigned to them, so that the algorithm's focus is laid on a higher level of abstraction. Like the flat evaluation algorithm which has been fully implemented in the latest couple of Onlabs versions, the hierarchical one is to be deployed, too, in the near future.

Last but not least, another field of further development is the specification of the weights in the algorithm in a more realistic fashion. In this initial scoring version, the weights have been defined intuitively; yet, in order for the evaluation algorithm to be more educationally efficient, machine learning techniques like artificial neural networks and reinforcement learning are to be used for their adjustment.

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Onlabs, along with its flat evaluation mechanism concerning the microscoping process, is available for download from its website².

² <https://sites.google.com/site/onlabseap/>

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Flexible continuing education (incl.CPD) and new types of courses (short learning programmes) to accommodate 25+ students

Using online primary sources to foster historical thinking

Orna Farrell, Dr. James Brunton
National Institute for Digital Learning, DCU.

Evaluating the significance of credentials and the significance of for-profit versus non-profit education in the veteran job market

Donna Duellberg¹, EdD; Christine Hansen, PhD²; DeAnna S. Dotson, Esq³; April Y. Brown, Med⁴;
CMC Edward Lewis, MA⁵
United States Coast Guard¹; Hawaii Pacific University²; Attorney, Criminal Justice Act panel, Ninth Circuit Court of Appeals, District of Hawaii³; Department of the Navy⁴; United States Coast Guard, USA⁵

Work in Progress - The MicroElectronics Cloud Alliance: A way to deliver OERs in a Cloud-based European Infrastructure

Rosario Gil-Ortego, Pablo Baizán, Alejandro Macho, Clara Pérez-Molina, Manuel Castro-Gil
Electrical and Computer Engineering Department (DIEEC), Industrial Engineering Technical School (ETSII), Spanish University for Distance Education (UNED), Spain
Maria José Albert-Gómez, Rafael Jiménez-Castañeda, Slavka Tzanova
Spanish University for Distance Education (UNED), Spain; Cadiz University, Spain; Technical University of Sofia (TUS), Bulgaria

Creating Curious Learners Through Short Learning Programmes

Liz Moody, Jo Lambert
Faculty of Business and Law, the Open University, UK

INFORM INSPIRE INNOVATE™ - Redefining an institutional Short Courses Division in South Africa

Carol Kat
Stellenbosch University; South Africa

Food for Thought: A New Type of Online Course for Non-Traditional Students

Virginia R. Mosser
Southern Virginia University / University of Virginia, USA

Connacht Ulster Alliance Ireland, Collaborative Initiative: Recognising Prior Learning (RPL) with an online ePortfolio assessment tool and an open online assessor skills

course www.myexperience.ie

Dr Carina Ginty¹, Mr Gavin Clinch²

Galway-Mayo Institute of Technology, Ireland¹; Institute of Technology Sligo, Ireland²

Fostering the digital transformation of European SMEs and Public Administrations: the IN-CLOUD project

Dario Assante, Claudio Fornaro, Emanuel Weitschek¹; Manuel Castro, Sergio Martin²; Ileana Hamburg, Sascha Bucksch³; Aisling Owens⁴; Ricardo Tavio Gallo⁵; Kostas Konstantinou, Spyros Stekoulis⁶; Alcino Pascoal, Catarina Reis⁷; Mario Spatafora, Ana Maria Cotovanu⁸

International Telematic University Uninettuno, Rome, Italy¹; UNED, Madrid, Spain²; IAT, Westfälische Hochschule, Gelsenkirchen, Germany³; Lisburn Enterprise Organization, Lisburn, United Kingdom⁴;

EVM Project Management Experts, Santa Cruz de Tenerife, Spain⁵; Anaptiksiaki Anonymi Eteria O.T.A Anatoliki Thessalonikis – Kentro Anaptiksis Anthropinou Dinamikou Kai Enischisis Tis Topikis Oikonomias, Thessaloniki, Greece⁶; Associacao Parque de Ciencia e Tecnologia de Almada/Setubal – Madan Parque, Caparica, Portugal⁷; Finance & Banking – Effebe Association, Rome, Italy⁸

Online Proctoring of Exams: authenticity, integrity, security

Gavin Clinch

Centre for Online Learning, Institute of Technology Sligo, Ireland

Using online primary sources to foster historical thinking

Orna Farrell

Academic Coordinator/Digital Learning Specialist, Humanities Programmes, Open Education, National Institute for Digital Learning, DCU.
orna.farrell@dcu.ie

Dr. James Brunton

Programme Chair-Humanities Programmes, Open Education, National Institute for Digital Learning, DCU.
james.brunton@dcu.ie

Abstract

This paper describes an ongoing initiative to enhance learner digital literacies by fostering historical thinking using digitized primary sources. Engaging with primary sources is central to the development of authentic critical historical thinking. In the past thirty years, millions of primary sources have been digitized by libraries and archives and has created a wealth of rich content for historians and history students. However the sheer scale of sources material, websites and questions about source quality make it a challenging research environment for learners. Based on current tutor and student feedback, additional support material that could increase access to these valuable open educational resources would be well received.

The initiative is creating a set of learning materials which will support the use of online primary sources and enhance the learner experience. These learning materials will support flexible/off-campus learners and their development of research skills in the six BA in Humanities (Open Education) history modules.

The learning materials are comprised of:

- An interactive guide to online primary sources
- An accompanying social bookmarking web page- Diigo
- An online tutorial to practise finding, evaluating and using online primary sources

Keywords: OERS, Blended Learning, Open Education, New modes of teaching

1. Introduction

The impact of technology, in particular the digitization of artefacts and historical sources has altered how we learn about the past. This paper explores how this digitisation of archival material is impacting the teaching and learning experience within the discipline of history. More specifically, the paper will detail an ongoing initiative called “The History Lab” which seeks to develop critical historical thinking in higher education history learners by engaging with digitized primary sources.



Over the past twenty five years, millions of primary sources have been digitised by libraries and archives and made available online. (Malkmus, 2008) From an Irish context, in the lead up to the centenary of the 1916 Rising, there has been a major drive to survey and digitise relevant archival material. These digitisation projects share a common ideal to make Ireland’s heritage widely available to everyone and to enrich the historical narrative. The Decade of Centenaries has contributed archival developments such as the digitisation of the Bureau of Military History Military Service Pensions

Collection, and the 1901 and 1911 censuses. Other projects such as the Google virtual tour “Dublin Rising 1916-2016 Virtual Tour” a unique digital primary source project demonstrate scale and scope of online primary sources available to history learners.

2. Method

The “History Lab” initiative is using a design patterns for learning framework to address the recurrent problem of history learners research skills and critical engagement with digital primary sources. (Maina & Mor 2015) Whilst considering the context of higher education and learning design, pedagogical affordances refers to how we “design a tool so that it supports activities which are seen as desirable or necessary for learning.” (Hammond 2010) Following a design patterns for learning framework, we examined firstly the problem, the context and then outlined a solution. (Maina & Mor 2015, Laurillard 2012)

2.1 Problem

History is the study and interpretation of the past, and engaging with primary sources is central to the development of authentic critical historical thinking. (Wineburg, 1999) Since the 1970s, millions of primary sources have been digitised by libraries and archives which has created a wealth of rich content for historians and history students. However the sheer scale of sources material, websites and questions about source quality make it a challenging research environment for history students. (Tally & Goldenberg, 2005) Based on current tutor and student feedback, additional supports which would support student research skills would be welcomed.

Research conducted by Tally & Goldenberg (2005) has found that using primary documents gives students a sense of the reality and complexity of the past and the multimedia nature of digital archives offer students multiple pathways into thinking about historical and cultural issues. Interacting with digital archives creates opportunities for authentic historical thinking processes.

According to the founder and Director of the Stanford History Education Group Sam Wineburg (2015), engaging with primary sources is central to the development of authentic critical historical thinking. Wineburg (2008) poses a very pertinent question in his article “Seeing thinking on the Web”:

“How do we use new digital technologies not only to make sources more available, but also to cultivate skills that teach students to read and think about these sources in meaningful ways?”

In order to address this question, Wineburg’s team at Stanford School of Education and the Center for History and New Media at George Mason University collaborated on a project called Historical Thinking Matters <http://historicalthinkingmatters.org/> which created a website which uses online historical resources in combination with tools designed to show and teach historical reading and thinking. Wineburg has designed learning materials which teaches students how to investigate historical questions by employing reading strategies such as sourcing, contextualizing, corroborating, and close reading using digital documentary evidence.

Educational researcher Avishag Reisman (2012) applied Wineburg’s *Reading like a Historian* curriculum in her 2012 study with 236 high school students in San Francisco which measured the effect of the curriculum over a period of six months in four dimensions: students’ historical thinking, their ability to transfer historical thinking strategies to contemporary issues, their mastery of factual knowledge, and their reading comprehension. Reisman’s study found that instruction with multiple documents increased students’ content retention and skills with sourcing and close reading

2.2 Context

The setting is Open Education, part of the National Institute for Digital Learning, which is a provider of online, ‘off-campus’ programmes in Dublin City University. The participants are learners studying on the BA (Hons) in Humanities which is a modular humanities programme whereby learners can study a combination of history, sociology, literature, psychology and philosophy. There are six history modules covering topics ranging from the Renaissance to modern Irish history and there are approximately 160 learners. The modules are delivered through a blend of virtual online tutorials and face to face sessions. The participants are mature adult students (over the age of 23) combining study with work and family commitments, in the context of this paper they are defined as flexible learners. (Brunton, Brown, Costello, Delaney, Fox, & Galvin, 2015)

Another key contextual element to this project is the centrality of research skills, digital literacy and familiarity with primary sources at an international, national, university and programme level.

In the UK, the (QAA, 2014) subject benchmark statement for undergraduate history states that students should develop “the ability to read and analyse texts and other primary sources, both critically and empathetically, while addressing questions of genre, content, perspective and purpose.” In Ireland, the National Framework for Qualifications (NFQ, 1999) states that the learning outcomes of all level 8 undergraduate degrees includes competency requirements of advanced research skills and critical thinking. These are reflected in our BA (Hons) Humanities programme learning outcomes such as: using advanced skills to conduct research, confidently negotiating access and navigation of online resources and internet based environments and utilise electronic reference resources. How can we encourage the development of these essential skills?

2.3 Solution

The solution was to create a set of active learning materials modelled on Wineburgs approach outlined above which will support and scaffold the learners' engagement with digital primary sources.

"The History Lab: Digital Research Skills" aims:

- To provide access & encourage the use of digital primary sources
- To develop advanced research skills that teach students to read and think about these sources in meaningful ways
- To teach students how to think like a historian i.e how to investigate historical questions by employing reading strategies such as sourcing, contextualizing, corroborating, and close reading using digital documentary evidence
- To encourage inquiry based learning (Laurillard 2012)

3. The "The History Lab: Digital Research Skills"

3.1 Interactive A-Z Guide to Online Primary Sources

We have created an interactive A-Z guide to online primary sources which contain a selection of 60 relevant resources to the BA Humanities six history modules. The guide contains a short description of each resource, a web address and some images of primary sources and some relevant embedded video. The guide was made using Atavist <https://atavist.com/> which is web based, embedded videos, links, interactive tables and is mobile ready.

3.2 Online Tutorials

We are creating a series of online tutorials to practise finding, evaluating and using online primary sources, which incorporate supporting video explaining how to use those resources which will encourage student visualisation of key concepts (Henderson, Selwyn, Finger, Aston, 2015)

The tutorials are structured around five key questions:

1. How can I use these online resources?
2. How can I find a journal article?
3. How can I find an entry in the census?
4. How do I search a newspaper archive?
5. How do I use a primary source in my work?

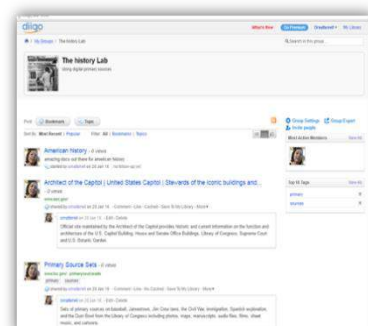
The tutorials are designed to encourage the learners to think like a historian. The tutorial are made using Articulate Studio.

3.3 Social Bookmarking

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A social bookmarking page for the History Lab has been created using Diigo. The aim of this page is to encourage group collaboration and peer learning, it makes organizing and saving web resources faster and easier for learners who can comment on other students' bookmarks, annotate and highlight interesting sections

4. Next Steps

Our next steps, is to launch “The History Lab: Digital Research Skills” to the BA Humanities learners in November 2016 and then collect feedback from the learners in April 2017, with a view to improving and or adapting the materials.

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EVALUATING THE SIGNIFICANCE OF CREDENTIALS AND THE SIGNIFICANCE OF FOR-PROFIT VERSUS NON-PROFIT EDUCATION IN THE VETERAN JOB MARKET

Donna Duellberg, EdD

United States Coast Guard, USA
donna.j.duellberg@uscg.mil

Christine Hansen, PhD

Hawaii Pacific University, USA
chansen@hpu.edu

DeAnna S. Dotson, Esq

Attorney, Criminal Justice Act panel, Ninth Circuit Court of Appeals, District of Hawaii, USA
ddotson02@gmail.com

April Y. Brown, MEd

Department of the Navy, USA
april.y.brown@navy.mil

CMC Edward Lewis, MA

United States Coast Guard, USA
edward.f.lewis@uscg.mil

Abstract

We investigated the impact of three broad “educational background” criteria on hiring of veterans after separation from military service. To test the importance of educational background in applying for jobs, we submitted over 500 resumes from four different fictitious applicants, each with a different educational background, and recorded the number of employer offers for job interviews. We then compared the number of job interview offers or “callbacks” for each of these four applicant backgrounds. We found that applicants with a degree from an institution of higher education, whether public/private non-profit or for-profit, received the most offers for interviews. Combined these individuals had an average 5.1% success rate: “Paul,” our fictitious applicant with a degree from a non-profit institution, received the most offers, with a 5.5% success rate; and “Lee,” our fictitious applicant with a degree from a for-profit institution, received the second most offers, with a 4.7% success rate. This small difference suggests that whether the degree was from a public/private non-profit or for-profit institution makes little difference to hiring officials. Applicants with only a job-related certificate had a 2.36% success rate. Applicants with no formal higher education, but with a background targeted toward the job, had a 0% success rate. We concluded that employers appear to prefer applicants with degrees over applicants with certificates, but that applicants with either a degree or a certificate are preferred to applicants with only relevant experience. We also noted occupational specialty played a role in whether or not interviews were extended to our fictitious applicants. Individuals with either a food service or culinary specialist designation received the greatest percentage of interview invites followed by veterans who had prior machinery technician or engineman rating insignias.

Keywords: For-profit vs non-profit educational institutions; credentialing; certificates

1. Problem statement and rationale for study

College education has never been more crucial in the job market. Recent studies (Carnevale, Jayasundera & Gulesh, 2015; Sherman, 2016) show that “97% of good jobs added in the recovery went to college graduates.” Surprisingly, even lower-wage jobs created in the recovery overwhelmingly went to applicants with some college, while applicants with only a high school education lost jobs during the same period. In fact, according to Soergel (2016), “although total employment in the U.S. grew by 31 percent between 1989 and 2016, the number of opportunities for individuals with a high school diploma or less has actually declined by 13 percent – or 7.3 million jobs.” These stunning figures strongly reinforce the wisdom of the military’s longstanding emphasis on voluntary education programs for its active duty personnel. Protections exist in the military education sector to buffer the service member from pitfalls in the educational marketplace, and to ensure that the member has the best chance of being hired in gainful employment after separating from service.

The renewed interest in evaluating the worth of academic institutions that serve the military community makes sense. Questioning the value of a degree versus a certificate and whether a degree from a for-profit or non-profit institution makes a difference in hiring practices is prudent considering the competition for shrinking dollars. Stewardship of the military’s Tuition Assistant (TA) Program, the program which funds voluntary education for over 1,340,000 active duty service members, and its policies are directly tied to an executive order titled “Establishing Principles of Excellence for Educational Institutions serving Service Members, Veterans, Spouses and other family members” (Executive Order no. 13607, 2012). Because of this executive order and other actions stimulated by Senator Harkin’s Committee on Health, Education, Labor, and Pensions and its 2-year investigation, the government has taken steps with legislation and pending bills in Congress to provide safeguards that protect students from abusive career colleges and safeguard taxpayer dollars. The Gainful Employment Regulations (2014) protect Americans from poor career training programs. Highlights of the rule include:

- Preventing students from being buried in debt by having accountability standards coupled with sanctions that would prohibit federal student aid;
- More rigorous accountability than previous regulations setting higher passing requirements and shorter paths to ineligibility for the poorest-performing programs;
- Transparency about student success and requiring institutions to provide important information about their programs, former students’ earnings, success at graduating, and the amount of debt accumulated;
- Improving student outcomes with increased accountability in higher education by setting standards for career training programs, including programs offered by for-profit institutions.

Proposed regulations further protect student borrowers and taxpayers against predatory practices by postsecondary institutions that will grant student loan forgiveness if defrauded or deceived by an institution. Additionally, the regulation would prohibit the use of mandatory pre-dispute arbitration clauses and class action waivers that deny students their right to file a lawsuit, or in their enrollment agreements or other pre-dispute arbitration agreements or clauses in other documents, in order to force students to sign away their right to pursue relief.

These proposed regulations protect students and taxpayers from fraudulent or failing institutions of higher education by establishing tougher program integrity targeting misleading claims by colleges and incentives used by recruiters to enroll students and ensure that only eligible students or programs receive financial aid; improving accreditation practices that focus on student outcomes; and strengthening the Higher Education Act’s 90/10 rule (2006) that protects military service members, veterans, and their families from predatory actions by for-profit colleges.

However, there is a lack of clarity whether or not student success should be solely defined as gainful employment post graduation. Emphasis on this outcome alone lends itself to questioning the entire process of attending college as there surely are more efficient and cost effective ways to train someone to task. This definition of success renders all the other bi-products of obtaining one's degree as inconsequential. Thus, the intent of obtaining one's degree has become more opaque, obscured by a flurry of new conditions, which are less familiar and less studied, but very important in the day-to-day operations of military educational centers. For example, the terminological scythe sliced across the traditional distinctions as "regionally accredited" versus "nationally accredited" versus "non-accredited," etc., and everyone felt confident that these were correlated with subsequent employment outcomes. The criteria seemed tangible and straightforward. We largely relied on the accrediting bodies' ratings of educational institutions—such as an educational institution's accreditation status and Servicemembers Opportunity Colleges (SOC) membership—to separate the educational wheat from the educational chaff. Moving away from familiar benchmarks to new criteria has definitely complicated matters for the education community. The challenge for us was to connect today's top credentials in a cause-and-effect way with an optimal future for the military member after separation, including job prospects. To attempt to clarify these connections, we chose to focus on two major criteria for our research: the for-profit versus non-profit and certificates and licenses versus academic degrees terminological distinctions.

In recent years the for-profit military educational sector has been largely lumped together into a single monolith, raising certain questions about whether the data set really supports the stark divisions sometimes drawn between the entire for-profit sector and the non-profit private or public sectors. This type of "categorical knowing" has led to questionable policy decisions. For example, the U.S. Education Department's "defense to repayment" proposal imposes conditions on for-profit and private non-profit schools, while exempting public institutions despite the fact that 85% of students attending institutions with a default rate of 30 percent or higher attend public schools (Cooper, 2016). Simultaneously, there has been a very rapid growth of interest in credentialing programs as opposed to traditional educational degrees—so rapid that it isn't really known if the infrastructure supporting these credentialing programs can withstand attacks on its credibility. Our study sought an objective basis for these new categories: How do these categories relate to the hiring of military members after separation from service?

We wanted to start with the body of research that already existed, and in this sense, the first category, for-profit versus not-for-profit sector was the easiest to investigate. In regard to the first dichotomy, for-profit versus not-for-profit distinctions, the discussion can almost seem like Darth Vader versus Luke Skywalker. The for-profit educational industry has been assigned the mask of the villain as the legitimacy of a for-profit education has recently received considerable scrutiny (Lang & Weinstein, 2012; Deming, Goldin, & Katz, 2014; Darolina, Koedel, Martorell, Wilson, & Perez-Arce, 2015; Cellini & Tuner, 2016; and Halperin, 2016). Lang & Weinstein's (2012) research found that "students starting associates degree programs at for-profit institutions have statistically significant worse outcomes than those starting in the not-for-profit/public institutions," albeit acknowledging this finding is probably not a causal one. Specifically Darolina's research team found "no evidence that employers prefer applicants with resumes listing a for-profit college relative to those whose resumes list either a community college or no college at all" (2015) and Deming's team found "that a bachelor's degree in business from a for-profit "online" institution is 22 percent less likely to receive a callback than a similar degree from a non-selective public institution" and "for health jobs that do not require a certificate, a certificate from a for-profit institution is 57 percent less likely to receive a callback than a similar certificate from a public community college (2014)." In addition, a recent flurry of questioning regarding the credibility of those accrediting bodies that are charged with oversight of the current accreditation system (Lederman, 2015). Cellini & Turner (2016) found "despite the much higher costs of attendance (for certificate students), earnings effects are smaller in the for-profit

sector relative to the effects for comparable students in public community colleges.” Halperin (2016) published a report, which identifies individuals by name who are personally demonized because they are aligned with the interests of for-profits. Several for-profit giants have now fallen. This brings us to a precarious place in military education.

To what extent do we take heed of these recent findings and put in place measures to distance our military members from further engaging in the pursuit for degrees from for-profits? This is a decision not taken lightly due to the high volume of veterans who have earned degrees from for-profits and such an action might be tantamount to informing thousands of veteran graduates that their degrees are worthless. Does the targeting of for-profits exclusively assume problems, such as loan default rates and the lack of employability, imply these are uniquely for-profit issues? Is all for-profit education then less valuable than not-for-profit education, or is there a fit between the particular students’ needs and what the educational institution has to offer? Do all research results point to the clear superiority of not-for-profit education over for-profit education, or are the results more complicated? Do we exercise caution as there’s very little proof that whether one’s degree is from a for-profit makes any real difference in landing a job?

The second main area we wanted to gather data about in relation to hiring was certifications and licenses versus degrees. In 2012, Congress directed the Defense Department to find ways to help the civilian sector understand the elements and technicalities of military rates in order that transitioning service members could receive full credit for their work experience. In this vein, numerous credentialing programs have been implemented to include military-to-civilian mapping, and most of the services have adopted web portals dedicated to helping service members match their military occupational specialties (MOSs) with what credentials would be needed for comparable work in the civilian sector. While this effort helps professionalize the ranks, there needs to be more evidence that credentialing will translate into these individuals securing employment. While earning a rate-related degree may be quicker than earning a general studies degree, many military members do not want to pursue employment in a career field that is related to a military occupational specialty or rate. Military occupational original selection is not only based upon interests; rate qualifications are contingent initially aptitude test scores (and sometimes, a personality test) and the availability of a rate (and in some cases, the availability of a seat within its school house). Opportunities for “enlistment reclassifications” are normally tied to the needs of the service (e.g., overstaffing or higher-priority staffing).

Generally speaking, crosswalks from military occupations to civilian employability are difficult because identical matches are the exception. On the other hand, a mapped credential can be exceptionally valuable. For example, Colonel Reed Hudgins, the director for credentialing, certification and licensing at the Army's Training and Doctrine Command said this of one military-to-civilian possibility during a Washington summit hosted by the American Legion: "One of them that astounded us was a maritime credential for our Army mariners: The training costs us about \$300, but having that credential means a \$20,000 difference in starting salary for that non-commissioned officer once he leaves the Army" (Serbu, 2015). Given all of these factors, we were curious what the evidence would say about the value of a degree versus a credential. To summarize, we set up the study to analyze whether for-profit versus not-for-profit degrees resulted in a difference in callback rates, as well as the impact of an academic degree versus a credential versus “only relevant military experience.”

This study focused completely on the military educational sphere and looked only at hiring rates of veterans who had separated from military service. The educational institutions, degrees, and credentials we analyzed were typical of those offered on military bases. These results are not necessarily applicable in a non-military context. In fact, as an aside, we might mention that we believe the gap between military educational culture and civilian educational culture needs to be better bridged. Military planners need to

acknowledge that this gap exists, and that the bridge to cross it should be made of solid planks of evidence. Thus, the military should continue to support the education of its ranks with its accustomed vigor, but should obtain a better understanding of which degrees and colleges offer more applicant leverage in the civilian world. A set of degrees may “seem equal” in the context of military culture, but have very different perceived values in a civilian context. A full study of this area is beyond the scope of the present study.

2. Literature review

Service members, along with mainstream America, have come to an understanding that education is a clear and viable path to social upward mobility. A positive correlation between education and income (Urahn, Currier, Elliott, Wechler, Wilson, & Colbert, 2012; Rothwell & Kulkarni, 2015) has been established across a wide range of literature. Therefore, the military has good reason to promote education among service members and to create a range of educational incentives and benefits.

However, the military education sector became a distinct sector of education for several reasons and left that path more nebulous. First—and most importantly—since many military personnel transferred locations or deployed frequently, there was a need to form SOC, a network of colleges which agreed to work together to minimize credit loss by simplifying credit transfers and reducing residency requirement. Second, even with SOC provisions, military personnel were often called to train in remote locations or to sea duty, and it was difficult for them to complete an entire semester of study without prohibitive interruptions. This led to programs like the Navy College Program for Afloat Education (NCPACE) and to other innovations, such as five and eight week terms or other accelerated term lengths, not typically found outside military communities. Third, some military members did not have access to transportation, making it much easier for them to take classes if they were offered right on the military base. This led to colleges and universities becoming associated with the military community and signing agreements at specific bases to offer on base classes. Fourth, since military pay formerly was fairly meager (for example, in 1985, E5s and below with less than six years on active duty, made less than \$1,000 per month), and tuition assistance (TA) was not reimbursed at 100% and capped annually (\$3000 - \$4000 annum depending on the branch of service), undiscounted tuition simply wasn’t affordable. This led to a limited number of schools willing to substantially discount tuition and rarely included the category of “competitive schools” (schools with lower than average acceptance rates). That’s an important fact to remember, because according to the College Board (2015), the average cost of tuition and fees for the 2015–2016 school year was \$32,405 at private colleges, \$9,410 for state residents at public colleges, and \$23,893 for out-of-state residents attending public universities. Fifth, the pursuit of education benefits ranked as one of the core motivators for joining the military for the preponderance of most recruits, and it continues to correlate with economic opportunities (Rostker, Klerman & Zander-Cotugno, 2014; Zoli, Maury, & Fay, 2015; Associated Press, 2007). Because promotion opportunities were sometimes linked to obtaining college credits, the interest in pursuing academic credits while on active duty increased. Military service members, who originally were not inclined to pursue college classes during their off-duty time, now had to learn how to balance both full-time work and class. This difficulty in balancing and prioritizing led to the popularity of those schools willing to tailor curriculum and services to accommodate the military life style. The most flexible schools were deemed the most “military friendly” and their high enrollment numbers were indicative of this distinction more so than other variables, to include academic rigor and earnings potential. In fact, a review of the schools listed in the SOC Degree Network System, even after its most recent “membership review and network revitalization” in June of 2016, includes only one school that is highlighted on the U.S. Department of Education’s College Scorecard website within these lists: “23 four-year schools with low costs that lead to high incomes”; “By state, two-year colleges where students earn high salaries after graduation”; “30 four-year schools with high graduate rates and low costs”; and “15 public four-year colleges with high graduation leading to high incomes” (College Scorecard.ed.gov).

How did we arrive to the point where it appears there is little synchronization in effort to maximize veteran (and other students') earnings potential? The answer, in part, can be extrapolated from the many responses on "Homeroom" the Department of Education's official blog (2016). Comments on the blog about the "23 four-year schools with low costs that lead to high incomes" list indicate that the recommended schools don't apply uniformly to all Americans. For example, the calculation for tuition greatly varies depending upon one's earnings and aid available; what might be a low cost school for some households is not for others. Echoed throughout the education community is the criticism that the new college scorecard ranking, because it ranks elite schools higher due to their higher graduation completion rates and better student outcomes of mostly elite students, serves to "become a self-fulfilling edict of shrinking the higher education landscape and widening the achievement gap between haves and have-nots" (Carter, 2016) and that the stratification will continue as non-elite schools will continue to serve disenfranchised populations.

There is also a historical basis for why different schools best suit different populations. Since the late 1980's, schools which provided degrees via distance education proved to be attractive options for military personnel. With the explosive growth of home personal computers, and the need for tailored curriculum, distance education proved to be a very good fit for most military personnel. Schools like the University of Phoenix, who were the first to offer online classes in 1989, appealed to busy adult learners when no one else was interested in catering to this group (Hanford, 2012). For those reasons and others, for-profits are intricately woven into the fabric of the military armor.

Over time both non-profit and for-profit educational options sprang up on military bases, and "free market" ideals led to support for school choice. Just as the lack of knowledge in the mortgage industry led some consumers to make poor decisions, some military students have simply lacked the requisite knowledge to choose well when thrown into the maelstrom of the free market. While any degree may always seem to be better than none, why would decision-makers want to settle for anything less than highly-leveraged results for every dollar spent on education? Yet to achieve such leveraging, more knowledge is needed about the perceived value of degrees to employers in the civilian sector. Unfortunately, due to the rapid changes in education, the data points change frequently. For example, Bill 3178 the "Strengthening Transparency in Higher Education Act" makes modifications such as distinguishing between non-profits and for-profits in a newly created "College Dashboard", a college scoreboard which originally didn't include this criterion. In fact, the Department of Education, up until recently didn't track graduation rates for part-time students, although these students minimally constitute 40% of all college students. Data was only compiled on full-time, first-time students because that was all the federal government required of educational institutions (Complete College America, 2011). Imagine the alarm when data was finally collected and we learned America's true college dropout rate. The new number, which included both part-time and full-time students, hovered around 40%. That ranked us at the worst in the developed world and led to many of the initiatives now in place designed to improve our ranking (Weissman, 2014). Conversely, the graduation rate averaged 60% for students who began seeking a bachelor's degree at a 4-year institution and subsequently completed the degree at that institution (NCES, 2016). According to the National Center on Educational Statistics, the break down is: the six-year graduation rate was 58 percent at public institutions, 65 percent at private nonprofit institutions, and 27 percent at private for-profit institutions. This striking contrast in graduation rates leaves some authors to research why students attend for-profits.

According to Iloh (2016), for-profit educational institutions tend to have a strong customer focus and also stronger ties to potential employers than do non-profit educational institutions. Classroom time tends to be hands-on and practical, and instructors may be far more supportive than in the public sector. The areas of study offered tend to be associated with demand in the economy, because students tend to be

non-traditional and are seeking qualifications for employment after graduation. Thus, Iloh (2016) points out that students are willing to take on debt because of future employment prospects. The colleges may utilize supportive techniques like cohort models to enhance retention. Despite criticism in recent months over for-profit institutions' operating practices, these institutions offer some advantages over the non-profit competitors. In addition to those reasons cited by Iloh, Tierney (2016) discusses distinctive advantages of for-profits: they are better able and more willing to build partnerships with employers because if their product, education for a career is not successful, the customer will not buy it. The result of these partnerships are internships and positions for students; and with greater financial resources at their disposal, they are able to enhance job assistance services to help graduates secure employment. For-profits are able to expand into booming fields and eliminate fields no longer attractive by keeping up with future economic and job trends, marketing themselves as specialists in select fields and cater to potential applicants.

Additionally, for-profit institutions are more likely to adopt competency-based education (CBE) curriculum, which emphasize student's knowledge, skills, and abilities, and reduce student seat time in the classroom (Tierney, 2016). This is important because CBE is proving to be a popular option to the traditional higher education model as it is more accessible and affordable, especially for "underprepared" college students (Girardi & Crew, 2016). It's important to be cognizant of demographics when we talk about underprepared populations. According to research conducted by the Manhattan Institute for Policy Research, 65% of students attending for-profits are older than 25 and almost 40% are either Hispanic or African-American (Bellin, 2013). While, the for-profit industry is characterized by poor graduation rates, higher loan-default rates and post-graduation employment concerns, to wage war on for-profits without providing its student base with other viable alternatives, is synonymous with waging war on this student population, too.

With today's emphasis on non-profit education in the military sector, the question arises as to whether all military students truly are best served by a non-profit educational model, or whether some students may actually benefit from the supportive, customer-based educational environment found in a for-profit school. A recent Gallup-Purdue survey revealed that only 36% of veteran students believe their needs were being met by for-profit and private non-profit universities, and for public universities, that number fell to 24% (Grant, 2015). "Complete College America" research shows, that despite non-traditional students being the new norm, traditional residential colleges still cater to the minority 25% of those students who attend full-time on campus. Given the current importance placed on "scorecards" and graduation rates, why would a college reach out to "riskier" students?

3. Experiment design, procedures & results

Resumes were generated using fictitious names and personal data of service members transitioned from military service into the civilian sector. Duplicated resumes tailored for eight different labor market categories (see Table 1) differed only in name, personal contact and education, and in order to minimize the possibility of recognizing similarities, the formatting and layout of this information. Possible combinations of education included: degree from non-profit institution; degree from for-profit institution; civilian equivalent credential for military occupational specialty; no degree or credential, but military occupational specialty indicated. All prospective employers received each of the four possible types of resumes over a 2-3 date range. Diverse distinct labor markets were selected in order to obtain a comprehensive snapshot of how and where type of degree or credential matters. Table 1 shows the military occupation specialties, appropriate civilian labor market and their civilian equivalent credentials for the veterans (based on the use the Navy and Army Cool sites):

Table 1 Military-Civilian Occupation and Credential

Labor Marker	Military Occupation	Civilian credential
Supervisor, Culinary	Food Service Specialist (FS/CS)	Chef de Cuisine (CCC)
Communications; computer equipment	Information Systems Tech (IT)	Cisco Certified Entry Networking Tech (CCENT)
Engines	Machinery Technician (MK) or Engineman (EN)	Automobile (A1-A6)
Security	Master of Arms (MA); Military Police (MP)	Certified Corrections Officer (CCO); Information Systems Security (CISSP)
Health Services	Hospital Corpsman (HM) or Health Services (HS)	Advanced Emergency Medical Technician (AEMT)
Logistics	Store Keeper (SK) or (LS)	Certified Professional Logistician (CPL)
Aircraft Maintenance	Aviation Maintenance (AMT) or (AM)	Certifying Technical Employee Competence (CertTEC)
Administrative Assistant, Supervisor or Office Manager	Yeoman (YN)	Certified Administrative Professional (CAP)

Resumes were sent to labor markets randomly through major job search engines. Resumes were sent during the summer months in 2015 over a 4-month range (June-September). We sent a total of 508 resumes (or 127 in each education category) and received a total of 16 invites for interviews. This provided us with an overall success rate of 3.1% for interviews or “callbacks.” Figure 1 (below) shows the percentages of callbacks distributed into the four possible categories of our subjects’ educational background: degree from non-profit institution (Non-Pro); degree from for-profit institution (For-Pro); civilian equivalent credential for military occupational specialty (Cred); no degree or credential, but military occupational specialty (NC/NC). Applicants with degrees from public and private non-profits were the most successful, receiving

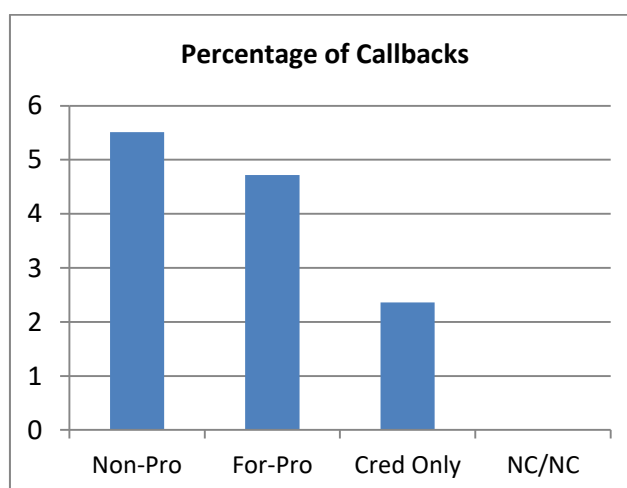


Figure 1: Percentage of callbacks per resume education category

7 callbacks (5.5% of the time), followed closely by applicants with degrees from for-profits, which received 6 callbacks or a success rate of 4.72%. Applicants without degrees but who possessed job related

certificates received 3 callbacks or a 2.36% success rate, and those without a degree or job related certification did not receive any invites to interview. We defined callbacks as invites to interview only, and not requests for further information. Our research did have a lower percentage of total callbacks than similar study using a different population (Deming et al., 2014), and we attribute this difference (3.1% vs. 8.2%) to the rigidity in our definition of what constituted a callback. That is, an invite for an interview had to occur or it was not counted. Callbacks requesting additional information were not counted. Table 2 shows a summary of the percentage of callbacks for each resume category.

Table 2 – Callback Percentages per Category

	Callback rate	Number of Resumes
Total	.031	508
By education		
BA, Public/Private	.0551	127
BA, For-Profit	.0472	127
No Degree, Credential	.0236	127
No Degree, No Credential	.00	127
By rate*		
FS/CS	.083	96
MK/EN	.075	40
SK	.025	116
IT	.018	112
By education and rate		
FS/CS:		
BA, Public/Private	.166	24
BA, For-Profit	.125	24
No Degree, Credential	.042	24
No Degree, No Credential	.00	24
MK/EN:		
BA, Public/Private	.10	10
BA, For-Profit	.10	10
No Degree, Credential	.10	10
No Degree, No Credential	.00	10
IT:		
BA, Public/Private	.036	28
BA, For-Profit	.036	28
No Degree, Credential	.00	28
No Degree, No Credential	.00	28
SK:		
BA, Public/Private	.034	29
BA, For-Profit	.034	29
No Degree, Credential	.034	29
No Degree, No Credential	.00	29

*YN, HS, ME, AET/AE had no invites

An analysis of variance (ANOVA) was conducted to measure if a statistically significant difference was observed between the type of response generated (callback or no callback) and four resume characteristics, specifically: resumes which list for-profit degree; non-profit degree; no degree listed and no credential; and no degree listed, but credential. No statistical significance was found.

Table 3

ANOVA for 4 categories					
Source	df	SS	MS	F	p
Between groups	3	.234	.078	2.595	.052
Within groups	504	15.139	.030		
Total	507	15.373			

P<0.50

A second analysis of variance (ANOVA) was conducted to measure if a statistical difference existed when degreed resumes (for-profit and non-profits combined) were compared to the success rates of credentialed only resumes and those resumes without credential(s) or degree listed. Using three treatment groups proved to be statistically significant:

Table 4

ANOVA for 3 education backgrounds: BA; Cred; NC/NC					
Source	df	SS	MS	F	p
Between groups	2	.230	.115	3.824	.022
Within groups	505	15.172	.030		
Total	507	15.401			

P<.05

In addition to the observed differences in callback rates by occupation (see Table 2), we noted a variance in callbacks by academic background within each occupation rate. That difference was most dispersed among the food services and culinary specialists. Figure 2 shows that from the 96 resumes sent to job relating to food services and culinary specialists category, eight applicants were invited for interviews. This overall success rate of 8.3% is further stratified: the food services and culinary specialists who possessed degrees from private or public non-profits received 4 callbacks (16.6%); the food services and culinary specialists who possessed degrees from for-profits received 3 callbacks (12.5%); and food services and culinary specialists who possessed no degrees, but possessed industry related credentials received one callback (4.2%).

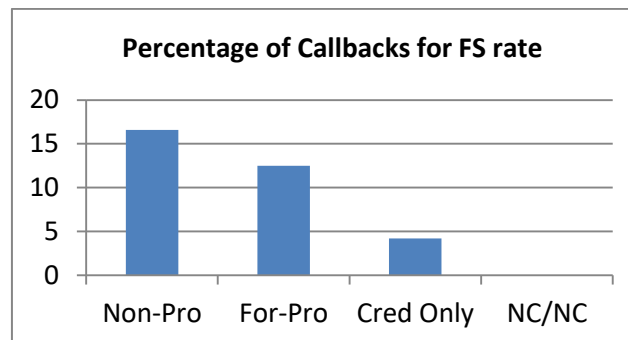


Figure 2: Percentage of callbacks for FS/CS rate

That difference was second most dispersed among the machinery technician and engineman specialists' occupational category. Figure 3 shows that from the 40 resumes sent to job relating to machinery technician and engineman specialists category, three applicants were invited for interviews. This overall success rate of 7.5% is further stratified as such: machinery technician and engineman specialists who possessed degrees from private or public non-profits received one callback (10%); the machinery technician and engineman specialists who possessed degrees from for-profits received 1 callback (10%); and machinery technician and engineman specialists who possessed no degrees, but possessed industry related credentials received one callback (10%).

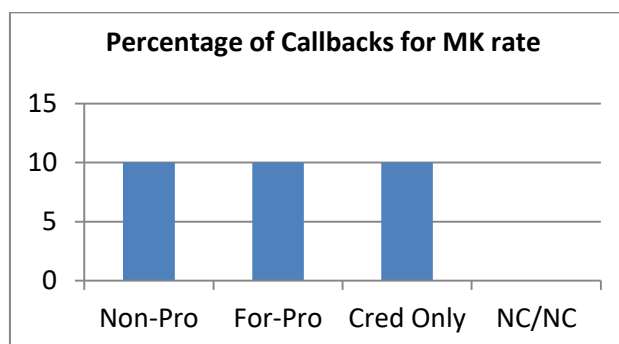


Figure 3: Percentage of callbacks for MK/EN rate

Since we observed a difference in callback rates by occupation (see Table 2), we also wanted further analyze the data and used a regression analysis to see if one's rate could predict callback success. After performing a regression on our data from callbacks, we found that only the food services and culinary specialists who possessed degrees from private or public non-profits were statistically more likely to receive callbacks (see Table 5).

Table 5: Regression for FS, MK, IT & SK Rates

	FS	MK	IT	SK
Non-Pro	0.0379* (0.0791)	0.4195 (0.1224)	0.3195 (0.0357)	0.160 (0.0243)
For-Pro	0.1177 (0.0791)	0.4195 (0.1224)	0.3195 (0.0357)	0.160 (0.0243)
Cred	0.5998 (0.0791)	0.495 (0.1224)	0.3195 (0.0357)	0.160 (0.0243)
None	0.0	0.0	0.0	0.0
Ave. Callback rate	0.0833	0.075	0.018	0.0255
Observations	96	30	112	116

P < .05%

4. Discussion

Although the for-profit industry is partly responsible for progressive strides in education, it stands accused of education's own eloquent version of "Primum non nocere." The public is scrutinizing for-profit education and its market value. Is it fair the for-profit industry is on the hook for failure of deliverables when there are many people who borrow unmanageable amounts of money? Is it fair that they must meet "gainful employment" standards, when according to the government's own "College Scoreboard" a fair number of non-profits could not?

Baum and Johnson (2015) would argue "yes" because when the focus is solely on students, unmanageable debt is centric to three types of students: graduate students, drop-outs, and students enrolled in for-profits. The researchers explain that while very high debt (debt in excess of 50K) by itself, is not necessarily indicative of defaulting, when coupled with low employment prospects and significantly

lower income, as is the case for drop outs and graduates of for-profits (Lang & Weinstein, 2012; Cellini & Turner, 2016), repayment difficulties are triggered. Others question how for-profits can solely be targeted when the number of students defaulting is higher at public schools; Cooper (2016) argues the 200,000 students who defaulted on loans while attending public schools are a much bigger problem for taxpayers than the 26,000 students who defaulted on loans while attending for-profits institutions.

Perhaps it is because our poor and wealthy are becoming increasingly polarized that we villainize the for-profit industry. In the guise of education being the great equalizer, thousands of conference attendees meet each year to plan educational reforms. Conferences like the Thomas B. Fordham Institute's "Education for Upward Mobility" convened as "a groundbreaking conference about the multiple pathways to the middle class and their implications for the education-reform and anti-poverty agendas." It studied "success sequences" of those who climbed the ladder to the middle class and examined their "trajectory" in detail. In one of their panel series, a figure was shared which showed a positive correlation between education and income (Urahn, et al., 2012). However, some caveats were missing.

According to a study by Rothwell and Kulkarni (2015) the five key contributing factors most responsible for post graduate economic success as defined by "salary, occupational earnings potential, and loan repayment" are: curriculum value; alumni skills; science, technology, engineering and mathematics (STEM) orientation; completion rates; and student aid. Clearly, some of these factors associated with successful economic outcomes are outside of the control of education institutions. For example, alumni skills, defined as "the average labor market value, as determined by job openings, of skills listed on alumni resumes" (Rothwell & Kulkarni, 2015) can fluctuate greatly depending upon the state of the economy.

Years ago, education as a clear and viable path to social upward mobility may have been true. But recent studies have shown an inverse correlation exists between a country's economic inequality and its citizens' economic mobility. The United States ranks high in economic inequality (Corak, 2013). In fact, educational achievement and social mobility are not always correlated, and social mobility is dependent upon the demand in labor markets (Brown and Lauder, 2009). So whereas middle class and lower class Americans are more likely to complete a degree, education expansion has not always translated into reducing social inequalities (Lannelli and Paterson, 2005).

The un-tethering of education to the guarantee of work does not exempt schools from societal expectations. While colleges should not be responsible for their students' future employment, they should be responsible for their employability. While congress should increase students and taxpayer protections in this regard, the new gainful employment rules are a misstep. Specifically, the program's finding that an institution would be deemed failing if loan payments of typical graduates "exceed 30% of discretionary income or 12% of total annual income" may be more evident of poor economic opportunities than a good program of study. Likewise, the military pays handsomely for unemployment compensation through the established Unemployment Compensation for Ex-servicemembers (UCX) program during a drawdown when thousands of its soldiers are separated from active service.

Measuring education success by graduation rates should also be re-examined as not every student who wants to take a college class also wants a degree. In fact, workers who want to remain competitive in the workforce must commit to lifelong learning (Howell, Williams & Lindsay, 2003). This is largely due to career changes, which occurs for about 40% of the U.S. population workforce in any one year – a staggering reality that now prompts companies to voluntarily pay for their employees to go back to college (Howell, et al, 2003). While it is assumed we are wasting money because America's dropout rate hovers around 40%, this includes part-time and full-time students and is largely skewed by part-timers who are less likely to graduate than graduate (Weissman, 2014). What isn't captured is how many of these part-timers are

“drop-ins” – students who intentionally take a class or two for self-improvement or to keep their work skills current. Earlier when graduation rates were discussed, we should have included “6-year graduation rates were highest at postsecondary degree-granting institutions that were the most selective (i.e., had the lowest admissions acceptance rates), and were lowest at institutions that were the least selective (i.e., had open admissions policies)” (NCES, 2016). Comparing for-profit graduation rates against graduation rates from other types of schools is unfair because for-profit schools have open enrollment and students have different objectives.

In summary, we want to be clear that we believe for-profit institutions need to adhere to regulations aimed at reducing student loan default rates—as should other institutions. We recognize that all types of educational institutions fulfill a need for various student populations. Education is not necessarily one-size-fits all, and some students may not feel confident or prepared enough to succeed in a more competitive and less supportive educational environment. For-profit education occupies a distinctive niche, and is not simply in competition with not-for-profit education. As the education landscape changes, what Herbert Hoover said in the 1930’s still holds true: “Competition is not only the basis of protection to the consumer, but is the incentive to progress.”

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Work in Progress - The MicroElectronics Cloud Alliance: A way to deliver OERs in a Cloud-based European Infrastructure

Rosario Gil-Ortego, Pablo Baizán, Alejandro Macho, Clara Pérez-Molina, Manuel Castro-Gil

Electrical and Computer Engineering Department (DIEEC), Industrial Engineering Technical School (ETSII), Spanish University for Distance Education (UNED), Spain

rgil@ieec.uned.es, pablo.baizan.es@ieee.org, alejandro.macho@ieee.org, clarapm@ieec.uned.es, mcastro@ieec.uned.es

Maria José Albert-Gómez

Faculty of Education, Spanish University for Distance Education (UNED), Spain

mjalbert@edu.uned.es

Rafael Jiménez-Castañeda

Cadiz University, Spain

rafael.castaneda@uca.es

Slavka Tzanova

Technical University of Sofia (TUS), Bulgaria

slavka@ecad.tu-sofia.bg

Abstract

This article is framed by the project “Knowledge Alliance 562206-EPP-1-2015-1-BG-EPPKA2-KA MicroElectronics Cloud Alliance (MECA)”. The MicroElectronics Cloud Alliance (MECA) brings together 18 partners from higher education institutions (HEIs) and enterprises to develop Cloud-based European infrastructure and organisation for education in micro- and nanoelectronics providing a range of open educational resources, remote access and sharing of educational and professional software, remote and practice-based learning facilities.

The project’s focus is on jointly development of MSc degree level courses for the new skills needed for the new jobs in the multidisciplinary sector of micro- nanoelectronics to be delivered as open educational resources in a cloud-based e-learning environment. The addressed problems and needs were identified through: literature study of European policies in the field of education and the needs and priorities of partner higher education (HE) institutions and enterprises in the sector, analysis of subject of area (microelectronics design, fabrication and application), labour market needs, study of the state of the art in cloud computing.

UNED, as a partner of the project, is developing two MSc courses in Microelectronics as open educational resources (OERs) with specific requirements to be part of a cloud-based e-learning environment.

Keywords: Cloud-based e-learning environment; European infrastructure; Microelectronics; Nanoelectronics; Open educational resources

1. Introduction

As mentioned above, the MicroElectronics Cloud Alliance brings together 18 partners from higher education institutions (HEIs) and enterprises to develop Cloud-based European infrastructure and organisation for education in micro- and nanoelectronics providing a range of open educational resources, remote access and sharing of educational and professional software, remote and practice-based learning facilities.

Neither university can afford the necessary infrastructure, clean rooms, technology and experts in all fields of this multidisciplinary science. Sharing of laboratory experiences, CAD tools, project ideas, and a common infrastructure represents a sort of “educational cloud” on top of the cloud software/hardware infrastructure. 8 European HEIs and 8 SMEs will develop e-learning materials for 16 courses on: CAD systems, microelectronics technologies, test, characterisation and application of integrated circuits and systems, and we will provide them as open educational resources to strengthen the virtual mobility. Each university will provide remote access to its facilities, laboratory experiments or software systems for the partners in a cloud teaching system, giving them access to new resources. The common ones can be optimized, reducing the singular cost per institute and increasing the available computational and structural power.

The impact of the university-business alliance will be in the education responsive to the labour market needs, graduated students prepared for the job, enterprises satisfied by the knowledge and skills of young specialists. The impact on the students will be in the highest quality of the specialised courses developed by the best departments in the field, the opportunity to train practical skills and competences with remote access to laboratories with advanced equipment and facilities, for the teachers – rich infrastructure and new shared teaching materials, for universities - the European dimensions in HE, particularly with regards to curricular development, virtual mobility of students and academic staff and integrated programmes of study, training and research.

2. Aims and Objectives

In MECA project 18 partners from HEIs and SMEs will provide open educational resources in micro- and nanoelectronics to facilitate the exchange and co-operative creation of knowledge at European level.

The aim of the mClouds project is the definition and development of cloud-based European infrastructure and organisation for education in micro- and nanoelectronics providing a range of open educational resources, remote access and sharing of educational and professional software, remote and practice-based learning facilities. Its specific objectives are:

1. Analysis of institutional, teachers’ and students’ needs in shared IT infrastructure, teaching materials and learning resources, meeting the requirement of the enterprises in micro- nanoelectronics and translation into functional specifications of mClouds. This objective targets the challenges of the multidisciplinary of the subject area and the needs of powerful CAD systems and servers, of sophisticated equipment and laboratories.
2. Networking of project partners from HE institutions and SMEs, to share ideas, methodologies and experiences in order to improve the HE programmes to face the rapid technological change in the sector and joint development of job-specific training modules. This objective addresses the needs of more responsive HE to the needs of the labour market.
3. Development of the mClouds system and realization of a shared server infrastructure, shared e-learning resources and the remote access to the CAD tools. This objective targets the needs of innovative and multidisciplinary approaches to teaching and learning in the interdisciplinary sector of micro- and nanoelectronics and the needs of closer cooperation between HE and business using the infrastructure, technology of partners’ universities and expertise of practitioners.
4. Pilot test of the virtual services and training teachers and technical staff in their use. This objective addresses the needs of the main users of the project results: the students and teachers in high quality educational resources and services.

5. Implementation of jointly developed cloud-based open educational resources in micro-nanoelectronics in the partners' educational contexts. This objective addresses the necessity of striking a balance between what is offered in the educational system and what is needed by the enterprises in the sector.

All project partners have some experience in the setup of learning environments with some common, but also some specific, solutions. The use of networked server systems, for giving to the students the possibility of developing hands-on laboratories, is a common setup, present in all the institutes. And both these aspects are the keys of the proposed project: the specific capabilities will be shared between the partners of a Cloud teaching system, giving to the others access to new resources, and from the other side the common ones will be optimized, reducing the singular cost per institute and increasing the computational and structural power that is available for each partner.

To summarise, within mClouds project we will strengthen the virtual mobility by providing open educational resources for virtual campuses and integrating access to virtual learning resources and online communities of practice into traditional courses.

3. Methodology

The project is planned for three years in order to include the pilot test and the implementation of system for virtual mobility, i.e. the full cycle of design, development, evaluation and implementation. The milestones are:

- Need analysis report (5th month)
- Specification of the three Clouds architectures for open learning resources sharing, IT infrastructure and CAD software common use (end of the 9th month),
- Job-specific courses and courses on entrepreneurship, project management (15th month),
- Updated HE curricula in microelectronics in collaboration with the practitioners from the industry and mClouds system developed and implemented with minimum 16 courses delivered as OERs (20th month),
- System officers and teachers and trainers from enterprises trained (24th month),
- Pilot tests (27 month),
- Exploitation/field trial (36th month).

For defining the necessary knowledge, skills and competences we will start with an extensive job analysis, i.e. work process analysis in companies in microelectronics and electronics packaging. The learning outcomes will be defined for each course with the corresponding credits after an assessment adopted by all partners.

The curricula will be reviewed in collaboration with the experts from the companies and joint practice-oriented modules will be developed. Jointly with SMEs business-oriented courses will be developed: on quality assurance in the enterprises, management of projects, entrepreneurship. The e-learning materials will be developed/adapted in such a way that substantial parts can be used in a self-instructive manner.

After training teachers and trainers in the Cloud system, the pilot test will be conducted with small groups of learners – minimum 10 per country. The field trial will be performed during the last 9 months of the project with minimum 240 students. Specific evaluation methods will be used and corresponding tools designed for assessment of knowledge (e.g. knowledge tests for the basic components, assembling procedures, defaults, automated machines etc.); of skills (e.g. tasks for finding solutions for routine problems); of competences (e.g. tasks to take responsibility for completion of tasks in work or study).

The evaluation and valorisation activities are planned for the whole project's lifetime. Project quality assessment will be based on a careful procedure of self-evaluation. Based on evaluations, the management of the project will make the necessary decisions and plan activities for their implementation. The evaluation will be more oriented to the end users, i.e. to obtain feedback to help developers to improve the products

and services, as well as to optimise the project development process through early diagnosis of defects, to reveal of unforeseen circumstances in the training environment, to ensure better communication in the development team, to measure whether training objectives have been achieved and trainees needs have been met and that results could be used for decisions about the implementation on European level and dissemination of the products.

4. Needs Analysis in Higher Education and labour market

The project's focus is on jointly development of MSc degree level courses for the new skills needed for the new jobs in the multidisciplinary sector of micro- nanoelectronics to be delivered as open educational resources in a cloud-based e-learning environment. The addressed problems and needs were identified through: literature study of European policies in the field of education and the needs and priorities of partner higher education (HE) institutions and enterprises in the sector, analysis of subject of area (microelectronics design, fabrication and application), labour market needs, study of the state of the art in cloud computing.

Specific needs and problems of HE in microelectronics that we intend to solve:

- Little reference is made to the needs of the work place and changes in the work place are not met with changes in education,
- Curricula need to be updated and universities need to collaborate to share course materials, intellectual property blocks and ideas.

So, we need a new partnership between education and work to address the need of synergy between the education and industry, to foster the development of competencies, technological and entrepreneurial skills. Moreover, no one university or SME can afford the necessary infrastructure, clean rooms, technology and experts in all fields of the multidisciplinary science of microelectronics. Sharing of laboratory experiences, of CAD tools, of project ideas, of common infrastructures represents a sort of “educational cloud” on top of the cloud software/hardware infrastructure. The advantages in terms of education effectiveness are course organization efficiency, instructors focusing on the area of expertise, common experiences of students of different countries based on similar infrastructures, tools, lab organization, learning improvement, thanks to the optimization of laboratories and courses.

The main step necessary to obtain these results is the implementation of an e-learning framework rooted on the tools developed for cloud management, allowing the cooperation and distribution of lab sessions, CAD tools and teaching experiences.

On the other side, the needs of such a project correspond to the needs of the sector of microelectronics design and fabrication, which is moving nowadays, back from Asia to Europe. There is a non-exhaustive list of enterprises in assembling/packaging in (micro)electronics. At the same time last 10 years there is a shortage of engineers in microelectronics and systematic decrease of students in electronics at the university can be a threat to the European economy competitiveness.

This project is designed to meet the needs of labour market of trained personnel and the needs of mobility of the workforce in the sector.

4.1. Survey results for students, teachers and business

Regarding to design the different OERs in the project, an online survey was developed, where teaching and learning needs were evaluated on the three points of view: students, teachers and professionals from the business. Following is described the most relevant results. The survey can be described as follows:

- Objective
 - To analyse user needs in shared IT infrastructure, teaching materials, learning resources in micro- nanoelectronics relevant for the labour market.
- Target Groups
 - Students in micro- nanoelectronics engineering education;

- University teachers and trainers in HRD departments, universities and colleges;
- Professionals from the business;
- e-learning environment developers and administrators.
- Sample
 - Students at different universities from the project;
 - Professionals and managers from enterprises in micro- nanoelectronics and microsystems, electronics packaging and communication from all participating countries;
 - Teachers in micro- nanoelectronics from all participating countries;
 - System administrators at the universities and enterprises involved.
- Instruments
 - Literature study;
 - On-line survey:
 - o 3 questionnaires for teaching/learning needs analysis for the three profiles (students, teachers and professionals).
 - Interviews.
- Implementation
 - On-line questionnaires with a link on the project Web site.
 - We have collected
 - o 152 answers from the students,
 - o 59 – from teachers and
 - o 23 – from the representatives of the industry.

4.1.1. Summary of results of the students' survey

- 13% of the respondents study Micro-nanoelectronics. The highest percentage is in Electronics with 37%, follows by Informatics/Information Technologies with 27%.
- 62% of the students their educational level is only graduated, 29% have a Master and only 7% have a Ph.D.
- 89% of the students use open educational resources and those who do not use are willing to learn with OERs.
- Few students have experience with virtual laboratories and remote access to CAD systems but most of them would like to (Figure 1).
- It is very important and encouraging with regard to the project objectives that the students fill comfortable with using virtual laboratories and they are ready to these educational practices (Table 1)
- Most of the students do not think that the use of OERs will improve their learning but 73% consider that the learning is more attractive with OERs.
- It is interesting that the learners prefer passive teaching methods: electronic books and videorecorded lecture to the interactive courses.
- PowerPoint presentations are not liked at all by the students and it might be because the content in the presentations is not sufficient for self learning.
- All advantages of OERs are appreciated: flexibility, reusability, virtual mobility of students, cost efficiency, connectivity with teachers.
- 41% of the students prefer to use OERs by online course; 32% by blended/hybrid course, and 27% by face-to-face course.

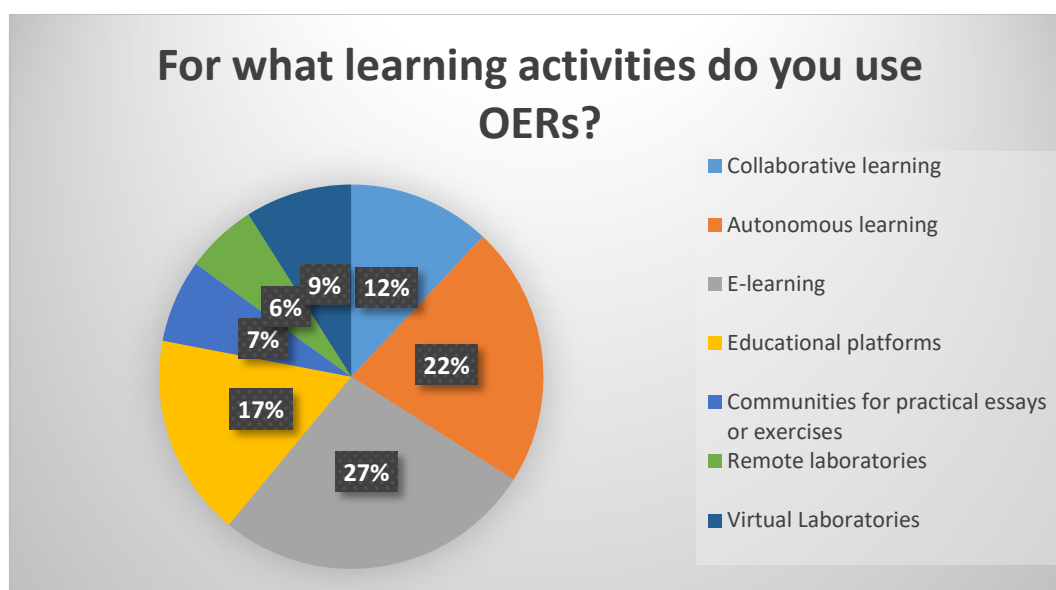


Figure 1: Results for the question: For what learning activities do you use OERs?

Table 1: Results for the question: Do you want to be involved in the activities, described below, in the near future?

Activities	Frequently	Occasionally	Rarely	Never
Studying additional e-learning materials given by the teacher	43,71%	39,07%	13,91%	3,31%
Searching for educational materials on internet	53,64%	34,44%	9,93%	1,99%
Following Open Courseware(s) provided by other universities	38,41%	32,45%	20,53%	8,61%
Watching recorded lectures or presentations given by experts outside your institution	38,41%	40,40%	17,22%	3,97%
Working virtually with students from other universities internationally	27,15%	37,09%	21,85%	13,91%
Carrying out experiments within remote laboratories	36,42%	31,79%	22,52%	9,27%
Designing electronic/ integrated circuits through remote access to the workstations	35,10%	33,77%	15,89%	15,23%

4.1.2. Summary of results of the teachers' survey

- 59 teachers from traditional and distance education universities and vocational education institutions answered the questionnaire, being the profile of university teacher the most common with a 81%. Inside the specialty of the university, the most common is Polytechnics with a 54%. And the highest educational level that teaches our universities is: PhD with a 36%, Master with a 32% and Bachelor with a 30%.
- If 89% of the students use open educational resources the teachers using OERs are only 69% and most of them use them occasionally.
 - It is not surprising because probably most of the teachers are from traditional universities with face-to-face education.

- All advantages of OERs are appreciated: flexibility, reusability, virtual mobility of teachers and students, cost efficiency, connectivity with students.
- Logically, the teachers consider that it is less likely that OERs provide high level of knowledge for the subject matters in technology. However, the percentage of teaching activities for the use of OERs is shown in the Figure 2.
- With regard to the generic skills it is considered that the abilities for independent learning and working, managing information, using ICT are favoured and the capacity of criticism and self-criticism and the adaptation to new situations – not so much.
- The teachers consider that e-learning does not improve students' performance as the student also think about but it makes learning more appealing.
- Most of the educators believe that the use of OERs would improve their practice and reduce their efforts and time used for teaching.

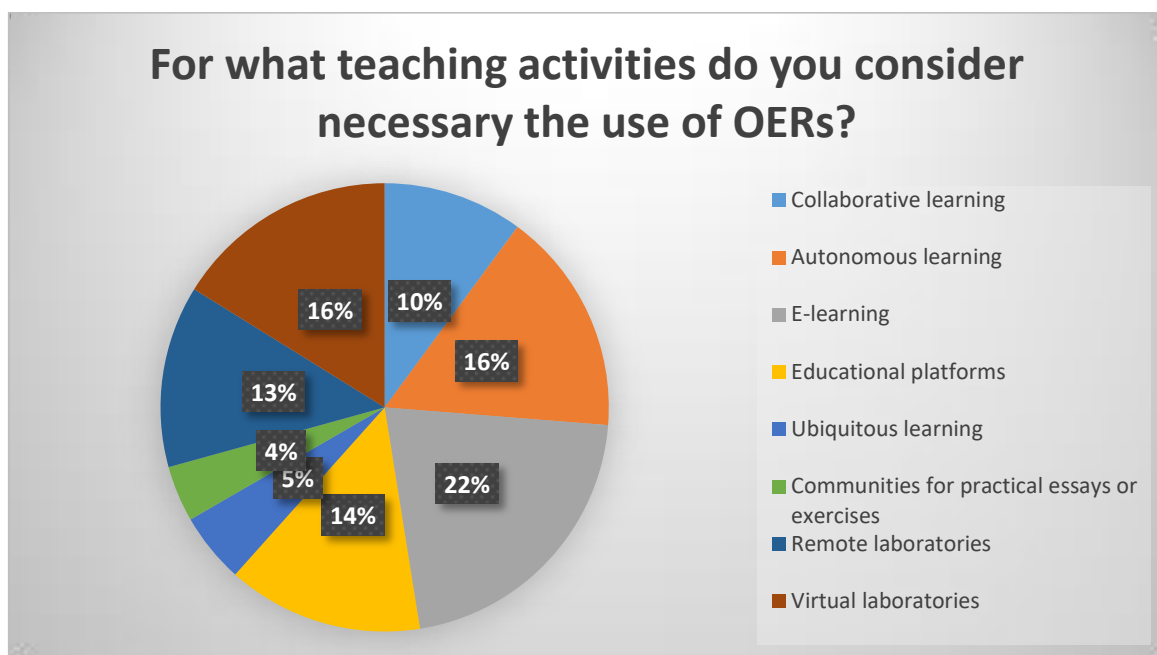


Figure 2: Results for the question: For what teaching activities do you consider necessary the use of OERs?

4.1.3. Summary of results of the professionals' survey

- 23 representatives of the business (Figure 3) answered the questionnaire about the importance of different learning contents.
- All the proposed courses are considered to fulfill a more than average need in short term.
- In long term the industry will needs even more skills and competences in the proposed topics.
- We can conclude that the university world is close to the industry needs.
- Effective communication with groups, presentation techniques, project management and survival on the labour market are considered as highly important by almost all respondents.
- Additional topics are suggested in power electronics, graphene technologies and system integration.

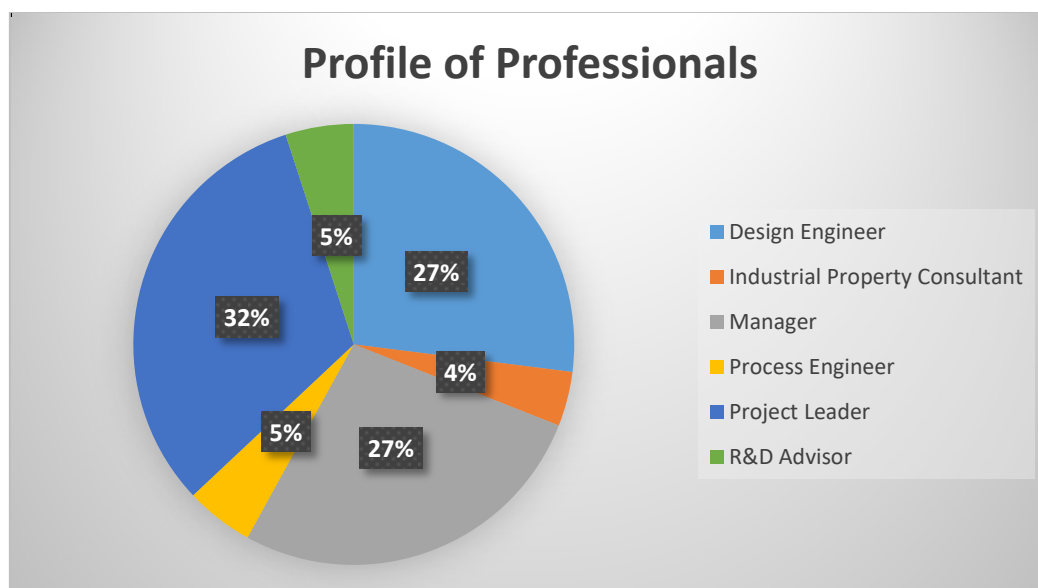


Figure 3: Profile of professionals from business

5. mCloud Architecture

The use of Information Technology (IT) infrastructure in the learning environment is a demanding challenge. The increasing system complexity requires the setup of powerful computer systems, the use of high performance networks, the acquisition of trained IT personnel to manage these hardware and software platforms. Moreover, computing power requirements, joint to learning tool complexity, are pushing academic institutions to build private data centres to host applications and give the service to students and academic staff. Traditional computing architectures are inherently inefficient from the point of view of both energy wasting and utilization efficiency. Statistics shows that the average utilization factor of a server in a traditional data centre is less than 10% and decreases with the reduction of the IT infrastructure complexity. Hardware virtualization can improve efficiency but it does not solve problems related to management costs, as local data centre maintenance is mandatory.

The cloud computing approach, created mainly for Internet application needs, can be adapted amongst other things also to IT architectures for e-learning. In fact, the design of an efficient training infrastructure based on a cloud approach can be also a key solution for traditional classroom training through sharing server resources.

The emergence of cloud computing is transforming the way organizations and companies purchase and manage computing resources. According to Cruz [2] cloud computing is changing the ways people do personal learning, interactive learning and many-to-many learning, in the primary, secondary and higher education spheres. Not only the distance from a desktop is the advantage or information longevity assured by the cloud resources. An important point is that it allows students to interact and cooperate with expanding circle of peers, regardless geographical location. And in this new way of interaction with other people we can be sure about the fact that the new generations are ready and well trained in this approach, thanks to the deep use that they use to have of social networks, network gaming and similar tools.

Some authors [3] discuss how cloud computing and the shift in the software industry towards software as a service, using agile development has led to tools and techniques that match much better to the classroom than earlier software development methods. At UC Berkeley the authors offer a software course based on cloud computing and agile methods to on-campus students and to 50,000 online students from the IT industry.

This proposal is based on the experiences of almost all HE partners in development of e-learning courses and on the experiences of our university (UNED) in development of training through remote laboratory access.

What is the innovation: Involvement of companies in a collaborative update of existing and development of new courses; sharing of laboratory experiences, of CAD tools, of project ideas, of common infrastructures in a sort of “educational cloud” on top of the cloud software/hardware infrastructure.

The advantages in terms of education effectiveness are course organization efficiency, instructors focusing on area of expertise, common experiences of students of different countries based on similar infrastructures, tools, lab organization, learning improvement, thanks to the optimization of laboratories and courses.

The main step necessary to obtain these results is the implementation of an e-learning framework with open educational resources, rooted on the tools developed for cloud management, allowing the cooperation and distribution of lab sessions, CAD tools and teaching experiences.

5.1. Technical implementation. Public and private cloud

There is the public cloud with big players like Amazon Web Services (AWS) and Microsoft Azure on the one site. And on the other site there are private clouds inside of institutions. Also a mixed flavour exists where private clouds are extended with computing power, additional features like high performance computing and machine learning or just storage from the public cloud. This mix can be used for example when there are peak usage requirements during a short period of time – e. g. a summer camp at a university for which it would not be worth to buy several new computers.

This layers of virtualization and packaging of computer resources leads automatically to thinking not so much in single computers anymore but thinking in applications for the end user. There is an ascending path from:

- Infrastructure as a Service (IaaS) Full access to virtual computers
- Platform as a Service (PaaS) The software development layer is fully administrated by the cloud provider, e. g. a PHP/MySQL web server.
- Software as a Service (SaaS) The complete application is fully administrated by the cloud provider like a WordPress website or a Moodle e-learning installation

5.2. CloudStack for a private cloud

For a private cloud these days there are two popular standards available: Apache “CloudStack” [1] and “OpenStack” [4].

We will concentrate on CloudStack because there were good experiences at one HE partner two years ago with new microelectronics and microsystems courses, which require the use of complex CAD soft-ware. Figure 4 is a screenshot for an example screen of the CloudStack web GUI. And some facts about CloudStack are:

- is an open source cloud management software.
- supports all important hypervisors like KVM, VMware, Hyper-V and XenServer.
- is mainly a Java web application (Tomcat) with an API and a web GUI that allows to overview, organize and manage virtual machines and to create virtual machine templates
- controls the virtual machines with agents or APIs of the vendor specific hypervisors
- is end-point agnostic: desktop, notebook, tablet
- a good network infrastructure is mandatory
- configuration data is stored in a MySQL database, so very transparent

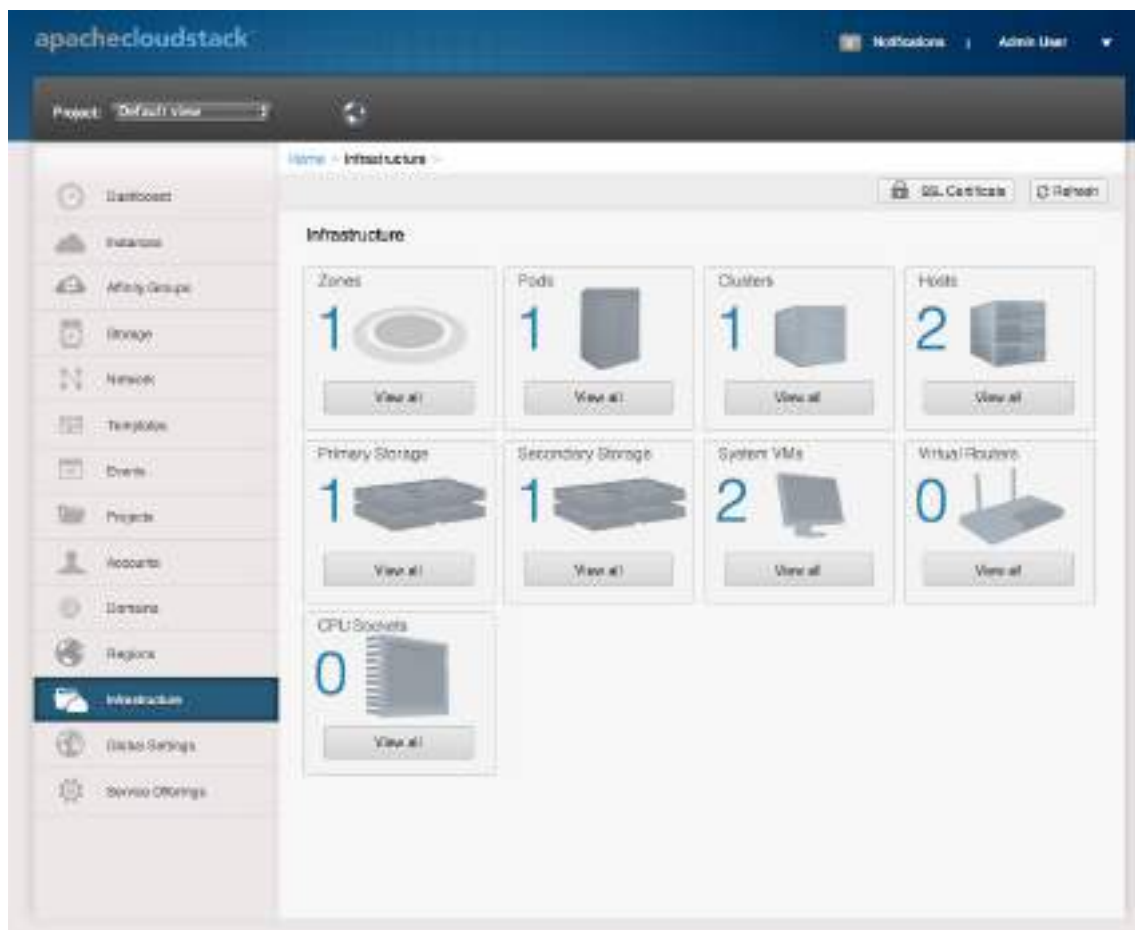


Figure 4: Infrastructure overview screen in CloudStack web GUI

CloudStack can be use for different cases. Some of them are:

User self-service:

Setup resources like virtual computers and applications like CAD software on their own by an easy-to-use and comfortable web application (instead of command line tools or something comparable).

Sharing of processing power, data and virtualized software

It will be possible to share computers and processing power, sharing of data and storage and virtualized software. But not: Sharing of commercial software licenses due to legal restrictions.

Bring in own student computers

Students with their own computers using remote desktops.

- No university PC for each student required
- Students know their own machines
- Can work around the campus or at home (depends on security restrictions, might be solved by a virtual private network VPN with encryption)
- Freezing sessions and continue somewhere else

Remote access to laboratories

- Common experiences of students of different countries based on similar infrastructures, tools, lab organization, learning improvement, thanks to the optimization of laboratories and courses.

- Sharing of laboratory experiences

Delivery of an e-learning environment:

Moodle as an open source software might be an adequate solution (especially in the newest version with responsive design theme which works on desktop, tables and mobile phone)

- Installed on several servers across Europe to be closer to the learners (could reduce the problem of network latency)
- Maybe distributed installations to have content synchronized between the universities and to be more stable in case of unavailability of single machines
- Better preservation of intellectual properties (not a single point of failure)
- Specification of auto-provisioning logic to scale the web e-learning environment depending on the load, especially for usage peaks and for the mobility of e-learning resources.

Some sort of cooperative work software

It would be useful to share project ideas, courses, files and teaching experiences between teachers and teachers or students and students. This should be supported by the educational cloud.

5.3. Infrastructure overview

Each university will install its own technical equipment, but the idea is to share between each other. The idea is: Start with three servers on three partner's sites and see, how it will be accepted and what we can learn from it.

The methodology that will be followed is:

- A map of the participating HEIs (logos) with their servers,
- The right place for the CloudStack controller
- Moodle web application installation
- CAD software installation
- Monitoring

5.4. Future outcomes

- Proof of concept for the feasibility with at least 3 participating universities
- Sharing of setup guidelines
- Virtual machine templates (VMs) for end-user self-service (e. g. for teachers or in companies)
- Pre-installed Moodle environment
- CAD software pre-installed (find a solution for license keys)
- Other learning relevant software pre-installed
- Student learning desktop
- FAQ with the most frequently asked questions for the system administrators
- Training material for system administrators

6. Two proposed courses by UNED

Follow the cloud-based e-learning environment, UNED, as a partner of the project, is developing two MSc courses in Microelectronics as open educational resources. The two courses are: 1) Microelectronics literacy and Technologies, and 2) Integrated circuits and design. These two courses joined to the list of 22 courses that are being developed by all the partners of the project. Table 2 shows the learning outcomes that will achieve in these two courses.

Table 2: Learning outcomes of the two courses developed by UNED.

Course	Knowledge	Skills	Competences
Microelectronics literacy and Technologies	Overview of fundamentals of microelectronics. Basic knowledge in the main technology processes in microelectronics.	Skills in classification materials, definition of semiconductor substrates and crystals. Ability of understanding the crystal growth processes, all the main manufacturing processes and thin film processes and choosing which is the best process to use for a specific design	Able to use different types of large scale integrated circuits Able to design the oxidation and deposition layers and the diffusion and ion implantation in microelectronics
Integrated circuits and design	Advanced knowledge in Technologies of integrated circuits and methods for designing digital integrated circuits.	Advanced skills in choosing which is the best technology to use for specific requirements in the production of an integrated circuit and advanced ability of choosing more suitable method for designing a specific integrated circuit	Able to use Lithography technology in the design of integrated circuits. Able to use CMOS technology sequence and BiCMOS integrated circuits. Able to manage and design custom circuits and logical matrices

The methodology proposed to develop these two courses is as follows:

- Develop contents and material for both courses in a document format (docx or pdf).
- Implementation content and material for both courses in our own e-learning platform, which is in aLF. For the course “Integrated circuits and design”, which is an advanced course in Microelectronics, it will design practical activities using the Remote Lab – VISIR.
- Migrate these two course to CloudStack in order to use in a cloud architecture by all the partners.
- Test these two courses with real students from the Master in Information and Communication Electronic Systems conducted by UNED and with students from the rest of partners.

7. Conclusions

The project addresses the needs of enterprises and HE of training new skills for new jobs and the needs of sharing open educational resources, IT infrastructure and expertise in the highly interdisciplinary area of micro- nanoelectronics where no one university can afford sufficient infrastructure and equipment. For the knowledge and cognitive skills training, the learning materials will be ICT-based with remote access to laboratories in the other countries, and the content will be based on the last research results and practices in the most rapidly developing science. The e-learning will allow virtual mobility of students and an easy update of the contents, which should be innovated every year.

Involving employers and labour market institutions in the design and delivery of programmes, supporting staff exchanges and including practical experience in courses can help attune curricula to current and emerging labour market needs and foster employability and entrepreneurship.

The Cloud computing approach, created mainly for Internet application needs, will be adapted to IT architectures for e-learning, but not only. In fact, the design of an efficient training infrastructure based on

a Cloud approach can be also a key solution for traditional classroom training through sharing server resources. The students will be able to interact with the remote experiments including in the real work place, change parameters and in some cases modify and design experiments. The mClouds architecture will enable the Europe-wide distribution of resources, in terms of lab-experiments, by utilizing multiple Web servers in a single network topology. Thus, instructors from different European countries can take the advantages of employing a running lab-experiment and present it in their native language and personal educational point of view.

Some benefits or advantages that we will obtain using this architecture are:

- Up-to-date curricula in the most rapidly developing science with rich offer of specialised elective courses that no one HEI can afford;
- Enlarged and more powerful infrastructure with the virtual use of the resources of the partners in the knowledge alliance;
- Opportunity to collaborate with enterprises in the research projects beneficial for both sides: access of HE researchers to the equipment of enterprises for investigation purposes and contribution of the academic researchers and PhD students to the innovations in the manufacturing processes of SMEs.
- Involvement of company staff in teaching and course development will improve the preparation of future graduates for the business environment, i.e. the companies will have better prepared new employees for their specific needs;
- Opportunity to use for training their staff a large variety of free courses developed by academicians and researchers all over Europe;

The knowledge alliance purpose is to build a long lasting partnership of SMEs with HEIs, which could evolve in joint research activities. Mostly the SMEs, which cannot afford research, may rely on the scientific potential of HEIs and the collaboration in supervising doctoral theses is a logical continuation of the knowledge alliance activities. In France, there is a good practice in such collaboration and it will be transferred in the other European countries including the co-tutoring practices by HEI and SME and by supervisors from different countries. And double line feedback, knowledge and synergy gain due to the specific enterprise/HEI partnership, increasing the research and innovation on the enterprise gained from the HEI academic competitive view and improve the HE thanks' to the enterprise's industrial application experience and knowledge.

Acknowledgment

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Creating Curious Learners Through Short Learning Programmes

Theme: Flexible continuing education (incl. cpd) and new types of courses (short learning programmes) to accommodate 25 plus students

Liz Moody

Senior Lecturer in Management Development, Faculty of Business and Law, the Open University, UK

Jo Lambert

Lecturer in Management Development, Faculty of Business and Law, the Open University, UK

Executive Education (Faculty of Business and Law) is the interface between employers and higher education. We design work-based learning opportunities for corporate clients for their leaders and managers. Increasingly, employers say they work with the OU to help instil a habit of learning, to help continually upskill and update employee knowledge and understanding through enabling a culture of learning across the organisation.

This investigation is aimed at learning what features encourage curiosity and excitement in learning and help lead to a culture of learning where learners willingly participate, and as a result both individuals and organisations benefit from their participation. Our focus is on learning in the workplace, whether through individual endeavour, by corporate purchase and/or specifically designed interventions.

Using two case studies we will compare and contrast two learning programmes:

1. Programmes of learning designed for large multi-sector organisations requiring multiple levels of learning and a variety of types of engagement: sounds bites at 15 minutes upwards to 5 hours of online blended with part or full-day face to face workshops to make up complete programmes and learner journeys that underpin all interactions with the learning.
2. A single programme of learning for a very specific audience previously unengaged in the new subject matter. The individual learning elements are up to 10 hours as a maximum, but technological challenges of global delivery limit a rich use of media as part of the solution.

1. Introduction

“The important thing is not to stop questioning. Curiosity has its own reason for existing.” Albert Einstein

Curiosity, or the desire to know, is widely acknowledged as a strong motivator to learn new things. Teachers and learners will often acknowledge that it is a far easier task to learn and therefore teach that what intrigues or interests students. In the workplace, however, the outcomes of learning programmes, particularly in the area of management development, are often prescribed by the employer in terms of what will be supported and what it is designed to achieve. In this way, we observe potential tensions arising between the learners’ individual interest in subject matter and their subsequent active and willing participation in work-based programmes that are provided by their employer. This paper is an exploration of how individual curiosity can be encouraged and utilised in the design of work-based learning. In particular it explores how curiosity can be encouraged through deliberate pedagogical design for adults in the workplace. It explores the inherent challenges and implications for learning providers and employers in this context and provides an interrogation of two case studies where blended leadership and management development programmes (where blended means online content and activities, interaction and support mechanisms) have been commissioned.

For the purpose of this paper, we define learners as adults in the workplace, engaged in learning interventions. Some of the literature refers to students as this is appropriate to their investigations of learning whether in a primary, secondary or tertiary educational context.

2. The Case for Curiosity

The relationship of curiosity to learning is not new with roots in philosophy and behavioural psychology, motivation theory, cognitive constructivist theories (Pluck & Johnson, 2011) and more recently in neuroscience. Behavioural science experiments with animals and humans seemed to show that curiosity is not a learned behaviour but suggest that we are programmed to acquire information (Birke & Archer, 1983). Curiosity fuels typically active learning behaviours like asking questions, exploration, researching answers, seeking solutions, and ‘trial behaviour’. Curiosity has been described as a state of mind (something that varies by situation), and a personality trait (a fixed feature regardless of the context) however while this attempt to classify is interesting, it is for us less so than understanding how curiosity can be harnessed to good effect in the context of adult, work-based learning.

As early as the 1950’s David Berlyne (Berlyne, 1954) made a theoretical distinction between ‘perceptual curiosity’ and ‘epistemic curiosity’. Perceptual curiosity describes situations where there is a stimulus that attracts attention, perhaps something out of the ordinary. Epistemic curiosity describes human behaviour associated with a desire to know more. This idea of a “thirst for knowledge” clearly is of relevance to those who design learning programmes. Berlyne’s ideas were later elaborated on by Loewenstein (Loewenstein, 1994) who postulated that learners are curious as a result of perceived information gaps and a desire to close that gap, to solve puzzles or problems or even find out what happens next. Experiments suggested that not only does curiosity encourage closure of an information gap, but as learners get nearer to closing that gap, their curiosity is increased. Conversely, learners were not curious if they did not acknowledge that they had an information gap.

Another explanation for why curiosity may have an important role in learning may be found in neuroscience. Being curious seems to make the brain more receptive to learning and furthermore, can make learning more rewarding for the learner as well as more memorable (Gruber, et al., 2014). Using brain imaging techniques revealed that brain activity was enhanced during states of intrigue and curiosity. Gruber et al suggested that this demonstrates a link between curiosity and extrinsic reward motivation,

observing that the neurotransmitter dopamine, is released when curiosity is aroused, involving the same circuitry and areas of the brain that provide a “feel-good” factor in other contexts.

In practice this could mean that through stimulating curiosity, learning experiences will be associated with positive emotions and be more effective both in terms of how the learning is encoded and the ability to recall learning acquired. Other studies (Kang, et al., 2009) have investigated the interaction of curiosity and prior knowledge. Like Berlyne, this appears to be related to the idea of the information gap in that knowing something about something is more likely to encourage a person to learn more than knowing nothing about it.

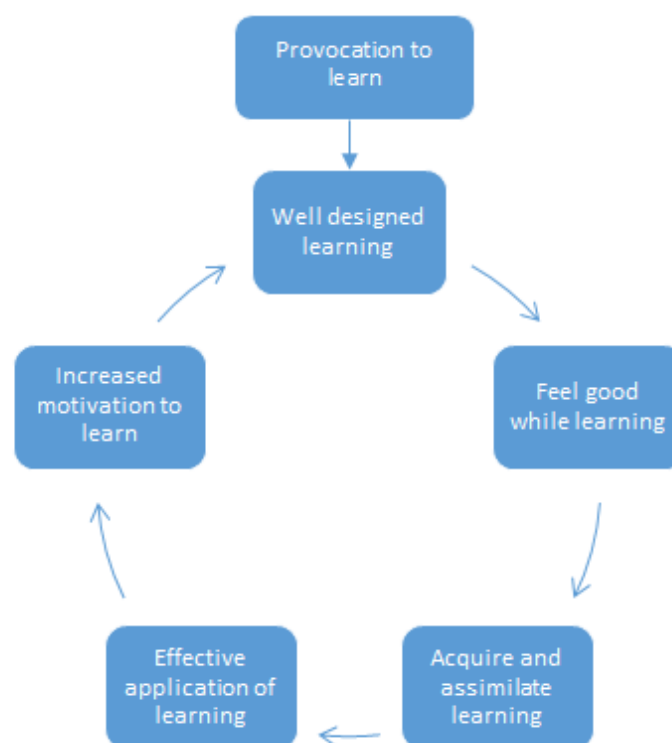
From an individual’s perspective, curiosity in and for learning is piqued when:

- There is an identified information gap
- There is some prior/existing knowledge from which to build on
- A problem will be solved, or a gap closed, creating a feeling of reward.

Furthermore the ability to recall learning is enhanced where curiosity is involved.

3. Implications for Management Education

Our assertion is that **if** learning design and delivery is to harness curiosity through deliberate stimulation, adult learners would have greater incentive to participate in the learning offered and the learning would have greater impact in the organisation as a result. Assuming the learning satisfies the curiosity it was designed to provoke, learners would experience the “feel-good” factor, acquire and assimilate the new learning and therefore apply it more effectively. The positive association with learning would have benefit longer term by improving the learner’s extrinsic motivation to learn, and learn again.



For management development programmes, effectiveness is often measured by the transformative impact of the learning outcomes and the business outcomes for the organisation. Learning outcomes can be expressed by the knowledge and understanding, skills, behaviours and attitudes that learners acquire through learning. To achieve business outcomes the learning outcomes need to be appropriately applied in the work context, at the right time. We believe that this dual purpose of work-based learning often sets up tensions and challenges that learning design has to overcome. When working with a corporate client, the requirements of the organisation and the needs of the learner need to be considered and ideally, balanced through the design and delivery of the programme. From an organisational perspective this means working towards their aims and business outcomes, and balancing these with any constraints on scope and scale of the subject matter, matched to the wider target audience, working with realistic delivery timescales and of course matching the programme to the detailed context of the organisation (e.g. available IT infrastructure or geographical spread) and importantly, the budget. On the other hand, recognising the learning needs of learners requires us to understand, amongst other factors, their prior learning experiences, preferred learning styles, how learning fits in with their daily working patterns, constraints on their ability to learn, (for example job role, access to online environment, disabilities) as well as their current level of knowledge or interest in the subject matter identified. Clearly with large scale projects, this is an incredibly complex process of establishing requirements and defining the scope of a programme. Inevitably it involves compromises and trade-offs and the ideal is not achievable.

We believe that there are tensions that arise as a result of the factors listed above and these additional ones:

- whether learning is paid for or free and who pays for it
- who identifies the need for learning
- how and from where learning is sourced and accessed
- where and when learning is undertaken
- what is gained from the learning in the broadest terms
- what impact learning has on the individual and the organisation

These and many other questions are of interest to us in designing effective future models of work-based learning that work for both the learner and their employer.

Is learning paid for, and who pays for it?

4. “Who pays the piper calls the tune”

Quite reasonably a CEO or CFO might ask why a business should pay for an individual to learn something they want to learn, if there is no apparent benefit or direct return to the business. Turning this question around, one might ask, since the company in question is paying for the learning, isn't it entitled to require the learner to learn? Put in this way, requiring learners to learn something about which they have no interest, seems less reasonable, given the positive impact of curiosity in the short and longer term and yet many organisations make learning mandatory. Can we force people to learn against their will? And if we can, is this an effective way of making the learning “stick”, of achieving a learning culture or an environment where learning becomes a positive habit? Undoubtedly the control of budgets and flow of money influences the model of work-based learning. This presents some further areas for exploration including the impact of individuals selecting their own learning (whether they or their employer pays) as well as the potential for an increasing role in the use of free educational resources in work-based learning. Our belief is that whether learning is provided free or paid for may also have an impact on motivation but this is another area for further investigation outside the scope of this paper.

Who identifies the need for learning?

While not always stated overtly, investment in work-based learning appears to be based on the logic and premise that “[L&D investments] and activity is directed towards improving organisational performance” (Chartered Institute of Personnel Development, 2015). Indeed of those organisations the Chartered Institute of Personnel and Development (CIPD) surveyed in 2015, only 6% stated there was no particular alignment to business strategy. The CIPD report further identifies L&D’s purpose as improving both individual and organisational performance through a concentration on improving capability now and by closing a potential skills gap implied by the business strategy. A significant minority of organisations described their sole purpose as ensuring compliance with statutory or regulatory compliance, as in health and safety training or money laundering amongst others. In other words, learning outcomes are aligned to business outcomes and the learning is intended to be effective in equipping learners in their work either through compliant behaviour or to cope with future change and challenges. Given that curiosity is an effective motivator of learning, the question is whether the organisation’s agenda for learning, their selection of its purpose and outcomes and how they elect to provide it is compatible with learner’s own curiosity and motivation to learn.

What is gained from the learning in the broadest terms?

As the CIPD report (Chartered Institute of Personnel Development, 2015) suggests, many sectors and companies have a vision of the transformation they want to see in how people work, the skills, behaviours and attitudes needed. They typically then prescribe the required outcomes for the business and the learners which logically translates into programmes or a curriculum. Knowledge is increasingly seen as central to the success of organisations and an asset to be managed (Boersma & Stegwee, 1996).

The provision of learning and development in organisations has changed over time and it is likely to continue to do so as a result of changing business models resulting in the need to build in adaptation to the workforce, creation of typically flatter structures, globalisation, outsourcing and offshoring which impact upon the available talent pool, (Ambrose & Ogilvie, 2010) and increasingly working in a distributed environment which affect teams. In particular, working as part of a virtual team, a project team or remote working means that employees will lose many of the opportunities for informal collaboration and knowledge sharing (Kimble, et al., 2000). The impact of four generations in the workplace also suggests that learners are likely to have very different experiences and expectations of learning depending upon their life stage and educational background. For the older generations many may not have studied for some time but have a wealth of work experience to draw upon while the youngest will have recent experience of learning and potentially using computer aided technologies without having had the opportunity to apply it in practice. The real question is how learning and development supports this changing profile and backdrop to learning?

Where and when is learning undertaken?

From our experience L&D departments often struggle to recruit managers to participate willingly in development programmes for a number of commonly cited reasons associated with their available time, competing priorities, immediate and unforeseen pressures on their business area, all of which mean that making time for learning is difficult. Other possible reasons we have heard include a lack of interest in the subject matter, commonly where soft skills are considered secondary to manager’s own professional, operational or technical knowledge. This includes a view that the learning will not provide any additional benefit or enhancement to their management capability hence it would follow that for some target

participants, there is no perceived knowledge gap. The result of such reluctance is that organisations may resort to strategies such as making attendance mandatory or even a condition of becoming a new manager or it being implied that it will help with career progression.

This begs a number of questions demonstrating the potential mismatch between the organisation's stated learning need, the inclination and motivation of individual learners to undertake that learning, who decides what type and how much learning is needed, its starting point and the end level to be achieved. It also has implications for the mode of delivery, location, time and pace of delivery and availability of learning over time (e.g. are there opportunities to repeat it or revisit learning as and when it is needed).

What impact does learning have on the individual and the organisation?

If the organisation's assessment of skills and behaviours needed does not coincide with the learner's own view of whether they need to learn or what they might like to learn, will work-based learning be as effective? Again, these questions throw up some interesting themes and areas for further exploration. For example, should organisations concentrate resources on those individuals whose own view of the skills and knowledge they need coincides with their employer? How should they address more reluctant learners or 'refuseniks' where they demonstrate neither interest nor willingness to use their time to learn. How does the organisation reconcile the trade-offs between theories of effective learning and the commercial reality of time for learning versus time for work and investment made in learning provision and its impact?

Developments in technology support better communication with and between learners, increase the reach of knowledge and the use of multiple devices also increases the opportunities for a more sophisticated pedagogical approach. The online environment and a wealth of quality open educational resources has supplied many possible solutions to the logistical issues above around payment, access, timing, availability and even personalisation of learning. However without the ability to create pathways through the mass of available information that meet learning goals, this mass of online content caters only for the dedicated autodidact. In order to harness such resources efficiently and therefore make learning meaningful and relevant, it takes someone to establish the veracity, accuracy and provenance of information, to curate content that supports good learning (Ambrose & Ogilvie, 2010). In other words, providing unlimited access to content does not equate with learning without the pedagogy.

5. Building pedagogy on sound principles

We believe that the foundation for effective learning lies in enabling the individual learner to have more control over their own learning and that curiosity can supply a key motivation for them to do so. This can be related to the much debated and critically reviewed principles of andragogy that Knowles wrote of in the 1970's. Knowles (Knowles, 1970) distinguished between adults and children's learning. He compared the different contexts in which learning takes place, and its role at different developmental stages.

As children we have huge capacity to learn new things and during school years we are taught what society believes are those things essential to our safety, survival, and also the development and pursuit of interests and preferences that will shape our working and adult lives. In this sense the curriculum is made up of what society believes children need to know. Sugata Mitra's (Mitra & Dangwal, 2010) experiments in New Delhi testify to the "natural curiosity" of children and their apparently limitless enthusiasm and capacity for learning. Notably his experiments demonstrated that children do not need to be taught in order to learn. By asking them questions, and providing a computer connected to the internet, the children were not only able to learn about subjects and concepts that were believed to be far in excess of their years and educational stage, while learning with their peers but they did so without a teacher. There are many aspects about these experiments beyond the obvious role of curiosity that are of interest including:

- the role of guidance in learning,
- establishing a pathway through learning and
- creation of meaning for the learner

This was achieved in the case of the New Delhi experiments by defining questions or statements that stimulate curiosity and by providing encouragement to progress, providing feedback and recognition for achievements and so on.

“While we’re all born with an intense desire to learn, somewhere along the line many of us lose our passion for learning.” (Warrell, 2014)

Formal and more traditional schooling for young people is very different to providing learning for adults. Adults, who are likely to have progressed through a formal, predominantly teacher led, schooling experience are also likely to be learning in addition to working. In today’s workplace we currently see anything up to four generations each with different experiences of schooling and education. This also manifestly impacts upon learning preferences with older generations more likely to express preferences for face to face learning versus the more learning by doing approach, often using a computer for which younger learners might express preferences (Ambrose & Ogilvie, 2010).

This implies a very different approach to planning and designing learning around both the working day and learning preferences, and further we believe the approach also has to take account of the different role that learning plays for adults in the workplace. A great deal of learning takes place outside of work-based formal training on the job, informally, in other social contexts and through synchronous and asynchronous participation in social learning (Sharples, et al., 2015).

6. A pedagogic review

The literature (Knowles, 1970)(Reigeluth, 2012) (Chickering & Ehrmann, 1996), and (Gagne, et al., 2005)) suggests adults are primed and ready to learn.

Knowles (1970) described six principles of andragogy as:

1. Adults have a self-concept of a self-directing personality: meaning they are capable of taking control of the goals and purpose of their own learning. This could be through self-teaching or under self-direction. Autonomous learning also included learners setting goals autonomously but choosing to learn in a teacher-directed way.
2. Adults bring a wealth of experience to the learning process: some of this experience provides both rich resources and a valuable platform from which to build new learning.
3. Adults come to the learning process ready to learn: we encounter a particular situation or circumstance which creates the need to know something, an incentive, need or stimulus to learn.
4. Adults are orientated towards immediate application of learned knowledge: closely related to point 3 above, Knowles (1970) suggested that adults tend to approach learning in the context of the real-life situations they are experiencing.
5. Adults need to know the reason for learning something: but more specifically how learning will be conducted, what learning will occur and why it is important.
6. Adults are driven by intrinsic motivation to learn: finally, adults are motivated to learn to solve problems that provide some notion of pay-off from learning.

While our experience seems to accord with many of Knowles' principles, in the context of the work-based environment there are additional factors to consider. For example, as was highlighted above, application of learning takes place within a bigger picture and structure of organisational objectives, teams, management

hierarchies and workplace culture. All of these may influence the time and opportunity to learn, the available support from a line manager or peers and crucially the potential of informal and social learning.

Brigitte Jordan and colleagues (Jordan, n.d.), at the Xerox Institute for Research on Learning and Work Practice Technology Group in Palo Alto, conclude that conventional approaches to training do not adequately prepare employees for the future economy. Experiments in group-based learning that facilitates lateral communication and peer to peer learning where other learners are seen as experts in their own right, have proven to be more effective. Catering for the wide ranging needs and contexts of learners has led to demand for modular learning, delivered when and where learners need it to fit with the reality of time pressured employees with changing roles and demands. Modules are becoming smaller in size, requiring less time to study, and requiring more frequent updates to keep pace with rapidly changing circumstances. The role of the learning and development department has shifted from constructing a curriculum to establishment of a learning environment (Ambrose & Ogilvie, 2010).

Reigeluth (2012) identified core ideas for education to meet the need of the individual. He suggests design needs to be learner centric, focussed on the needs of the learner, their skills and what they need to achieve from the learning, not what is required to be taught. As with Mitra's work, it is the learners who drive how the learning is conducted, any instruction or facilitation is orchestrated by the learner themselves. Content and method are customised, pathways and learning contracts being central tools for achieving this. Progression is based on attainment, however attainment is defined. This allows for slower learners to master content before being forced to move on while at the other end of the scale, faster learners are no longer frustrated and waste valuable learning time waiting for the group to move on. Formative and summative assessment provide a valuable role in guiding the learning through feedback and assessment against attainment and progression. Further parallels to Mitra can be drawn through the prevalent use of collaboration, just as it is a requirement in other dimensions of a learner's life (social life, work life, family life) as well as the use of enjoyment. Switching from the extrinsic motivation for learning (a reward will be attained) to the intrinsic motivation where learning is done because it is enjoyable and satisfying.

Chickering and Ehrmann (Chickering & Ehrmann, 1996) developed seven principles (amplified below) to encompass the proliferation of technology in teaching.

1. Stimulate student-tutor (faculty) contact: contact both in and out of the classroom environment stimulates student motivation and involvement. How the classroom is defined, divided and delineated in the technology sphere can help engagement of all students (content related, admin related, issue related, social related – synchronous v asynchronous, carefully constructed v ad lib).
2. Stimulate co-operation among students: working with others often increases the involvement in the learning. Sharing ones ideas and responding to others improves critical thinking skills and deepens understanding.
3. Stimulate active learning: the learning design process at the Open University breaks down learning into assimilative, productive, finding, experiential, communication, interactive/adaptive and assessment.
4. Offer fast feedback to students: for example through diagnostics, competency frameworks, contextualised pathways, enabling individuals to assess where they are starting out from on their learner journey, their progress along the pathway and what end points are in sight. Frequent opportunities to reflect and note how far along a journey an individual has come are important, especially now informal learning is playing a larger role in completing the learning picture for an individual.

5. Highlight the time invested: a simple equation: time + energy = learning. Enabling students to plan their time effectively (even down to ensuring resources are available appropriately) ensures maximum use of time allocated to learning. On the other side of the coin, recognising the amount of time an individual has spent learning (student participation) can be useful analytics in the design process (with all the usual caveats).
6. Transmit high expectations: expect more and you will get it. Setting powerful contextualised problems to be solved can drive students to not only acquire information but also sharpen cognitive skills of analysis, synthesis, application and evaluation.
7. Respect different talents, abilities and ways of learning: providing different opportunities for individuals to showcase their talents. While providing opportunities for individuals to flourish in the way that suits their preferred learning styles, a truly blended learning solution can push them to learning in new ways that do not come naturally.

In providing a blended approach to learning, the online element can address many aspects of a more personalised approach to encouraging and maintaining the interest and enthusiasm of work-based learners, at scale. In this respect it has several advantages over traditional face to face learning events not least the accessibility and timing issues of learning at scale across a distributed workforce. In order to utilise curiosity as a stimulus and provocation to learn, however, in addition to relevant content, appropriately curated and delivered, there are additional features and areas of further investigation to include in the instructional design of materials. Gagne (Gagne, et al., 2005) developed a procedure for instructional design that has its origins in cognitive psychology and information-processing theory, for the preparation of modules and courses based on 9 events:

1. Gain attention
2. Inform learner of objectives
3. Stimulate recall of prior learning
4. Present the content
5. Provide guidance
6. Elicit performance
7. Provide feedback
8. Assess performance
9. Enhance retention and transfer

From our experience of delivering blended learning, in addition to utilising principles and apply best practice learning theory and design approaches, we recognise there are crucial additional factors that support the uptake of learning while effectively stimulating and encouraging curiosity.

Communication

A wide ranging role for communications and support to learners outside of the programme itself is required to be effective. Using Gagne's events, as a basis for this we believe a programme needs to be:

1. Promoted to gain attention and have appeal to learners. This might be through campaigns that make connections to areas of personal interest, personalised endorsement by peers, more senior individuals or line managers
2. Positioned to say how and why it will be useful to learners which in addition to the learning outcomes may also talk about how it fits to what they have learned before, what it will enable them to do next, with more confidence, knowledge or ability

3. A positive demonstration of how it closes learning gaps (e.g. by reference to a competence framework, career aspiration) or how it adds to an existing area of interest
4. Supporting a real need at the right time and so ideally available to learners at the time they need the knowledge or techniques to hand or to allow them to progress at their own pace
5. Providing advice in the form of additional resources, for learners to go further and deeper as their curiosity takes them there
6. Supporting real life decisions and choices by providing feedback and interaction that provide information beyond right and wrong answers by provoking further thoughts and reflection
7. Testing knowledge and understanding and providing opportunities for the application of learning and encouragement to reflect and share the experience with others either while learning or as relevant situations arise at work
8. Focused on retention and transfer of learning into real life by ongoing contact, monitoring of learning and support interventions if needed
9. Followed up by communication, about ongoing progress, any further opportunities to progress the learning, reminders of what they have learned and have still to cover. Using the behavioural economists approach of "nudge theory" (Thaler & Sunstein, 2008) based on learning analytics and feedback for learners may provide a means of stimulating further learning.

7. Discussion – how do we apply theory to practice: key points from the case studies

We have observed and highlighted research that supports our view that curiosity is a valuable and powerful motivator for individual learners. We have also sought to provide an overview of the literature, thinking and practice that while it has until now been more implicit in the design behaviours we have developed while working within the constraints and limitation of the corporate context. The theory has informed our practice over time in designing work-based learning and we believe also supported our success in being selected by organisations as their learning partner or provider.

Wider workplace environmental changes imply a changing role for learning and development departments who are moving from training delivery towards procurers of training. While undoubtedly more work is required to bring the whole articulation of pedagogic theory and application in practice together, doing so requires a sophistication amongst those who procure learning contracts on a number of fronts. Recognising the trends and developments in pedagogy and appreciating the role of curiosity in learning is one aspect of that but in addition, there are questions of resources and infrastructure to consider too. For example introducing a personalised, contextualised, always on, just in time, blended programme that keeps content up to date and prompts and encourages learners to learn relies upon a robust learning management system and significant investment of time and money. We believe that the ability to deliver this at scale can result in a very effective and cost-effective solution for large, dispersed cohorts of learners.

We cannot claim that we have ever succeeded in creating a winning and repeatable formula that can be applied to every situation and nor would that be appropriate for customised Executive Education programmes. These are by definition learning adapted for a specific target audience and context. We have also pointed out some of the typical compromises and trade-offs that exist in working for what is effectively two “masters” – a client who pays for programme, specifies its aims and therefore sets out the success criteria by which it will be judged – and the individual learner whose personal interests, ambitions, attitudes and experiences shape their view of proposed learning.

What follows are descriptions of two organisations to whose management development programmes we have had substantial input. These illustrate many of the attempts to incorporate best practice into the

programme design while building on the curiosity of learners. They also provide a degree of realism by demonstrating the compromises required.

Wellcome

One key question driving the solution design for Wellcome was "why do this when [online] bookstores contain a plethora of management and leadership texts, some written by scientists themselves?" Understanding the learner and the nature of their work environment was critical to a design to provoke their curiosity and motivation.

The learning was designed to have immediate context both in terms of content and application: (Reigeluth Learner focused and Customised; Knowles Adults are orientated towards immediate application of learned knowledge). A key differentiator is the lack of time to be invested by the learner in thinking "how does this apply to me?" All examples and case studies are drawn from the laboratory based researcher environments. Time is spent applying the learning to the workplace rather than assimilating it into learners' own context.

The content itself is interspersed with experiences, anecdotes and sound bites from carefully-selected senior leaders in the scientific community to enhance the credibility of the learning within the target population and also provide motivation and endorsement messaging. This draws on the importance of positioning the learning (Gagne, 2005) and also Knowles (adults need to know the reason for learning something by highlighting the trajectory possibly available to them.)

Recognising [any] prior learning in management (Knowles: Adults bring a wealth of experience to the learning process; Gagne: Demonstrate how it closes their learning gap or adds to an existing area of interest) is used to develop reflective practice, promote self-awareness and self-management. The mechanism for collecting and evidencing the prior learning enabled learning to support the ability to create personalised pathways through the remaining curriculum.

From the learner perspective, the pathway approach enables informed choices on the learning required - how, when and if it will be studied. They have ownership of their pathway, they can purchase the learning proposed through the platform, through their own organisation or via the third party provider. In addition to providing the learning outcomes and synopsis of the learning, we provided exploration into how they learn, how management is impacted by learning styles and what has worked best for them. We recognised the prior educational experience of the learners is to a very high level (all Post Doctoral) and traditional face to face supervision led. (Chickering and Ehrmann: Respect different talents, abilities and ways of learning; Reigeluth: Customised)

Throughout the whole process, from initial engagement to registration to undertaking of content learning, the final assessment piece is explicitly communicated. Chickering and Ehrmann: transmit high expectations; Knowles: Adults need to know the reason for learning something and where it will take them in terms of problem resolution.

The UK Civil Service

A key consideration for developing managers in the civil service was the range of levels, experience and contexts that the programme had to cater for across numerous professions, departments, locations and working environments. This ranges from distributed teams, to those on the frontline for whom planning time for learning is particularly difficult. Hence part of the solution was to provide learning in small chunks,

to create contextualised materials that can be downloaded, exercises and activities that can be used on a just in time basis. This learning design supports the view that the programme has to be focused on learner need and circumstances, as Reigeluth and Knowles both found.

The chunks of learning are provided as part of an overall learner journey that in many cases combines the online and a face to face element (Chickering and Ehrmann acknowledge the impact of previous experience of learning and learning preferences).

The learner journeys are created in three phases – engage, focus and embed. As such, some materials that are free to learners, in order to engage them in the topic (Berlyne's stimulus to attract attention; Gagne's stage to create appeal) and before moving on to paid for learning (focus) where most of the learning takes place should they proceed to it (Loewenstein's information gap). The topics are often endorsed by known senior civil servants who contextualise the importance of the topic, give it credibility and sets the rationale for the learning in terms of how they want the service to operate. (Knowles: adults use learning to solve problems as they encounter them; Chickering and Ehrmann's setting of high expectations)

The use of diagnostics and gap analyses creates the suggestion of an information gap (Loewenstein) and along with communication campaigns and course descriptors on the portal, these are designed to hook the learner and stimulate their curiosity to learn more. (Thaler and Sunstein "nudge theory" applied to learning). In the focus phase there is more emphasis on tutorials and knowledge testing providing immediate feedback (Gagne, Chickering). Finally in the embed phase, there is encouragement to apply the learning in the workplace (Knowles) and the provision of tools, signposting to further reading and resources for a deeper dive into the subject (Gagne) and encouragement to reflect on what has been learned either individually or through contact with others.

Workshops provide an opportunity to cater for different learning styles, (Chickering) the opportunity to socialise with peers and to get immediate feedback from a facilitator. While these are not cost effective at scale (and there are over 400,000 managers being targeted by this programme) their inclusion acknowledges that many adult learners are still accustomed to a tutor led environment, with the opportunity for immediate feedback and interaction with others and drawn to opportunities to engage in networking, social and informal learning. Constraints of IT access, bandwidth and devices mean that it will be some time before social learning can be supported online.

The short, standalone learning chunks are interspersed with narrative to link learning and to guide learners along a pathway towards the next stage of their learning while acknowledging what they may have already learned or know and providing choice about what to do next. Learning can therefore be managed at the learner's own pace with activities built in to encourage reflection and trial in the workplace. Learners can also produce their own portfolio as a record of their learning which is there to refer to as and when needed. (Reigeluth's learner centred and learner active approach)

It was recognised by Civil Service Learning research that the line manager has a crucial role and is a controlling influence on time devoted to learning, as well as being a potential source of support, feedback and encouragement. Resources and guidance for line managers has been built into the programme to encourage positive involvement of line managers. (Chickering's stimulation of wider student contact and setting of high expectations of the learning and the learner).

Learning is currently assessed via short quizzes that test for understanding. There is an expectation that some activities will be completed prior to attendance at workshops however there is no formal testing of this. (Gagne and Reigeluth's criterion referenced assessment).

8. Conclusion

A review of literature in relation to curiosity and learning, design of learning, learning theories and our practical experience of delivering blended learning in the workplace have led us to conclude that achievement of an ideal management development programme requires a multi-disciplinary and multi-faceted approach to truly encompass best practice across all of these dimensions. In reality, the ability to put all of these into practice is constrained by a number of factors, not least the limited time, resources and budgets at the disposal of most L&D departments. Hence live programmes will inevitably require a degree of compromise. Perhaps organisations need to be less prescriptive how, what and in what order and when learning is provided. This represents a major shift in the role of learning departments and their ability to control the learning of individuals.

Appendix: Wellcome Case Study Background

Wellcome is a global charitable foundation which supports scientists and researchers to improve the health of everyone. They are both financially and politically independent, allowing them to determine their own strategic priorities for research. Wellcome currently supports over 14,000 people in more than 70 countries. Over the next five years, Wellcome aim to spend up to £5 billion “helping thousands of curious, passionate people... explore ideas in science, population health, medical innovation, the humanities, social sciences and public engagement”.

Wellcome approached the Open University (OU) in July 2015 to explore the creation of a management based curriculum targeted at bio-medical researchers. Their experience of funding research indicated research output could be improved if early career postdoctoral researchers had (equal) access to robust, contextualised management skills education across the world.

The curriculum comprises both hard and soft management skills such as project management, budgeting, recruitment, team working and communication skills combined with specific skills of writing scientific papers, public engagement in science, and career development. The final suite of modules cover equality and diversity; bullying and harassment; and cultural awareness.

Parameters impacting on design

Wellcome’s stated reasons for approaching the OU were:

- The OU’s reputation in supported, online, distance learning,
- The OU’s reputation in work based learning, and
- The OU’s charitable status and social mission.

Through the process of scoping the opportunity presented by Wellcome, the OU identified the following design parameters to adhere to:

1. The learning and support should be wholly online;
2. The learning must be fully accessible in areas where internet connectivity is poor;
3. The learning must be immediately impactful for the bio-medical researcher;
4. Any prior learning in management should be recognised; and
5. The total learning should not exceed 100 hours and each individual module should be no more than 10 hours.

The target audience is are highly educated in a traditional education system (face to face, supervisor lead PhD) and may not have experienced learning in an online environment. However, online skills (finding and

storing information, assessing credibility of information, navigating websites, online security, purchasing online) are likely to be well established.

The designed solution

A bespoke platform has been constructed to meet the needs of the target audience. The platform consists:

- o An open to all marketing area: to act as a landing page for marketing materials; to promote the benefits of the programme of study; computer specification; detailed information on the curriculum; frequently asked questions; call to action to register
- o A registration gateway: collection of personal, institutional and demographic data
- o A study dashboard: where a registered researcher navigates their learning journey. Links to all available modules and assessments (via a payment gateway); frequently asked study questions; access to learning support
- o The ability to present an individualised learning journey
- o A payment engine: for purchase of the assessment and modules
- o A virtual learning environment hosting all the assessment and modules
- o Creation of the prior and post learning assessment
- o Creation of the contextualised curriculum
- o An e-portfolio tool for collation of evidence for assessment purposes
- o Completion and certification capability
- o Reporting and analytics for evaluation

The Learning Journey

Once individuals have registered for the International Funders' Award, they are invited to submit any prior learning undertaken in management topics via a directed set of activities in the e-portfolio tool. If they have none, they can check a box and continue with the learning journey in its entirety.

Learning Advisors (contracted staff of the OU) assess the prior learning and determine which modules are required for study. The Learning Advisors programme the pathway and the modules required for study are displayed to the individual. Modules not required for study are still available, but presented as "exempt".

Individuals can choose to study the module with the OU or source the learning from elsewhere (for example, their own institution).

At the end of the learning, individuals undertake the final assessment piece: a project orientated work-based activity designed to embed the management skills learning into their context. Successful completion generates a certificate of completion for the International Funders' Award. The certificate is a uniquely generated record for each individual and held against their personal record.

Appendix CSL Case Study

Background

Civil Service Learning (CSL) is a centralised department that supports the procurement and supply of many aspects of the learning and development for the UK civil service, the administrative infrastructure that supports the UK government at Westminster and throughout the devolved administrations as well as civil servants based overseas.

The Open University is part of a wider consortium of learning providers that won a contract to supply programmes of blended, workplace learning for managers across the UK Civil Service. As such the learner profile spans a very wide range of departments, functions, professions and subject areas as well as management contexts (e.g. managers of small co-located teams, managers of managers, managers of large and dispersed teams, and/or projects).

The curriculum is structured across a typical learner journey in three stages – engage (raising awareness, stimulating interest in topics); focus – where the bulk of content is provided to develop knowledge and skills and finally the embed phase in which it is intended learning will be applied and there are opportunities to reflect upon its impact. The core curriculum reflects the essential capabilities and knowledge that all civil service managers would ideally have at least an awareness of. Leadership and management and change management form a prominent part and online tutorials are made available via the CSL portal with face to face events completing the blend. Their learning management system provides a portal to support

- o News and previews of learning and development events, prompts and reminders
- o A range of free learning designed to engage learners in the subject matter
- o Paid for learning via online tutorials available beyond a paywall and further signposting to relevant other topics and sources of more content and resources on the subject
- o Event booking and a service centre where learners can receive advice on the suitability of alternative topics for their needs

Parameters Impacting on Design

Comprehensive guidelines were included in the contract setting out the parameters for the design of learning elements:

1. It is expected that learners will do their learning in the workplace (i.e. during working hours) therefore using the available equipment and access to wi-fi
2. Workshops (face to face) will ordinarily be no longer than 3 hours in length, and may be shorter – this may be relaxed subsequently for learning outside of the core
3. Online learning should be produced in no longer than 15 minute units of time – there being no limit to the number of units for a given topic
4. The learning should address awareness level for all managers with further levels acknowledging the more in depth and specialist knowledge of practitioners and professionals

These guidelines acknowledged the different working practices in such a diverse range of functions and departments from those engaged in largely policy and administrative roles to those engaging face to face with the general public and on the phone through public offices (e.g. border control, job centres) and contact centres (e.g. tax and licencing offices). The role of the line manager as a facilitator and enabler of learning was highlighted.

The features and functionality of the portal are being released over time as the different technological constraints (firewalls, low bandwidth) and logistics that apply across departments (work patterns, access to devices) are addressed. This does place some constraints upon the ability to design in a fully integrated blended solution where learners are supported online by tutors and social learning and synchronous live events can be staged. The ambition for the programme is to include the latest and best practice of blended

learning, bearing in mind these technical constraints, as it is recognised that this provides the best solution to scale provision to this large target audience for the given budget. It should be said that there is some legacy of user resistance to online learning given previous experience of quite basic e-learning.

The Curriculum

The curriculum is also evolving. Initial releases of content are focused on 'awareness level' for the core curriculum or specifically those subjects where there is recognised demand and apparently more universal interest expressed by departments. Content has been co-created with subject matter experts who provide authors and learning designers with guidance on a suitable educational level, civil service terminology, case studies and context specific examples to ensure relevance of tutorials and learning materials. There is a vigorous quality control process involving pre-testing, pilots and review to create a level of consistency and acceptance for the programmes before they are made available on general release.

Learner journeys have been designed to encourage engagement through free material before the paywall often self-assessment or diagnostic content before moving into the more focused learning phase where the aim is to change behaviours and encourage skill development. Finally learning is embedded through follow up activities and materials that are designed to encourage application of learning in the workplace, or further learning through more resources and sources if learning in greater depth, or related topics.

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INFORM INSPIRE INNOVATE™ - Redefining an institutional Short Courses Division in South Africa

Carol Kat

Stellenbosch University; South Africa
carolk@sun.ac.za

Abstract

Stellenbosch University (SU) recognises the demands on tertiary institutions of the 21st century to attract a broader cross-section of the South African community into educational, vocational and skills-development activities and has strengthened its knowledge-transfer structure by including short learning programmes as part of its academic offering. These short learning programmes not only broaden the diversity of the institution's student profile but also encourage entrepreneurship and innovation amongst staff and students alike. SU's short course presentations promote flexibility in learning with the delivery of online, blended and virtual programmes and also accommodate market demands and trends by providing further education and continued professional development opportunities.

To be able to meet certain social and educational imperatives, comply with the requirements of government regulations and meet the institutional academic quality assurance requirements, SU has over the last six years had to redefine the fundamental principles, products, processes and structures of its short learning programmes.

Institutionally, practical and effective policy and system changes were implemented to fulfil SU's responsibility to play a role in the educational development of the South African community, to encourage staff to act, engage and innovate, and to exercise firm internal governance and control aligned to the established best practices of institutional short course presentations. Here we reflect on these changes and the challenges encountered while responding to institutional and societal needs.

Keywords

institutional policy; flexibility and innovation in learning; short learning programmes; broaden access; 'learn and earn' market; societal needs

1. Introduction

SU, with ten faculties and five campuses throughout the Western Cape of South Africa (SA), is one of the oldest academic institutions in South Africa, is currently ranked in 301st position in the world university rankings (according to the Times Higher Education World University Rankings) and is well-positioned as an international academic leader on the African continent. In recent years, and like other universities in SA, Stellenbosch University has found itself on a changing educational playing field. With an emphasis, and it appears to be worldwide, on greater socio-economic responsibility, and with societal demands rapidly changing, mobility and flexibility in education is being promoted as an opportunity for institutional economic growth while fostering an environment of diversity and inclusivity.

As stated in Stellenbosch University's *Institutional Intent and Strategy 2013-2018* (pp 11), SU's "institutional focus is on four strategic areas – broadening our knowledge base, promoting student success, increasing diversity, and becoming systemically more sustainable" and to achieve this SU has had to also look at redefining and redesigning fundamental principles, products, processes and structures. Expansion of SU's short learning programmes (also referred to as short courses) forms a dynamic part of this strategy by broadening access to the 'learn and earn' market and fulfilling market demands and trends by encouraging innovation and entrepreneurship through commercialisation of intellectual property.

SU's Short Courses Division (SCD) was established in January 2007 to provide the institution with specific operational and administrative services and to establish an enabling environment for the alignment and effective management of short course systems and processes. All short courses offered by SU are accredited by the University by means of its quality assurance systems and mechanisms that have been approved by the national Council for Higher Education (CHE)/ Higher Education Quality Committee (HEQC) in compliance with South African Qualifications Authority (SAQA) regulations. The Division is also responsible for formulating, implementing and executing SU's Policy in Respect of the Presentation of Short Courses within the institution. Over the past six years, the SCD has had to implement effective policy and system changes to respond to the vocational and educational market needs, to meet the institutional academic quality assurance requirements and to comply with the requirements of the relevant SA government and other regulatory institutions (the Department of Higher Education and Training [DHET], the Council for Higher Education [CHE] and the South African Qualifications Authority [SAQA]).

Changing institutional policy and management systems present certain challenges: alignment with institutional objectives; campus-wide consultation processes; approval from the various institutional forums, committees, Senate and Council; integration with existing data system technology and obviously financial implications.

This narrative is not based on any scientific research or findings, but is a reflection based on first-hand experience of the challenges and successes that an institutional SCD encountered while implementing policy and system changes while still recognising the need to respond to institutional needs and societal demands as well.

2. Background

At SU, a short course is seen as a learning opportunity that does not form part of the official, approved and subsidised qualification and programme profile of the University, but it does fulfil the University's responsibility to play a role in the community by providing continued professional education; further education; the exploitation of third-stream income; the commercialisation of the University's intellectual capital; and the stimulation of innovation. Short course presentations link to all three core functions of the University: research; applied learning and community interaction. A SU short course is not a qualification or part of a qualification and a short course does not lead to a qualification. In exceptional cases, the University's Assessment and Recognition of Prior Learning (ARPL) process may be applied for admittance to or recognition of learning for an academic programme that leads to a qualification.

The original *Policy in respect of the Presentation of Short Courses at Stellenbosch University* was accepted and approved by SU Council in October 2007. The SCD, created in the same year, is a central mechanism to promote and support the development, registration and presentation of short courses by the University in a structured manner. This includes establishing: a framework for the quality assurance of short courses and financial budgeting and reporting; specific certification criteria; developing and maintaining a short courses website for marketing purposes and online student registration and creating an opportunity for SU staff to earn additional income and to develop as entrepreneurs.

A detailed audit of the SCD by external auditors mid-2009, reflected that the institutional short courses policy needed to be revised and it also highlighted several other shortcomings within the short courses environment. Recommendations included stricter policy implementation with regards to finances and certification; upgrading of short course electronic data systems and infrastructures to facilitate policy compliance whilst remaining aligned to the latest requirements of the SA government and regulatory institutions.

As Walters (2005: 79) stated "transformation is dependent on changing administrative procedures and practices of the institution" and "there are many examples where policies are contradicted by regulations or daily practices". The external audit process made it apparent that SU would need to adapt its short course environment by restructuring its administrative framework and by revising an existing short courses policy to address this changing environment appropriately and effectively.

SU's short course environment has the potential to not only expand and strengthen the institution's knowledge market but to also generate third stream income for the institution and afford staff an opportunity to earn additional income as entrepreneurs. This is now becoming more relevant given the current financial sustainability challenges facing universities throughout South Africa. Funding has become one of the key challenges in most South African academic institutions as October 2015 saw the start of ongoing student protest action throughout our country centred around demands of reforming institutional fee structures to broaden access to education. Nationally, higher education institutions depend on tuition fees as one of its sources of income and universities are having to revisit formal programme fee structures, and find a tuition fee model that will be financially sustainable in a country with a diminishing economic growth rate and increasing institutional expenses.

3. Making the changes and addressing the challenges

Institutional support services divisions, if professionally administered and managed, make valuable contributions to an institution's core business and potentially have a role in improving student outcomes. To professionalise SU's short course administrative processes, the SCD needed to respond to the audit recommendations by improving its short course policy, practices and mechanisms. The decision was taken at the end of 2009, to first extensively upgrade and integrate the existing infrastructure with regards to short course electronic databases and data management. Once these databases were fully implemented and integrated then the short course policy would be revised to align with these procedures and processes as stated by Bourgeois *et al* (as cited in Walters: 2005) that there should be a combination of '*successful actor strategies in decision- and policy-making*', and '*conducive conditions related to organizational structure and context*'.

This came at a time when higher education in South Africa was under scrutiny with institutions needing to position themselves strategically, with transformation needing to be student-centred, with institutional innovation being supported and encouraged due to a shrinking economy and a competitive job market, and with the development and improvement of new educational concepts (eg MOOCs and SPOCs) - all this has to be taken into consideration, whilst still keeping education relevant and maintaining a high level of academic excellence.

4. Organisational facilitation

SU already provided specific operational, administrative and support services, but these needed to be expanded and enforced with stricter control measures put in place. These necessary services and processes need to be closely regulated, firstly to meet the academic quality assurance requirements of the University and secondly to maintain SU's delegated responsibility of accrediting its short course presentations. The final responsibility for short course presentations (including the academic, financial, administrative and personnel aspects) would remain a decentralised function for the purpose of fulfilling academic quality assurance requirements and approval would still rest within the normal reporting lines of University management (departmental chairpersons and deans or heads of environments and centres of responsibility), as delegated by the SU Senate. Short course co-ordination, administration and support service would remain as a centralised function facilitated by the SCD.

First, the SCD had to set about implementing extensive course and student registration system upgrades, adopting a "phased in" approach with the financial shortcomings receiving immediate attention. The first phase of SU's short course electronic registration systems consolidation was initiated during 2010/2011 with the redesigning of the standard short course budget form and making the submission of a short course budget a compulsory field on the short course registration system. Provision also needed to be made for environments to submit actual financial reporting electronically, after the final presentation of the specific short course. A short course can now only be re-registered and approved for presentation the following academic year, if the financial reporting for the previous year's presentation has been submitted and approved by the institutional Finance Department.

By 2012, the short courses website was further developed for the marketing of short courses on behalf of the academic environments. By the end of 2013, the online student registration system and centralised database of the history of candidates attending short courses was implemented. This also included drafting a set of short course *Terms and Conditions* with regards to application and admission, payment, cancellation, SU liability and privacy policy. Since SU's short courses are presented throughout South Africa, Africa and even further afield, there are large number of students applying and registering for a short course whose home language is not English and subsequently the University drafted the terms and conditions in plain language for ease of understanding, but it is still considered a legally binding document.

An electronic certificate request system was activated during 2015, to ensure secure extraction of student and course data for certification purposes - up until this point certificate request templates had been completed manually by course co-ordinators and then submitted (in Excel) to the printing unit which SCD has entered into a printing agreement with. This process was time consuming and often lead to data errors

on the certificates. The University recognises the value and acceptance of its short course certificate's worth and since the institutional logo is displayed on these certificates it was imperative from a reputational risk aspect, that the certificate request process should be automated to populate and generate the certificate request file from within the short course management systems.

Further financial and course registration system adjustments have continued through to mid-2016. The short course and student registration systems are closely integrated with other existing institutional electronic systems viz. Student Information System (SIS); Customer Management Relationship System(CRM) and Financial System (FIN) and seamless articulation is crucial to ensure there are no unnecessary delays or bottlenecks in the workflow processes.

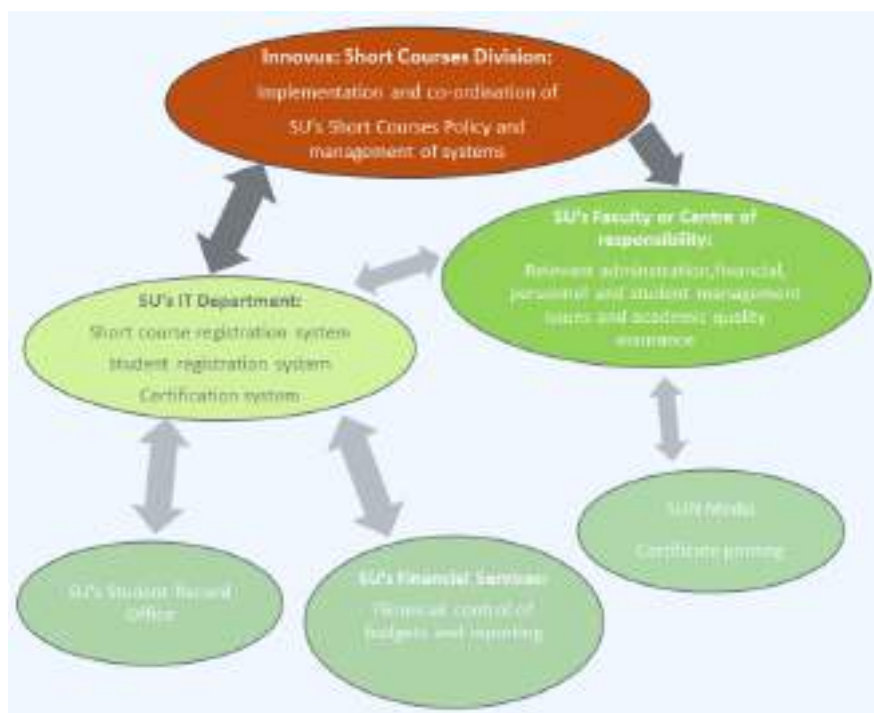


Figure 1: Schematic representation of the centralised Short Courses Division showing integrated roles of responsibility

The first half of 2016 saw the SCD's website undergoing another upgrade - the third since 2007. The enhanced website features include an improved usability design which ensures a more efficient student-user journey to obtain easier access to course, enquiry and application information, a mobile application design to enable candidates to register for a short course from their mobile devices and a *Google* analytics facility to monitor the traffic on the webpage.

Further to these major changes, 2015/2016 also saw the development of a profile-driven "dashboard" integrated with the short course systems to facilitate the extraction of statistics and data necessary to fulfil the reporting requirements on all the faculty-relevant short course activities to deans and heads of centres of responsibility at SU. Our Information Technology Division designed a suitable data platform which is a multi-dimensional model in a Data Warehouse coupled with a Tabular cube. Management information

required for institutional reporting purposes is identified from within the institutional data sources: SIS; CRM and FIN and is then used to create prototype reports in Excel.

These system and website changes had to be wisely approached and implemented since over-regulation can inhibit academic flexibility and restrict entrepreneurial activities that were specifically being encouraged. Likewise, without proper regulating and accountability, the institution is exposed to risks, both operational and reputational. Initially, the changes were met with mild opposition from certain institutional environments - notably, the stricter financial reporting mechanisms possibly raised the most objections. We found that generally, users were not entirely resistant to the process changes but we noted that implementing new electronic systems was sometimes daunting to staff members. It appeared to be more a case of having the right skills but lacking belief in their own ability than the systems being user-unfriendly. However, this risk factor was reduced by communicating the proposed process and systems changes before implementation, obtaining constructive user feedback regarding the proposed changes before and after implementation, providing user guides and training to the users and by providing support after implementation. Short course co-ordinators have gradually adjusted to the new applications and new approaches, and are now actively using the systems.

The centralised electronic databases, which include short course registration, financial administration, student application and registration, invoicing, course and facilitator evaluation and certification, provide:

- a presentation history of the short course for auditing purposes;
- control measures for the quality assurance of the academic offerings - a workflow history of the electronic recommendation and approval of the short course by the deans on recommendation of the departmental chairpersons or by the heads of environments and centres of responsibility;
- record of financial approval of budgets and financial reporting regarding short course presentations;
- access to electronic student application and registration via SU's official short courses webpage;
- a record of the student's personal information;
- a record of the student's acceptance of the *Terms and Conditions* regarding admission, payment of fees, cancellation of application and SU's liability;
- a record of invoicing and payment of course fees;
- the level of the participants' attendance or competence and the type of certificate issued;
- a valid and secure certification process with application of strict standard procedures for the issuing and printing of short course certificates; and
- record of the general and logistical evaluation of the short course presented and the evaluation of the facilitators which may be used to further develop or improve the short course.

These electronic database changes were obviously undertaken at a substantial cost to the Division. However, with "universities under mounting financial pressure as a result of a rearrangement of national expenditure priorities" (SU *Strategic Framework* [2000: 6]) and short course presentations having the potential to generate substantial third stream income for the institution, it was considered imperative that the major upgrading of the short courses environment must be done as comprehensively yet as practically as possible. The reality of the South African educational environment is that with the emergence of new

target groups in need of education and applied competence and skills development, the need for appropriate business models to be implemented within institutions is even greater.

5. Policy facilitation

In December 2014, after four years of redefining our short course processes and after an eleven month policy revision and SU consultation process, the Short Courses Policy (initially implemented in October 2007) was approved by SU Council for implementation in January 2015. A small Task Group led the policy revision process with the support of a Referral Committee. This Committee, comprised of fifteen relevant and representative role players from various SU environments, served as a sounding board as well as an advisory committee to the Task Team throughout the policy revision process. Following a campus-wide consultation process with the policy draft document being tabled at General Management meetings and at all the Faculty Board meetings, the document was presented at the various institutional forum and committee meetings during this eleven month period. This consultation process was essential to obtain input and comments in order to give faculties and staff co-ownership of the policy and to ensure that the final policy was extensive and acceptable to the academia.

The revised policy had to align with the most recent requirements of the Council on Higher Education including the Higher Education Qualifications Sub-Framework and with SU's existing institutional objectives. It also had to align with other relevant SU policy documents - such as the *Regulations for Quality Assurance of Short Courses*; the *Regulations for the Financial Aspects of Short Courses*; the *Learning and Teaching Policy*; *Assessment and Recognition of Prior Learning Policy*; and the *Policy in respect of Exploitation of Intellectual Property*.

Institutionally, policy documents are usually formulated concisely and supplemented by a separate implementation manual, but to realise the full context and complexity of the environment, the policy document includes annexures with a more detailed description of SU's principles and processes. This approach was chosen on the strength of experience gained at SU since the implementation of the 2007 Policy on Short Courses and of the findings of the 2009 short courses audit.

6. Measuring the success

Access to centralised databases facilitates better administrative support to and accurate record-keeping for SU staff and the upgraded electronic systems have made provision for regular monitoring of financial administration.

From the financial perspective, a full-cost approach is applied to all SU's short course activities. In other words, all direct and indirect expenditure related to a short course presentation should be recovered from the income from the specific short course. Income for the institution is generated by a standard Indirect Cost Recovery Rate (ICRR) of the University on third-stream income, as determined from time to time, and which applies to all external income generated by short courses. By recovering indirect costs associated with activities funded from an external source, the University generates a substantial third stream income from its short course presentations and is able to establish itself as a financially sustainable enterprise. A faculty or centre of responsibility, the department/division and staff responsible for a short course

presentation may also share in the profit after expenses, in terms of a profit-sharing formula and subject to the provisions of the University's Financial Policy and Tax Legislation.

Implementation of an electronic short course certificate request system ensures correct registration (course and student) data is extracted from the secure registration systems and reflected on the certificates, and also provides a secure mechanism for managing short course certificate reprints. This potentially reduces the risk of fraudulent certification and maintains the integrity and validity of the SU certificate. Since implementing the automated certificate process, there has been an estimated 90% improvement in validity (correctness) of information on certificates and an estimated 50% improvement in turnaround time of populating and generating certificate requests.

Data necessary for reporting requirements and assessment to support SU decision-making and planning is easily able to be refreshed and accessed so that the SCD can extract the latest statistics for these reporting purposes. These reports also provide accurate data for the Division to monitor the success of the gradual "phasing-in" of improved electronic systems and databases and the subsequent revision of the short courses policy. For example, not only has there been a steady increase in the number of approved short course presentations from 2011-2015, but the number of student registrations is showing substantial growth for the period 2014-2015 (since the electronic short course student registration system was only fully implemented for the 2014 academic year, data prior to this is unreliable and is not used for reporting purposes):

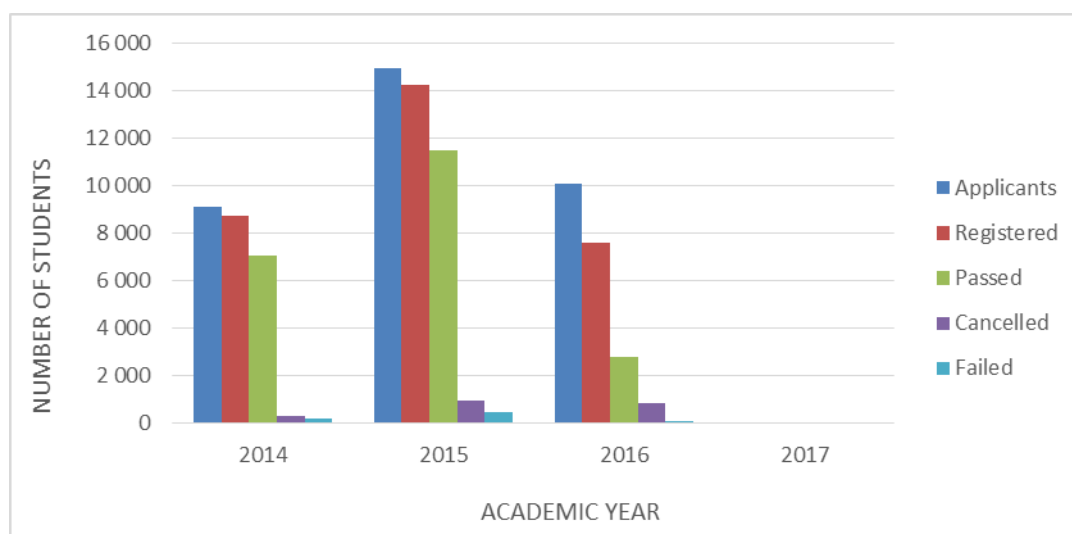


Figure 2: Increase in number of short course student registrations over the 2014 and 2015 academic years with 2016 registrations still in progress.

From these reports, the University is also able to assess which academic environments are actively presenting short courses and which academic environments could be encouraged to investigate the needs of the market within their specific field and then review and assess the strategic benefit for the institution should they expand their short courses portfolio. As can be seen from Figure 3 below, SU's Faculty of Economic and Management Sciences and particularly SU's Business School - Executive Development is at

the forefront with regards to short course presentations followed by the Faculty of Medicine and Health Sciences.

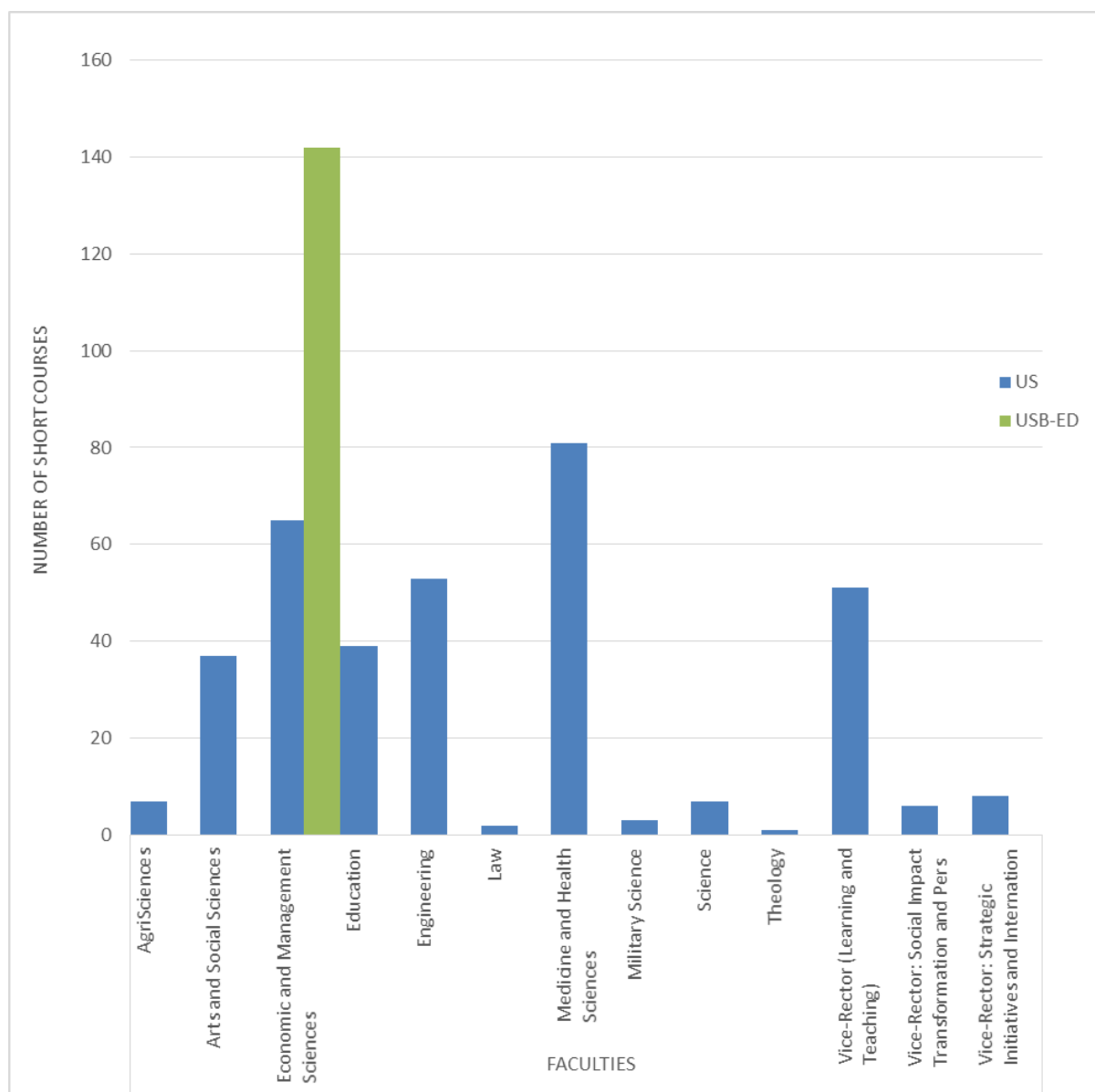


Figure 3: Number of short course presentations per SU Faculty for the 2015 academic year.

Further data extraction supports the fact that perhaps SU needs to explore the possibilities of increasing its short learning programmes at National Qualification Framework (NQF) levels 5 and 6. In SA, the NQF integrates education and training into a unified structure for learning achievements at a specific level and supports the ability to adapt acquired skills and knowledge within a working environment. All short courses must be offered at specific NQF levels and the University may present short courses in the Higher Education and Training band of the NQF, namely levels 5 to 10 with level descriptors providing a description of each of the ten levels on the NQF. NQF levels statistical data for SU for 2015 (Figure 4 below) reveals that:

- 37% of the short learning programmes were pitched at undergraduate level (NQF levels 5 and 6) with mainly business management and public leadership development courses being presented at this level; while
- 63% were pitched at postgraduate, professional qualifications and Masters level (NQF levels 7, 8 and 9) with health sciences; education, engineering, business management and public leadership development courses making up the majority of these levels.

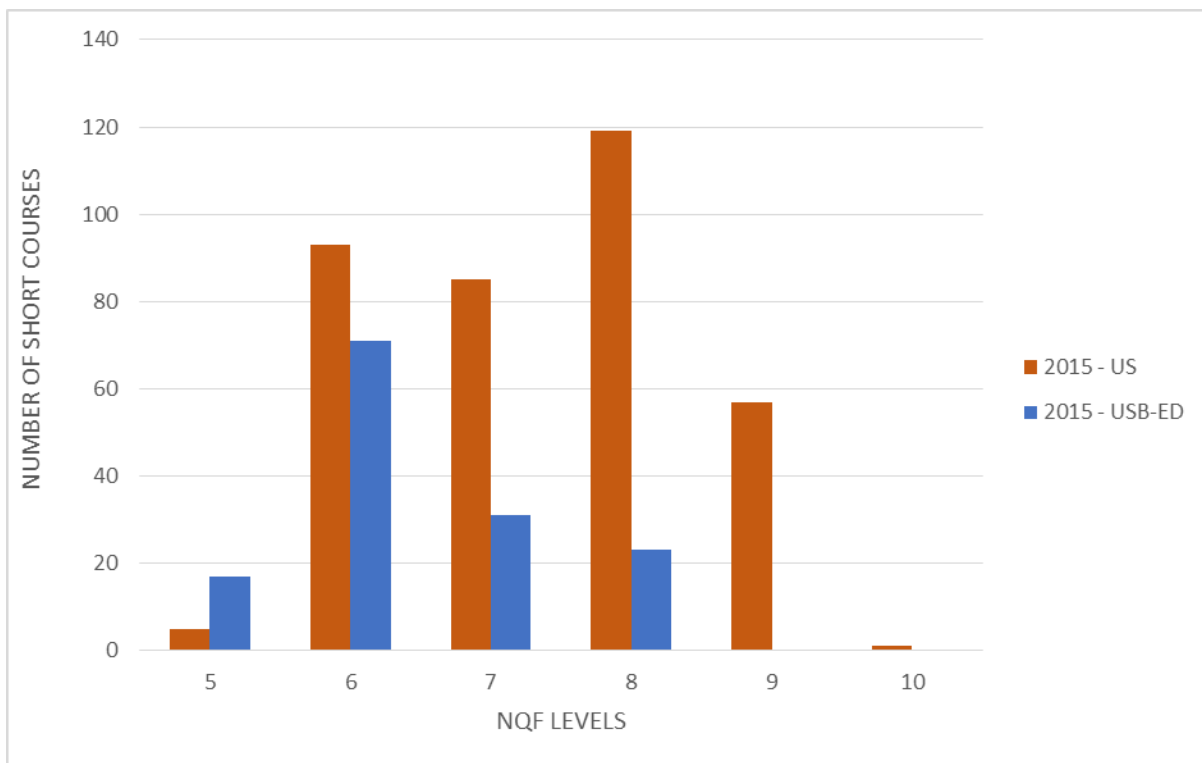


Figure 4: Number of short course presentations for US and USB-ED for the 2015 academic year reflecting NQF levels of presentation.

SU's short courses website is a powerful marketing tool and the design and back-end integration thereof has to be carefully monitored and maintained by the Short Courses Division to meet the changing demands and trends of the short course environment. We have seen a marked increase in the number of short course enquiries and online student applications since the 2016 upgrade of the website.

The SCD is able to regularly update and maintain the electronic short course management systems and the short courses website at a relatively minimal cost so as to ensure user-friendly administrative systems and up-to-date course information available on the website. This allows the SCD to continuously monitor and streamline the administrative processes and also measure and manage our website effectiveness.

Finally, the policy document has better formulated clauses with certain practical stipulations and includes a more detailed description of principles and processes. These clear protocols provide SU staff with a formal institutional guide as to the criteria and requirements in planning and presenting short courses. The electronic management of data and administration processes reduces the risk of non-compliance by staff to

SU's policy provisions and ensures that SU meet the criteria of the CHE/HEQC with respect to the delegation of the accreditation of short course presentations. The policy also had to make provision for the future institutional expansion of delivery platforms for accredited online and blended short courses.

7. Conclusion

Plans 2016 and Beyond

Higher education is a dynamic engine for public and private sectors with multisectoral interests. We are living in exponential times with regards to higher education and SU's SCD will need to further establish itself so as to thrive in this "restructured", IT-enabled and competitive educational environment.

The SCD would like to expand on its services and benefits that it offers to the institution by including further programme and logistic management support. Careful consideration will need to be given as to how to the SCD can approach and facilitate these additional services which could incorporate course planning and marketing, packaging and distributing course content, booking of venues and equipment and travel arrangements for course presenters. However, challenges include staff capacity and an appropriate financial model.

SU's short learning programmes span a broad range of academic fields of study, drawing on market demand and need. SU now needs to embark on the expansion of its online and blended short courses presentations, as stated by Clinefelter (2012:1) in his summary of a *Learning House* webinar "Innovation in the higher education market has spurred rapid growth in online learning". By offering a fully accredited Stellenbosch University short course online, it could potentially meet the needs of the busy business executive needing a market-related refresher course or the market demands of industry-specific skills development of the working individual. It is not simply a case of repackaging existing face-to-face or contact accredited short courses and then placing them online - accredited online short course programmes still need to be delivered in compliance with applicable university policies and academic quality assurance regulations and need to have a user-friendly and effective, interactive course design with seamless connectivity and easy accessibility.

The SCD in collaboration with SU's Telematic Services Centre for Learning Technologies and Information Technology Division, is currently reviewing external and internal hosting platform possibilities so as to be able to offer online access to accredited short learning programmes with simple navigation, visual design elements (including screen recording), assessment tools and interactive sessions. Obviously the usual challenges, which include funding, capacity, time investment and articulation, associated with this type of expansion and development will need to be addressed.

There is also currently a critical need for skills development programmes in specific disciplines within South Africa in the Further Education and Training sector. The institutions within this sector face serious funding challenges, administrative and other restrictions. Since universities fall in the Higher Education and Training sector, they may not present or accredit certificate or learning programmes in another educational sector. However, possibilities of industry collaborating with a separate organisational structure or spin-off company should be a consideration to address this educational societal need. Executive development within institutions has been addressed by the development of Business Schools and Centres within academic institutions, but perhaps consideration can be given to tertiary institutions being instrumental in providing an opportunity for industry to create an external "vehicle" within the Further Education and

Training sector and which can equip candidates, from all walks of life, with the necessary knowledge and skills they require.

Finally, it seems apparent that to ensure the success and continuation of institutional short learning programmes, innovative initiatives will need to be pursued continuously so that easy access to organised specialised career and personal skills development will inspire individuals to become more economically active. SU's Short Courses Division is well-positioned, with upgraded administrative systems and processes and revised institutional policy now in place, to further redefine and restructure its short course processes to address future challenges of providing flexibility and innovation in learning.

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Food for Thought: A New Type of Online Course for Non-Traditional Students

Virginia R. Mosser

Southern Virginia University / University of Virginia, USA
virginia.mosser@svu.edu

Abstract

In this paper I elaborate a new type of online course, which I designed and taught to a group of twenty-five non-traditional students. The course was implemented in response to an initiative put forth by the University of Virginia to offer flexible, continuing education to many different types of adult students. The students were very diverse (returning students, immigrants, majors in humanities, social sciences, and natural sciences). I used the software Blackboard Collaborate which allowed me to have one-on-one and small-group Skype encounters with students. All students and the instructor met as a class on line once a week for an hour. Then we worked in smaller groups for varying periods of time.

The subject of the course was a multidisciplinary study of food. Content was approached from three perspectives: 1) historical, 2) anthropological and 3) cultural. Each of these points of view afforded me the potential to include the most fascinating research on food. This hermeneutic or interpretative approach to the study of food provided a good point of departure for the course.

Keywords: Flexible continuing education; new types of courses; higher education for minorities (refugees, migrants)

1. Introduction

The virtual choir of Eric Whitacre is a good place to begin a study of an online seminar designed to simulate a face to face classroom. Whitacre has achieved an interesting namely, to render the physical presence of people unnecessary for a performance of his work. As we see from the Youtube film, none of the singers in Whitacre's choir are physically present and neither is he, yet everyone is following his conducting: 185 voices, 243 tracks and singers from 12 countries. Doing an online seminar is very much like conducting a performance and of course the students are expected to follow the professor's direction. But just as in a musical performance, students must be prepared before it begins. (Whitacre, 2010).

To make ready for the beginning of the semester, students first must finish watching a class module as preparation for the coming semester. During this multi-faceted set of digital documents, all the course academic and technical rules are provided.

Most of the essential parts of this narrative are done, in this case using the Panopto feature of Blackboard Collaborate. This video is placed on the course website with enough time so that all students can watch it

before the course even begins. This short part of the course website sets the tone for the seminar and gives students a good idea about the subject matter. (Mosser, 2016)

In addition to completely watching and reading the course module all students must somehow contact the professor either by email or telephone to make sure that logging in to the course site before class runs smoothly and the equipment everyone is using, works. When I did it in Blackboard Collaborate, there occurred a few difficulties as I assume everyone experiences. Students were advised to make sure they all had headphones with microphones and that their internet provider functioned at least with the professor's equipment. This all took some time to prepare before the course began, but it was well worth it.

There were some problems even after the course began which were not predictable. One was the necessity of using one of two browsers: Mozilla Firefox or Internet Explorer. Any other browser would not work. Another difficulty was that when the moderator logged on too early (i.e. two hours before class began) that voice was immediately thrown out of the session and could not be heard by the students. Both of these obstacles were easily remedied.

2. Pedagogical Approaches

Beyond this, there were pedagogical approaches that needed to be employed to make sure all the students remained online and were participating. One method is to ask all students to participate in a given order so that they provide the majority of the commentary and the professor can avoid simply lecturing to them. One way to do this is as follows:

- 1) At each class, two discussion leaders will prepare to lead the discussion.
- 2) Everyone else is assigned the task of making up a question from the book that is to be covered during that class.
- 3) All students must then send their questions to the professor by email.
- 4) Professor corrects the grammar as needed and then he/she sends the questions to all students and to the two discussion leaders.
- 5) When the class "meets" everyone, except the discussion leaders, is divided into pairs.
- 6) Each student asks his/her partner the question he/she has formulated
- 7) The other student of each pair decides whether or not his/her partner's answer is correct.
- 8) Now, each student has at least one point of discussion to offer when the class "reconvenes".

Dividing the class into pairs can easily be accomplished by the "breakout room" feature in Blackboard Collaborate.

Finally when the pairs reconvene, the discussion leaders then present their power point after which the discussion questions appear before the class.

Here is an example of a set of discussion questions for *Babette's Feast*: (Betzer, Christensen, & Axel, 1987)

Babette's Feast Discussion Questions

1. Did you expect Babette to eventually return to France with her money just as the sisters did?
2. What did you think of the dream that one of the sisters had just before the dinner meant?
3. What do you think was so important about the General's presence at the feast?

4. The villagers start out the dinner not talking about or acknowledging the food, but as the night progresses, they visibly enjoy it more and more, and begin to talk about it. Is this them succumbing to evil, as they originally thought, or a realization of a new faith?
5. What is significant of the general's statement about how the chef at the Café Anglais made feasting a "love affair that made no distinction between bodily appetite and spiritual appetite"?
6. Toward the end of the dinner, the general says that choices don't really matter because "mercy is infinite...we need only to await it with confidence and receive it with gratitude." What is the significance of this in the context of the villagers?
7. It is said in the movie that "the only thing we can take away from this earthly life are those that we gave away." Does this mean that Babette will be greatly rewarded for
8. giving all that she had to the sisters or did she simply owe them for taking her in?
9. Babette's Feast illustrates the clash of two religious ideologies involving food: Fasting and/or eating simply for nourishment vs. feasting to honor god and life. Which do you think the group will embrace after the feast?
10. Do you think Babette was good or evil? An angel or the devil in disguise? In other words, was the feast a temptation and a test of faith?
11. Do you think the dinner was symbolic of the Last Supper? If so, how?
12. Babette was a Christ-like figure, feeding and nourishing the souls of the villagers. Do you agree or disagree with this?

After the class answers their questions in pairs, the two discussion leaders show a power point presentation highlighting the main points of the book or film. After the power point, discussion leaders can "call on" each student to offer his/her question and answer. Then others can join in and others now tend to extrapolate on comments. This is an approach to get them talking because everyone has a part to play and they have already discussed one aspect of the film or book with someone. Each student then has an integral part to play in the class.

Another activity to include all students in the seminar would be to have them study one of the earliest cookbooks in the West, the Roman *De re coquinaria* ("On the subject of food") attributed to Caelius Apicius (Apicius & Vehling, 1977). In this exercise, each student must choose one recipe and produce a youtube of himself/herself cooking it in their kitchen. Here is an example of one such presentation: (Sommar, 2016)

After each presentation, students can offer their opinions and questions. The one question for everyone is: Would this recipe in their opinion, satisfy a modern palate? To prepare students to make their youtubes, one approach would be to divide them into smaller groups of four students or less during the week before the assignment is due. The professor then can begin helping them by "visiting" the smaller groups preparing for class. One preparation for this exercise is to assign one of the many television shows that have been downloaded onto youtube. I assigned a professional production by the BBC of documentarians Giles Coren and Sue Perkins (Coren & Perkins, 2015), showing the same sort of effort. As we met for this class, there was an online quiz to ensure everyone watched the assignment and then a discussion followed. See appendix for entire quiz.

Another approach to help student involvement is to Skype periodically throughout the semester about their individual paper topics and their research due at the end of the term.

3. Types of Software

For all of the advantages of Blackboard Collaborate, and all that can be done to make sure students participate, there is one big disadvantage: the moderator/professor can only see six faces at once. There is another program that is far superior to Blackboard Collaborate which is "Zoom." (Zoom, 2014)

Up to 100 students' faces can be seen at the same time using this program, a distinct advantage over Blackboard Collaborate.

4. Course Content

Finally there is a booklist for this seminar which students should begin reading as soon as they register for the class. At each class meeting, there will be a quiz on the book assigned for that week.

Here is an annotated list of the books/films required for the course:

We begin with the question: How did agriculture get started? To address this in part, we read Jared Diamond's *Guns, Germs and Steel* (Diamond, 1997). This Pulitzer prize-winning book explores the spread of food production in prehistoric times by examining the food culture of the native in Papua New Guinea.

The next question is: What was the meaning of food in an age dominated by Christianity in Europe? Caroline Walker Bynum's *Holy Feast and Holy Fast: The Religious Significance of Food to Medieval Women* (Bynum, 1988) in part asks the question of how medieval women used food to show their piety, gain power in the family and define their vocations.

The next book discusses the impact of the interchange of foods between Europe and the Americas following the "discovery" of the New World. For this we will read Raymond Sokolov's *Why We Eat What We Eat* (Sokolov, 1993).

In the second section of the course, we will ask ourselves: How do cultural forces influence food habits? For this discussion, we will examine Marvin Harris's *Good to Eat Riddles of Food and Culture*. We will also invite a guest lecturer from the University of Virginia Medical School who will speak about how biology influences food habits (Harris, 1998).

We will have to wait until the seventh week of the semester to do what we have all been waiting for: the story of how chocolate was first discovered in Mexico and its impact on history including its use as currency and its inspiration during times of war. The book to read is *The True History of Chocolate* by Sophie and Michael Coe (Coe & Coe, 2013).

The next topic will be a delicate conversation about how and why attitudes have changed throughout history concerning body size and shape. Peter N. Stearns, *Fat History: Bodies and Beauty in the Modern West* will be our source for this topic. We will also have a guest speaker again from the University of Virginia Medical School come in to discuss helping young people with eating disorders and the causes of bulimia and anorexia nervosa (Stearns, 2002)

Next we will discuss the ideological and political motivations behind the modern health food/vegetarian movements and read Warren Belasco's, *Appetite for Change: How the Counterculture Took on the Food Industry* (Belasco, 2006). We will also take a very funny, but historical look at how the health food industry

began in the US with the life and work of J. Harvey Kellogg and his so-called health sanatorium in Battle Creek, Michigan. The film that depicts this story is *Road to Wellville* (Abraham & Parker, 1994).

Finally, during our last session we will ask ourselves what aspects of the American food system trouble people living at the start of the twenty-first century? For this we will read Schlosser's *Fast Food Nation* (Schlosser, 2012), which is a blistering attack on the fast-food industry in the US.

5. Conclusion

In conclusion, most of the twenty-five students responded to this course positively. They were excited about the topic and seemed to cooperate. Those who took advantage of personal contact with the professor regarding papers usually learned from it and wrote good papers. They enjoyed making youtube presentations and especially found it interesting to travel in time back to different eras to investigate what our ancestors ate. Most stated that this was a course that changed their outlook on their everyday lives.

Appendix: Quiz on BBC Documentary *Supersizers Eat...Ancient Rome*

- 1) The person who cooked most of the ancient Roman food was:
 - a) Rosetta Stone
 - b) Betty Crocker
 - c) Lorenzo Bartinelli
 - d) Valentina Harris
- 2) Most of the early Ancient Romans ate meat.
T or F
- 3) Breakfast and lunch were not formal affairs in ancient Rome.
T or F
- 4) Utensils were not used ancient Rome.
T and F
- 5) What is a Vestal Virgin?
 - a) An old woman who is tired of sex.
 - b) A very young girl who watches fires and has no sex.
 - c) A very young girl who watches fires who eventually can have sex.
 - d) None of the above.
- 6) Carthaginian porridge was eaten in Rome probably because Rome eventually conquered Carthage.
T or F
- 7) The Roman general who was a glutton and who refused to eat a simple meal alone was:
 - a) Julius Caesar
 - b) Claudius
 - c) Lucullus
 - d) Caligula
- 8) Garum, although used as a sauce for many ancient Roman dishes, would not be used on anything today.

- T or F
- 9) The word *Mensa* translates from the Latin as:
- a) Officer's mess
 - b) A student cafeteria
 - c) Course or table
 - d) Both A and B
 - e) Both B and C
 - f) None of the above
- 10) Nonna was an occasion when the well-to-do passed out meat to the poor.
T or F
- 11) Some modern people eat mutton and so did the ancient Romans.
T or F
- 12) During a dinner with Marc Antony Cleopatra did succeed in eating the most expensive dinner in the world.
T or F
- 13) Legumina is:
- a) A kind of topping used on everything by the ancient Romans.
 - b) Pudding eaten at the end of a meal
 - c) A kind of flatbread.
 - d) None of the above
- 14) Boudica was a member of which of the following tribes:
- a) Vikings
 - b) Iceni
 - c) Vandals
 - d) Celts
 - e) Saxons
- 15) Before the Romans we did not have turnips.
T or F

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Connacht Ulster Alliance Ireland, Collaborative Initiative: Recognising Prior Learning (RPL) with an online ePortfolio assessment tool and an open online assessor skills course www.myexperience.ie

Dr Carina Ginty

Galway-Mayo Institute of Technology, Ireland
carina.ginty@gmit.ie

Mr Gavin Clinch

Institute of Technology Sligo, Ireland
clinch.gavin@itsligo.ie

Keywords: Recognition of Prior Learning, RPL, ePortfolio, access to Higher Education, flexible learning, life long learning, online assessment.

Abstract

The Connacht Ulster Alliance (CUA) is a group of Higher Education Institutes in Ireland comprising GMIT, IT Sligo and LYIT. In 2012, a Recognition of Prior Learning (RPL) development team within the CUA initiated a project titled 'My Experience' to inform, support and facilitate Irish or international applicants in applying for RPL to gain entry onto a programme or seek exemptions from parts of a programme. Since 2015, the team has released a *My Experience RPL Toolkit* including: a RPL online portfolio assessment tool built on Moodle; an RPL information website at www.myexperience.ie; an online course on RPL Skills for higher education staff at <http://cpd.learnonline.ie>; and a level 9, 10 ECTS teaching development module aimed at RPL assessors and mentors. Since the release, over 100 RPL applicants have piloted the tool and built an ePortfolio RPL application. The institute assessor and applicant experience from the pilot, has informed adaptations and enhancements to the RPL assessment tool.

The need to develop the *My Experience RPL Toolkit* arises from a number of factors including the fact that lifelong learning participation rate is just 7.3% in Ireland compared to the EU average of 10.5% (National Forum, 2015). With regards to the employed sector, it is just 6% participation in Ireland, compared to the EU average of 11% (National Forum, 2015). Therefore, there is great potential to promote RPL access pathways to higher education among the experienced workforce in Ireland that are seeking to up skill and gain a formal qualification.

Further challenges identified during the pilot phase include: the lack of awareness that Recognition of Prior Learning access opportunities exist; candidates need guidance on how to build a portfolio of evidence; and assessors are unsure how to match experiential evidence to learning outcomes. The *My Experience RPL Toolkit* helps address these issues and creates more opportunities for mature learners to gain advanced entry to a programme at GMIT, IT Sligo and LyIT in Ireland.

1. Background to the My Experience Project

The higher education system in Ireland comprises of the university sector (7), the institutes of technology (14) and the colleges of education (5), all of which are substantially state-funded, autonomous and self-governing. In 2014, the National Forum for the Enhancement of Teaching and Learning introduced the 'Enhancement Fund'. The purpose of the annual funding call is to create a collaborative culture with a particular focus on the following themes to date: the quality of teaching, learning and assessment; managing transitions; a professional development framework; and the development of a digital roadmap in Higher Education.

In 2016, the Connacht Ulster Alliance which includes Galway-Mayo Institute of Technology (GMIT), Institute of Technology Sligo (ITS) and Letterkenny Institute of Technology (LYIT) launched the My Experience RPL (Recognised Prior Learning) online assessment toolkit, following support from the National Forum Teaching and Learning Enhancement Fund. The toolkit includes an information website and an online RPL application tool for candidates looking for access or advanced entry to a higher education programme. In addition, a free open online course has been developed for Higher Education staff seeking professional development in RPL assessment skills and supporting RPL applicants effectively (<http://cpd.learnonline.ie/>). The Connacht Ulster Alliance (GMIT, IT Sligo and LYIT) first initiated this project back in 2013 to inform, support and facilitate Irish or international applicants in applying for RPL to gain entry onto a programme or seek exemptions from parts of a programme. This project involved technical enhancements to the RPL online ePortfolio application tool at www.myexperience.ie; the development of an open online educational course for staff working in higher education (<http://cpd.learnonline.ie>), and a roadshow and webinars to demonstrate how the tool works at GMIT, IT Sligo, Letterkenny IT, DCU and Waterford IT. As a result of the roadshow, WIT and DCU will now activate the My Experience RPL ePortfolio assessment tool in their own institutes.

2. The My Experience Toolkit

A dedicated web portal (www.myexperience.ie) has been created to provide relevant information on RPL through short videos and text. The website defines the different mechanism of RPL assessment, provides details on the process and links to the RPL ePortfolio assessment tool. The ePortfolio application tool was created in Moodle (i.e. an online learning development tool) as this provides for assessment of learning. As a paperless tool, it provides an electronic submission of evidence and allows the learner to submit their portfolio in a sequence of stages resulting in the creation of a professional RPL portfolio. The ePortfolio of evidence includes: certified learning; experiential learning; references; work experience outputs and motivational statements. The RPL ePortfolio tool has been piloted in GMIT, IT Sligo and LYIT with over 80 applicants.



Figure 1: www.myexperience.ie

In addition an accredited RPL module for higher education staff (Level 9, worth 10 ECTS) has been developed. This module aims to provide participants with a deep understanding of the policies and procedures associated with the process of Recognition of Prior Learning (RPL). It provides participants with an appreciation of the complexities associated with the management of RPL at a Higher Education Institution. This module, which is practically based and interactive, is aimed at developing mentors and assessors with the knowledge and competencies to enable them to become effective assessors of RPL candidates.

3. The term RPL explained

Recognition of Prior Learning (RPL) is the generic term for learning assessment mechanisms and is used within Higher Education Institutions to describe the awarding of credit/exemptions to applicants on the basis of demonstrated learning that has occurred prior to admission.

RPL is defined as a process whereby prior learning is given a value and this provides opportunities for advanced entry to a further or higher education programme and/or awarding credits for elements within programmes and in some cases RPL can result in a full award from a higher education institute¹⁶⁰. Furthermore, the European Inventory on validation of non-formal and informal learning, country report Ireland 2014, explains “RPL incorporates prior, formal, informal and non-formal learning and that which is validated within the context of a specified destination award from level one to ten on the national framework of qualifications” (p. 3, European Commission, CEDEFOP, ICF International; 2014)¹⁶¹.

The National Strategy for Higher Education (2011, p.55)¹⁶² states that “RPL is particularly important as flexible and workplace learning opportunities expand. A national framework for RPL must be developed, based on the expertise and experience already built up in the higher education institutions. Progress in this regard will help to shift the emphasis from educational inputs towards learning outcomes. This student-centred philosophy lies at the heart of the National Framework of Qualifications (NFQ)”.

Recognition of Prior Learning (RPL) is therefore a key foundation for lifelong learning policies and it is critical to the development of an accessible, further and higher education system. RPL encourages people of all ages to participate in learning and attributes value to all of their work and life experiences.

4. Why develop the My Experience RPL Toolkit

The need to develop the My Experience RPL Toolkit arises from a number of factors including the fact that lifelong learning participation rate is just 7.3% in Ireland compared to the EU average of 10.5%. With regards to the employed sector, it is just 6% participation in Ireland, compared to the EU average of 11% (CEDEFOP, 2015)¹⁶³. Therefore, there is great potential to promote RPL pathways to higher education among the experienced workforce in Ireland that are seeking to up skill and gain a formal qualification

¹⁶⁰ National Forum (2015), *A Current Overview Of Recognition Of Prior Learning (RPL) In Irish Higher Education*. Available at <http://www.teachingandlearning.ie/wp-content/uploads/2015/11/Project-2.pdf>

¹⁶¹ European Commission; Cedefop; ICF International (2014), *European inventory on validation of non-formal and informal learning 2014*. Final synthesis report <http://libserver.cedefop.europa.eu/vetelib/2014/87244.pdf>

¹⁶² Hunt, C. (2011) *National Strategy for Higher Education to 2030*. Report of the Strategy Group. Department of Education and Skills, Government Publications, Ireland.

¹⁶³ CEDEFOP (2015), *European guidelines for validating non-formal and informal learning*. Available at <http://www.cedefop.europa.eu/en/publications-and-resources/publications/3073>

Further challenges identified, that have driven the development of the MY Experience toolkit includes the lack of awareness among candidates in Ireland that Recognising Prior Learning (RPL) actually exists, or candidates are unsure how to build a portfolio of evidence. The My Experience RPL toolkit helps address these issues and it will create more opportunities for mature learners to gain advanced entry to programmes at GMIT, IT Sligo and LYIT.

5. Feedback and evaluation of the My Experience Toolkit

RPL applicants, assessors and managers across the CUA have reviewed and assessed the RPL toolkit at a number of stages since December 2014. Feedback has been received through workshops, group discussions and via interviews. In response to the feedback a number of interface and functional improvements have been made to the tool. These improvements have primarily been made to make the RPL assessment tool more intuitive for both applicant and assessor.

In September 2016 a defined workflow was agreed and implemented within the assessment tool. The following specific roles were created for faculty within Moodle to support the workflow:

1. Assessor (subject matter expert to assess the application)
2. Coordinator (to support the applicant and the process)
3. Registrar (for final approval)

The process now runs through the following phases:

1. Applicant completes each section of the ePortfolio and submits application for assessment.
2. Assessor notified via email that an application has been submitted.
3. Assessor reviews the application and makes a decision. This could be to request further information or that the applicant complete a challenge exam or other form of assessment.
4. Assessor makes a final decision to approve or not approve the application and changes application from 'active' to 'signed-off'
5. Applicant and Registrar are notified via email that a decision has been made.
6. Registrar reviews assessors' decision and changes application from 'signed-off' to 'archive'.
7. Assessor and applicant notified via email that application has been archived.
8. If not approved applicant has 5 working days in which to appeal the decision.

6. Applicant registration

Register

In advance of completing the eportfolio application please contact the relevant head of department to confirm if the programme is running this coming academic year.

Step 1: Select the Institution

Step 2: Select the Area of interest

Step 3: Select the Course

The figure shows three empty dropdown menus stacked vertically. The first menu is labeled 'Choose Institution' and contains the options 'GMIT', 'LylIT', and 'IT Sligo'. The second menu is labeled 'Choose Discipline' and is currently empty. The third menu is labeled 'Choose Course' and is also empty.

Figure 2a: RPL Applicant Registration

Register

In advance of completing the eportfolio application please contact the relevant head of department to confirm if the programme is running this coming academic year.

Step 1: Select the Institution

Step 2: Select the Area of interest

Step 3: Select the Course

The figure shows the same three dropdown menus as in Figure 2a, but with selections and red arrows. In the 'Choose Institution' menu, 'IT Sligo' is selected. In the 'Choose Discipline' menu, 'Engineering' is selected. In the 'Choose Course' menu, 'Meng in Civil Engineering (add-on) L9' is selected. Three red arrows originate from a single point on the left and point to the selected options in each of the three menus.

Figure 2b: RPL Applicant Registration

When an applicant selects an Institute the system lists the disciplines available. When a discipline is selected the system lists the programmes.

Your Choice

Institute: Discipline: Programme: Construction Management

Your Profile Your Education Your Work Experience Additional Evidence Overview

[Click Here to View Example Profile](#)

Your Profile / About the Applicant

You

Gender: Male

Name: Bart L. Scott

Profile picture: [Upload a file](#) (Maximum size for new files: 5020KB)
You can drag and drop files here to add them.

Date of Birth: 23 June 1975

MPS / Social Sec. Number:

About You
Write more than 100 word summary about you.

Font family Font size Paragraph

I spent 10 years learning to paint watercolours under the tutelage of Yuttop, before embarking on a 20-year trip around the world with my loyal servant Scrubby painting a watercolor of a different port roughly every two weeks for a total of 501 watercolours.

I sent each painting back to France, where the paper was glued to a support board, and a craftsman named Georges Winkler cut it into a jigsaw puzzle. Upon my return, I have spent my time solving each jigsaw, re-orienting the scene.

Figure 3: RPL Applicant Interface

7. Assessors

CONNACHT-ULSTER ALLIANCE

CUA e-Portfolio Tool

Home e-Portfolio e-Portfolio

Navigation

- Home
- My home
- Site pages
- My profile
- Current course
- My portfolio

Administration

- e-Portfolio administration
- Site settings
- Locally assigned roles
- Permissions
- Check permissions
- Roles
- Logs
- Helpdesk
- Feedback

Link to portfolio: How to complete your portfolio: Submitting

Active Signed off Archived

Page 1 / 1 (last)

Name	Message	Date	Status	Internal assessment	Action
		24 January 2019			Archive / Sign-off
		5 June 2023			Archive / Sign-off
		24 August 2025			Archive / Sign-off
		8 August 2012			Archive / Sign-off
		4 November 2013			Archive / Sign-off
		28 August 2025			Archive / Sign-off
		20 April 2015			Archive / Sign-off
		26 October 2014			Archive / Sign-off
		20 April 2015			Archive / Sign-off
Bart L. Scott		27 June 2024			Archive / Sign-off

Figure 4: RPL Assessor Interface

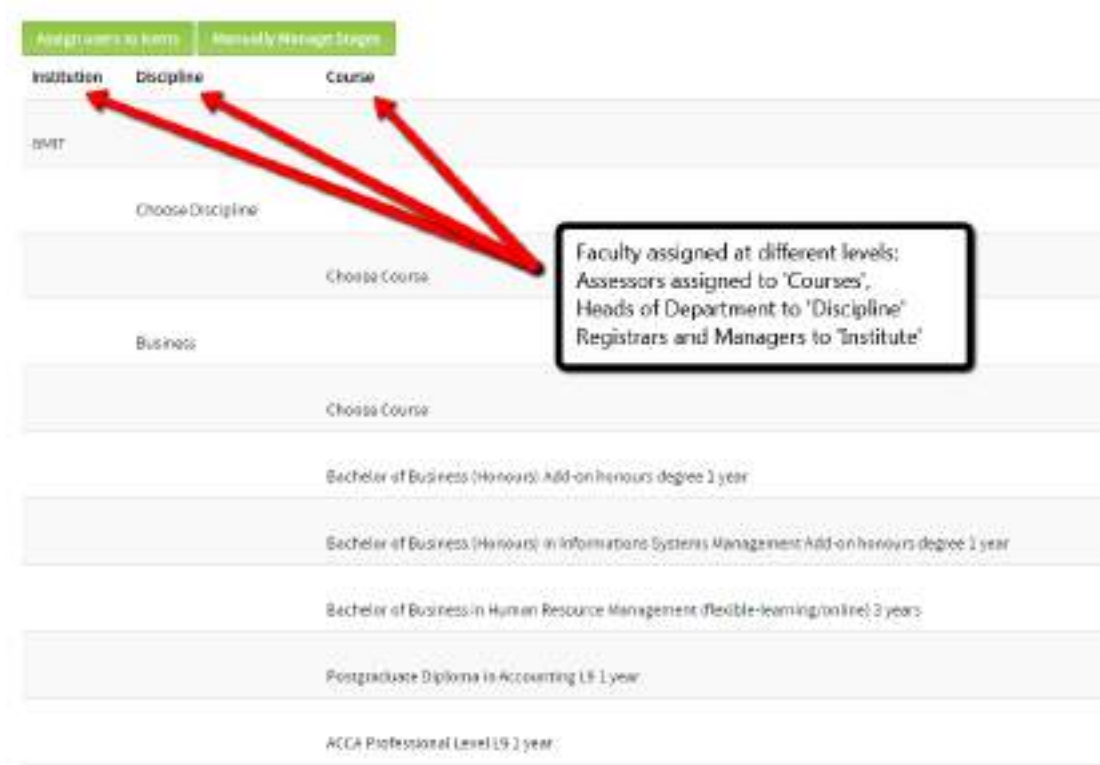


Figure 5: RPL Administrator Interface

A hierarchical structure was created to filter staff appropriately within the system. This resulted in assessors only seeing applications for the programme or course they are involved with. Heads of Department and Heads of School have wider access and can see all applications for the programmes or courses in their department. Registrar's and RPL Coordinators have access to all applications submitted to their institute while administrators have access to all applications, applicants and assessors across all three institutes.

Challenges identified during the pilot phase include: the lack of awareness that Recognition of Prior Learning access opportunities exist; candidates need guidance on how to build a portfolio of evidence; and assessors are unsure how to match experiential evidence to learning outcomes. The My Experience RPL Toolkit helps address these issues and creates more opportunities for mature learners to gain advanced entry to a programme at GMIT, IT Sligo and LyIT in Ireland.

8. The Student Experience

Some recent student success stories who completed the My Experience application tool this year include Lucy Bracken from GMIT and Alan Lowe from IT Sligo.

IT Sligo Student, Alan Lowe, explains "While I did not meet the standard entry criteria for an online programme at IT Sligo, I was made aware of the www.myexperience.ie website and experiential learning could form part of a successful application. So I reflected on my membership of numerous professional and trade association committees and regular attendance at conferences and seminars and I realised I had developed knowledge and skills associated with a Level 8 Civil Engineering degree. This enabled me to gain

advanced entry to the Level 9, Certificate in Road Maintenance Engineering and Network Management programme at IT Sligo.”

GMIT Student, Lucy Bracken explains “I read about the Certificate in Food Innovation and Entrepreneurship course available in GMIT School of Science, instantly I made inquiries knowing it would be something that may help me embark on my business idea. My only concern was that although I had a vast amount of relevant experience, I had no formal third level education and I felt I would not be eligible to apply for the Level 9 certificate. On meeting with the RPL mentors and assessors in GMIT, it was confirmed that I did not meet the formal entry requirements but that RPL was an access route and my 25 years of relevant experiential learning would be recognised when making my application. Using the myexperience.ie website, I submitted my RPL ePortfolio including all supporting evidence required for the application. I found the tool very user friendly and felt that I gained a lot from creating the ePortfolio realising the importance of my experience and skillset, I sometimes took for granted. I am delighted I was accepted onto the course and I now have the opportunity to pursue my goals at GMIT”.

Candidates who are interested in applying for RPL and advanced entry to a programme at GMIT, IT Sligo and LYIT are encouraged to visit the website at www.myexperience.ie and seek advice from the institute heads of department on making an application through the My Experience online tool.

For further information on this CUA collaborative initiative visit www.myexperience.ie or contact the project development team: Dr. Carina Ginty (GMIT) carina.ginty@gmit.ie, Mr. Gavin Clinch (IT Sligo) clinch.gavin@itsligo.ie, Mr. Oran Doherty (LYIT) oran.doherty@lyit.ie.

9. About the Connacht Ulster Alliance (CUA):

The Connacht-Ulster Alliance (CUA) was established by the three Institutes of Technology of Galway, Letterkenny and Sligo in July 2012, through the signing of a formal MoU. Since their establishing in the early 1970s, the CUA partners have made a substantial contribution to raising the educational profile of the region and to attracting innovative enterprises into the region, and have demonstrated their capability to evolve over the last 45 years to meet regional needs. The CUA is committed to continuous change to meet the future needs of the region. In becoming a TU, the ambition is to enhance the services and programmes provided to students, widen the access from the dispersed population across the region, and to deepen the regional embeddedness and the level of engagement with enterprises.

Fostering the digital transformation of European SMEs and Public Administrations: the IN-CLOUD project

Dario Assante, **Claudio Fornaro** and **Emanuel Weitschek**

International Telematic University Uninettuno, Rome, Italy

Contact : d.assante@uninettunouniversity.net

Manuel Castro and **Sergio Martin**

UNED, Madrid, Spain

Ileana Hamburg and **Sascha Bucksch**

IAT, Westfälische Hochschule, Gelsenkirchen, Germany

Aisling Owens

Lisburn Enterprise Organization, Lisburn, United Kingdom

Ricardo Tavio Gallo

EVM Project Management Experts, Santa Cruz de Tenerife, Spain

Kostas Konstantinou and **Spyros Stekoulis**

Anaptiksiaki Anonymi Eteria O.T.A Anatoliki Thessalonikis – KentroAnaptiksis Anthropinou Dinamikou Kai Enischisis Tis Topikis Oikonomias, Thessaloniki, Greece

Alcino Pascoal and **Catarina Reis**

Associacao Parque de Ciencia e Tecnologia de Almada/Setubal – Madan Parque, Caparica, Portugal

Mario Spatafora and **Ana Maria Cotovanu**

Finance & Banking – Effebe Association, Rome, Italy

Abstract

The IN-CLOUD project, funded in the framework of the Erasmus+ Programme – Strategic Partnership, aims to raise awareness regarding how cloud computing can boost economical growth and innovation and to qualify professionals able to introduce the Cloud technologies in SMEs and public administrations. The project aims to deliver and award VET qualification, designed according to the EQVET model. This paper describes the main activities carried out by the IN-CLOUD partnership to implement the project activities, realize the planned outcomes and pursue the project objectives.

Keywords: Cloud computing, Digital transformation, Smart education, Open educational resources, Vocational training

1. Introduction

Cloud computing is now defining the future in ICT, facilitating new corporate and entrepreneurship models at all levels. It is a breakthrough paradigm that, applied to companies, public administrations and Universities, can enhance their innovation, cost-effectiveness and competitiveness.

Several studies underline the way European SMEs' growth and empowering entrepreneurship can be boosted by means of Cloud Computing technologies. Still, market trends shows that European SMEs are not making the best of the cost-effective solutions cloud computing has to offer. Virtualization and sharing of resources can drastically reduce the investments in hardware and software, especially for smaller companies. This would facilitate their access to the markets and their resilience to financial crisis.

SMEs are a pillar of the European Union economy: in 2013 about 21.6 million SMEs employed 88.8 million people and generated 3.666 trillion in values added. The European Commission has recognized the Cloud technologies as a booster of the SMEs competitiveness and the consequent impact that such a technology can have for the development of the European Union, both in terms of economic growth and employment opportunities. Therefore, in 2012 it adopted the strategy "Unleashing the Potential of Cloud Computing in Europe", commonly known as European Cloud Computing Strategy, in order to speed up and increase the use of cloud computing across all economic sectors. This strategy is the result of an analysis of the overall policy, regulatory and technology landscapes and of a wide consultation with stakeholders, to identify ways to maximise the potential offered by the cloud.

The European Cloud Computing Strategy includes three key actions, the most effective being the creation of an "European Cloud Partnership" providing strategic options to turn cloud computing into an engine for sustainable economic growth, innovation and cost-efficient public and private services. The European Cloud Computing Strategy final objectives are a net gain of 2.5 million new European jobs, and an annual boost of €160 billion to the European Union GDP (around 1%), by 2020.

The IN-CLOUD project, funded by the European Commission in the framework of the Erasmus+ Strategic Partnership program, intends to pursue the objectives of the European Cloud Computing Strategy. The project general objective is to foster a partnership between Higher Education and the corporate sector, in order to qualify new professionals capable to boost the competitiveness and growth of European Companies and Universities, thanks to the advantages offered by the cloud computing technology.

This objective is reached by pursuing the specific objectives of:

- raising awareness among European Companies, Public Administrations and Universities regarding how cloud computing can boost economical growth and innovation
- creating VET qualifications for professionals inside European Companies and Public Administrations, training them to introduce and manage cloud computing technologies and services inside their systems.

The IN-CLOUD partnership involves 8 partners coming from 6 different countries (Germany, Greece, Italy, Portugal, Spain and United Kingdom). The partners are 3 Universities, 1 SME, 1 Local Development Agency, 1 Technological Park, 1 Business Advisory/Incubator and 1 expert of VET qualifications. The partnership ensures a very good geographical coverage and puts together complementary competences.

The project aims to directly impact on the European companies and public administrations, in terms of staff members trained and qualified to use cloud computing technologies and services, of the European

Universities, in terms of enhancement of the didactic offer on cloud computing, in order to better meet the requests of the labour market, of the students and professionals, in terms of better employability chances. The IN-CLOUD qualifications, designed using the ECVET instrument, will allow the transnational recognition of the acquired competences and will enhance the employability of the qualified users at European level. The project long terms benefit will be to speed up and increase the use of cloud computing across all economic sectors, according to the European Cloud Computing Strategy, and to foster a close partnership between Universities and companies on cloud computing.

Actually, the first year of the project has been concluded. This paper aims to show the concluded activities, the ongoing ones and the expected results.

2. Main project outcomes

According to the model of the Erasmus+ Strategic Partnership program, the project is organized in Intellectual Outputs, which are tangible project outcomes. Five of such outputs are expected, plus a supporting one.

2.1 Intellectual Output 1 - Training needs and professional skills analysis

This aim is to realize an analysis of the training needs of the labour market and of the state of art of Cloud Computing technologies. The activity has been realized by submitting an online survey, by interviewing experts in the fields and by analysing studies in the sector. The survey has been realized in the different partners' languages in order to encourage the target groups to reply.

More than 700 replies to the survey have been collected in the partnership countries. These data have been the basis to elaborate, together with additional information obtained from other studies, the analysis of the labour market needs. From the survey, a general interest towards the Cloud technologies clearly emergent in all the countries, even though with local differences regarding the applications. The lack of competences seems to be the main cause that has prevented a wider diffusion of the Cloud in the SMEs.

Table 1 – Relevant replies to the online survey realized for the Intellectual Output 1

Q5: Why don't you use cloud computing services in your business/organization?						
	Italy	Spain	Germany	UK	Greece	Portugal
I'm not familiar with cloud computing services	33%	7%	43%	0%	0%	14%
I'm not aware of cloud computing benefits	15%	0%	29%	33%	50%	29%
Cloud computing services bring no benefits for my business/organisation	10%	7%	14%	0%	50%	43%
Migration to cloud computing services is too complex	5%	27%	0%	0%	50%	14%
Financial reasons	10%	20%	57%	0%	25%	29%
Security concerns	23%	33%	57%	0%	50%	14%
Doesn't apply to me	28%	40%	0%	67%	0%	29%

Q7: What benefits does the cloud offer to your business/organization?						
	Italy	Spain	Germany	UK	Greece	Portugal
Cost efficiency	58%	61%	81%	71%	11%	75%
Scalability & flexibility	47%	65%	67%	36%	67%	75%

Sustainability	27%	22%	10%	21%	22%	25%
Maintenance by cloud provider	31%	48%	48%	29%	33%	67%
Security	33%	17%	24%	29%	56%	42%
Improved service delivery	55%	43%	90%	21%	11%	42%

The research has led to the production of a deliverable that summarizes all the results of the study, identifying the main skills lacking in the labour market and grouping them in terms of didactic units. The main identified areas which would require training activities are:

- Business and financial skills
- Technical skills
- Project management skills
- Contract and vendor negotiation
- Security and compliance
- Data integration and analysis skills
- Mobile app development and management

Then, an analysis of the Cloud services and technologies has been carried out in the partnership countries. This research has led to the release of a deliverable representing a catalogue with more than 60 projects and Cloud providers in the partnership countries. The document intends to support professionals looking for Cloud solutions, for companies and public administrations in need of Cloud services to be integrated in their systems and anybody who wants to have a first idea of the Cloud. As a plus, the partnership has decided to make the catalogue available in all the partnership languages, in order to facilitate its adoption. The deployment of the translated versions is ongoing.

2.2 Intellectual Output 2 - IN-CLOUD Qualifications

This activity intends to design specific VET qualifications on Cloud services and technologies, to design the validation methodologies, the accumulation and transfer instruments and finally to validate them.

The design of the VET qualification has been realized taking into account the analysis of the surveys carried out at European level by the partnership in the Intellectual Output 1, the existing Cloud services and technologies available at European level, current national and international studies and finally the target groups identified in the project proposal (SMEs ICT technicians, public administration managers, instructors, professionals, etc).

As results of these studies, the partnership has identified three main target sectors:

- the business sector, being the main target of the project. Due to the high number of professionals potentially interested to the qualifications, it is reasonable to propose several qualifications with different degrees of complexities and different levels of deepening of the Cloud concepts;
- the public administration sector, due to the high impact that the Cloud services and technologies can have both in the management of the public administrations and as benefits for the citizenship, and due to the widespread need for employees of public administrations to acquire digital skills;
- the education sector, due to the potentiality of the Cloud to enhance the common teaching and learning methodologies and the need for teachers at all levels to improve their digital skills.

For this reason, four valuable qualifications have been identified:

- Certified Cloud Professional for Business: it is a basic qualification for all the operators in the

business sector. It provides the basics of Cloud computing and an entry-level knowledge of the main applications for business. The certified professional, even without advanced ICT competences and skills, is able to use the most common Cloud technologies and services, enabling the persons to evaluate their utility for the company and their cost-effectiveness.

- Certified Cloud Professional for Public Administrations: it is a basic qualification for all the operators in the public administration. It provides the basics of Cloud computing and an outline of the main Cloud applications for the public administration and the citizens. The certified operator is able to adopt (or suggest the adoption) of Cloud services and technologies both for the internal management of the public administration and for the services to the citizenship, evaluating their utility and their cost-effectiveness.
- Certified Cloud Professional for Education: it is a basic qualification for teachers and instructors operating in schools, Universities and training centres. It provides the basics of Cloud computing and an outline of the main Cloud applications for teaching and learning. The certified operator is able to adopt Cloud services and technologies for managing, creating and delivering didactic contents and to organize new Cloud-based didactic activities, evaluating the utility and the cost-effectiveness of the solutions.
- Certified Cloud Technology Professional: it is an advanced qualification for all the operators in the business sector. It provides advanced concepts of Cloud security, Cloud infrastructures and architectures, Cloud virtualization, Cloud storage services. The certified professional is able to introduce and manage advanced Cloud technologies and services, is able to evaluate their utility for the company and their cost-effectiveness.



Fig. 1. IN-CLOUD qualifications

During the project, then the partnership has started to work on the methods for validation of Learning Outcomes and on the accumulation and transfer instruments. Regarding the validation methods, the possibility for each partner to validate and/or officially recognize the learning outcomes has been investigated. This analysis will lead to the definition of the validation methodology. At the same time, an analysis of the different national credit system for VET in the partner countries has been carried out, to check the partial or full compliance with the ECVET system. This will lead to the definition of the accumulation and transfer instruments.

Finally, when all these instruments will be ready, they will be validated and eventually tuned during the delivery of the training courses.

2.3 Intellectual Output 3 - Interviews and showcases

The activity intends to produce a collection of interviews and showcases, in the different partnership countries and languages, to create a set of concrete examples of application of the Cloud technologies. This will be a real support to the training course and an instrument to facilitate the diffusion of the Cloud technologies.

Concise and effective video Interviews (max lenght 15 min each) have be carried out at distance by all the partners and recorded in terms of videos which will be available on the project website www.learn-in-cloud.eu. People to be interviewed will be selected by the partners at national and international level in Europe and the U.S.A. Experts in cloud computing, ICT specialists, managers of ICT infrastructures, researchers, managers of companies and public administrations, experts in technological innovation, creators of ICT start-ups have been selected among the potential people to be interviewed.

Showcases will be used to present practical examples of introduction of cloud computing technology into companies and public administrations in order to enhance their services and efficiency.

At the beginning of the activities, methodologies to collect interviews and showcases have been agreed among the partnership and templates have been provided. Then, a scheduling of the activities has been agreed in order to collect the required contents respecting the project time plan.

In order to increase the visibility of the video interviews, apart from the project website, the partnership has agreed to deploy the collected materials also in a dedicated project Youtube channel. Legal aspects related to copyright and reservation of data has been taken into account: a liability exception for the free publication of the information has been prepared and all the authors of the contents are asked to sign it.

The collection of the interviews and showcases is ongoing. So far, 27 interviews and 15 showcases have been already collected and are in the postproduction phase. Others will be collected in the next two months; each partner has a schedule of the expected activities.



Fig. 2. Interviews to Alberto Ruiz (Apps Editor, Spain) and Fotini-NioviPavlidou (Aristotle University of Thessaloniki, Greece)

2.4 Intellectual Output 4 - Training courses

The activity intends to produce the didactic modules related to the previously identified VET qualifications (IO2). On the basis of contents and of the expected learning outcomes of the qualifications, a total of 14 didactic modules have been identified. They are:

1. Introduction to cloud computing
2. Security basics
3. Cloud models
4. Cloud business services and applications
5. Legal and technical aspects of cloud computing for business
6. Cloud services and applications for education and training (ET)
7. Legal and technical aspects of cloud computing for education and training
8. Cloud services and applications for public administrations and for citizens/community
9. Legal and technical aspects of cloud computing for public administration and for citizens/community
10. Cloud security
11. Cloud models and providers
12. Cloud architecture
13. Cloud virtualization
14. Cloud service and application development and implementation

The learning contents of these modules have to be produced in the partnership languages and delivered at distance. Therefore, the Uninettuno e-learning web platform has been introduced to the partners and general rules for the production of distance learning contents have been provided. Then, an internal scheduling of the production process has been agreed among the partners, sharing the interim results and periodically discussing about the production process in terms of timing, scheduling and products. Each partner will self-produce a certain number of the didactic units. The produced didactic units will consist of video-lessons (variable length according to the course topic), digitalized and hyperlinked to texts, exercises and web-links.

A proper mix of the didactic units and other additional materials (interviews and showcases, other existing OERs) will contribute to the creation of the courses. They will be available as open-online courses.

Once the video lectures and the additional materials will be ready, the delivery process will start on the project e-learning platform, that has been implemented in the project website. In order to perform the activity successfully, delivery procedures will be defined at first including: enrolment procedures, deployment periods, activities during the delivery periods, students' monitoring procedures, technical and administrative issues. Since the courses will be available as OERs, no charges will be asked to the students. At the end of each delivery period, the students who will have completed all the planned didactic activities will be assessed, thanks to the tracking system already implemented in the web-platform, and eventually awarded of the corresponding IN-CLOUD qualifications. At the end of each delivery period, statistics of the didactic activities will be globally analysed. All the partners will have a virtual meeting in order to discuss about delivery period results, in order to point out success aspects and to propose solutions for the identified weaknesses. The impact of the students awarded with the qualification in the labour market will be monitored too, by means of interactions with the stakeholders.

Samples of video-lessons will be also broadcasted on the satellite channel UninettunoUniversity.tv, managed by UNINETTUNO, covering all Europe and neighbouring countries, in order to reach a wider audience.

2.5 Intellectual Output 5 - Virtual bootcamp

The activity intends to implement an online tool to enable a smart and flexible education on the Cloud technologies for everybody. The online tool is able to assess the user's skills, interests, competences, free time and other parameters, finally suggesting him the most appropriate learning path to acquire the wished skills and competences in an efficient way. This solution can prevent the users to look for disordered and unqualified learning resources on the web, but at the same time offers customized learning path taking into account their specific profiles. Following the proposed didactic activities, the user will acquire the required competences in order to introduce the necessary cloud computing solutions in his facilities.

The virtual bootcamp is therefore complementary to the previous outputs and acts as an adaptive learning environment.

Two activities are scheduled, the design of the virtual bootcamp and the next deployment and delivery. The first activity is ongoing and should be concluded in November. It includes both the design and development of the software and the design of the assessment tools. The implementation of the online tool is almost concluded and it is in the testing phase, while the assessment and evaluation tools are almost defined. The delivery activity will start consequently.

The web application will include also an evaluation questionnaire, useful to assess and continuously improve the bootcamp.

2.6 Intellectual Output 6 - Dissemination materials

The activity intends to create the infrastructure for the delivery and the dissemination of the project. It includes the realization of both the project website and the dissemination material.

The project website is not just the place where the outcomes are deployed, but includes a full e-learning platform and the online tool implementing the virtual bootcamp. Its deployment starts at the beginning of the project in a draft form and is improved during the project duration.

The dissemination material includes all the outputs (leaflets, brochures, research papers, newsletters, etc.) realized by the partnership in order to reach the widest impact.

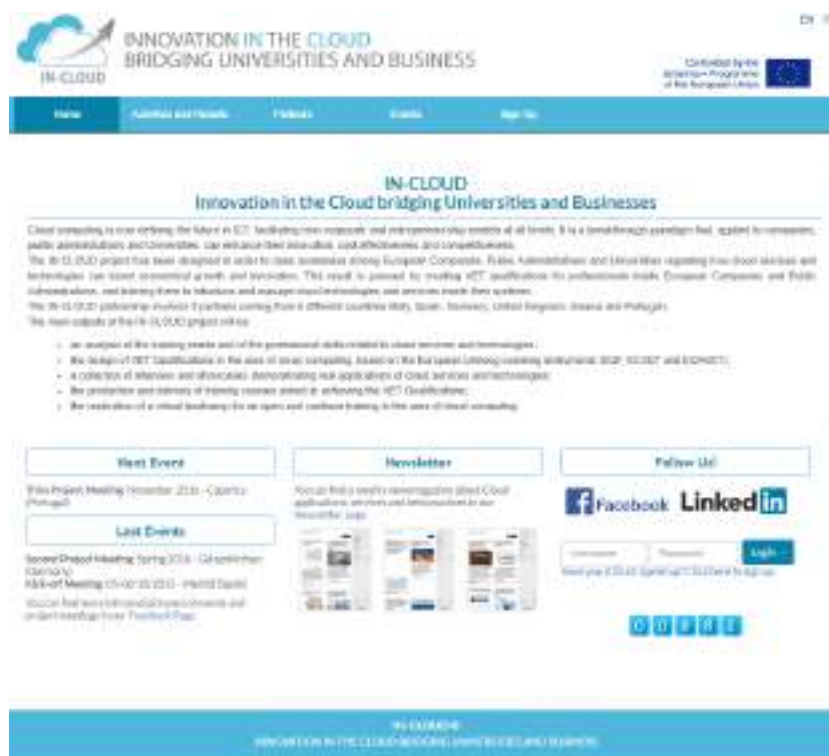


Fig. 3. The IN-CLOUD project website

A key aspect in the dissemination will be the national stakeholders' meetings, planned in all the partnership countries just before the beginning of the delivery period, in order to give awareness of the produced outcomes, of the IN-CLOUD qualification and to attract students for the courses.

3. Relation with other existing qualifications

Cloud Computing is becoming quite a popular technology. Several mayor U.S companies (Microsoft, Amazon, VMware, CISCO, etc) offer some training courses on Cloud Computing, leading to the acquisition of corporate certifications. They don't foresee any credit transfer system and their recognition is just connected to the popularity of the awarding company.

In contrast, the IN-CLOUD project has designed some qualifications designed according to the EQVET, including a system for the accumulation and transfer of learning outcomes and the recognition of the qualifications at European level.

The learner may be struggled choosing between the notoriety of the U.S corporate certifications and the transferability of the IN-CLOUD qualifications. To solve this question, the partnership is trying to sign agreements with the main U.S corporations providing courses on Cloud Computing. A concrete contact already exists with some of them and should lead soon to an agreement. This would allow the IN-CLOUD students to freely access the corporate learning resources, in addition to the ones provided by the project. Therefore, the student would be able to get at the same time the IN-CLOUD qualification and expertise on the corporate Cloud technologies. This would finally enhance the visibility of the project and the adoption of the IN-CLOUD qualifications.

4. Conclusions

The competitiveness and the cost-effectiveness of small and medium enterprises are key aspects to survive, especially in the first years of their life. Sustaining their growth is essential for the European economy and this can be pursued also by improving their digital competences. Cloud Computing is a young technology with a broad range of applications and an immediate usability. This technology can foster the digital transformation of the European SMEs, enhance their competitiveness and create new job places. The IN-CLOUD project is in line with the initiatives put in place by the European Union in order to encourage the largest diffusion of this technology.

Acknowledgements

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Online Proctoring of Exams: authenticity, integrity, security

Gavin Clinch

Centre for Online Learning, Institute of Technology Sligo, Ireland

Clinch.gavin@itsligo.ie

Fore note:

Proctor (n) an invigilator at a university or college examination

Proctor (v) to invigilate, supervise or monitor

The terms 'online proctoring' and 'online invigilation' are interchangeable.

This paper adopts the term 'online proctoring' in preference to 'remote proctoring' since it references the critical role of the internet in providing a secure solution to the invigilation of exams. The term 'remote proctoring' can refer to any form of invigilation that occurs outside of standard exam location such as the 'find your own proctor' model.

Abstract

Online education at IT Sligo is attracting a growing number of overseas students. Some of these students are Irish emigrants who left Ireland to find employment abroad and identified a need to further their education. These students see IT Sligo as their local provider – even if they are on the other side of the world. In addition to Irish students the Institute is attracting foreign students from the rest of Europe, Africa, America and Australasia and is currently exploring international online education opportunities.

Typically, online students are only required to attend the Institute for practicals/workshops and exams. When a programme does not involve practicals or workshops the only time a student is required to attend is for terminal exams. The majority of the Institutes online learners are in full-time employment and the requirement to attend the Institute for a number of exam days can seriously impact their work schedule. Additionally, the cost of travelling to Ireland is often prohibitive to participation in an online programme and conflicts with an expectation that online education is flexible and designed to meet the needs of the part-time learner. To overcome these issues the Institute now facilitates overseas based students sitting exams at their place of work or home via online proctoring.

The conference session will report on the impact of online proctoring of exams on students and faculty at IT Sligo and conclude with an open discussion on the use of such technology; its advantages and the challenges of authenticity, integrity and security.

Keywords: online invigilation, online proctoring, online exams, authenticity, exam security, academic integrity

1. Introduction

Academic integrity is paramount to the validity and reliability of examinations yet data obtained in the US and Canada, over a three year period highlights one in five students admit to cheating in a test or exam¹.

Online education at IT Sligo is attracting a growing number of international students. Some of these students are Irish emigrants who have left Ireland to find employment overseas and see the need to further their education (often as a means to gaining employment in Ireland in the future). These students see IT Sligo as their local provider – even when they are on the other side of the world. In addition to Irish students the Institute is attracting foreign students from the rest of Europe, Africa, America and Australasia and the Centre for Online Learning is currently exploring international online education opportunities.



Figure 1: International dimension: 62 Students in 16 Countries on 13 online programmes (2013/2014)

Typically, online students are only required to attend the Institute for practicals/workshops and exams. When a programme does not involve practicals or workshops the only time a student is required to attend is for terminal exams. The majority of the Institutes online learners are in full-time employment and the requirement to attend the Institute (or Cork/Dublin) for a number of exam days can seriously impact their work schedule. This is further exacerbated by the relatively short notice (4 weeks) the Institute currently gives of exam times and dates. Additionally, the cost of travelling to Ireland is often prohibitive to participation in an online programme. It conflicts with an expectation that online education is flexible and designed to meet the needs of the part-time learner.

2. Background:

In previous years the Institute had allowed overseas based students to sit exams at 'approved' examination centres, such as Higher Education Institutes, in their vicinity in order to avoid the time and expense incurred travelling to Ireland.



Barrow Island, Western Australia



Mining in Sierra Leone

Just how distant and remote are our on-line learners?

Oil Rigs in SE Asia



Oil Sands, Fort McMurray, Canada



Figure 2: how remote are IT Sligo's online learners

In the academic year 2012/2013, the online, BSc in Construction Management programme included twenty five students that were based in ten different countries across six different time zones. This presented the programme Committee with the following issues:

- 1) It was not possible to set exam times to suit the operating hours of approved HEIs as the time zones varied over Irish Summer Time from -7 hours to +11 hours
- 2) The couriering of exam papers and scripts to remote locations of the world and back (in time to be marked) was risky. In the previous academic year two exam scripts only arrived back on the morning of the final exam board
- 3) Locating an approved HEI in the vicinity of each students' location proved challenging
- 4) The cost to the student of invigilation at an approved HEI was prohibitive (often in excess of €80 per exam)
- 5) There was a reluctance on the part of academic staff to set more than one exam paper

To overcome these issues the Centre for Online Learning proposed a pilot project to facilitate overseas based students sitting their final exams (May, 2013) at their place of work or home via online proctoring. The proposal was accepted by the Institutes Education and Quality Manager and the Examinations Secretary and was approved by the Registrar. A number of companies provide online proctoring services but at the time only one company, Software Secure, provided a 24/7 service. Their procedure involved the

visual and audial recording of the student via the student's webcam as well as the recording of their computer screen. The recordings were reviewed by the company's certified reviewers and a report, including a link to the recordings, was sent to the Institute.

This procedure addressed the 5 issues listed above but a new issue was identified. The Software Secure service did not deter or prevent cheating as it did not provide a live connection between the exam taker and the proctor. The reviewing of recordings meant the proctors could detect cheating but the lack of a live proctor meant they could not deter or prevent cheating. Consequently, it was decided to run a second pilot to trial a provider that would connect proctor and student in real time.

3. The Second Pilot Project:

Since the first pilot project another provider, ProctorU, had transitioned to a 24/7 operation. They delivered an online demonstration of their procedure for online proctoring on 5th September, 2013 to Centre for Online Learning. Their model of proctoring appears to prevent cheating rather than passively detecting it. It involves an invigilator connecting to the exam taker in real-time rather than watching a recording of the exam taker. In this scenario the invigilator can interact with the exam taker and also support them with any technical issues.

1. They observe the test-taker via a web cam. The test-taker is connected to a real person who speaks with them to guide them through the process.
2. They watch the test-taker's screen in real time and see everything that the test-taker is doing both at their location and on screen.
3. They authenticate the test-taker's identity to ensure that the person being monitored is the proper test-taker.

On the 24th October, 2013 the President of ProctorU, Don Kassner made a presentation to 25 IT Sligo staff, including the Examination Secretary, exam office staff and Heads of Departments. It was noted that the company, established in 2008, provide an online proctoring service to 370 Universities and certification and training partners (mostly in the US) and had proctored nearly 500,000 online exams. One of the Universities they now provide for, Western Governor's University (WGU), has 43,000 online students and run over 1500 online exams every week. ProctorU was also approved to proctor new credit-bearing MOOCs from Coursera.

For this pilot 25 students, located in 9 different countries, sat a total of 52 exams pertaining to 18 modules across 8 online programmes.

You can take your exams from home with online proctoring!



Institute of Technology, Sligo is proud to offer you the opportunity to take your exams at home with online proctoring. Using a webcam and a reliable high-speed internet connection, you can take your exams anywhere.

If this is your first time on the site and you wish to take your exam online, please click the "Getting Started" link above. If you are returning to schedule or take an exam, please **Sign into your online proctoring account.**

Figure 3: IT Sligo portal on ProctorU

4. How it Works:

The student:

- I) Enrolled onto Moodle 'exam' page by Online Exams Administrator (OEA)
- II) Has access to help files, tutorials and videos
- III) Links from Moodle page to an IT Sligo portal on the ProctorU website
- IV) Selects, registers and pays for exam in advance
- V) Satisfactorily completes a compulsory practice exam or is not given access to final exams
- VI) At time of exam connects to a live proctor
- VII) Shows 2 forms of photographic ID
- VIII) Shows the physical environment to proctor via webcam
- IX) Returns to Moodle exam page, reads exam rules and selects the exam paper
- X) Proctor inputs the password for student to access the exam paper
- XI) Completes the exam using Moodle Quiz, Microsoft Word, Excel or other computer application as appropriate

- XII) Submits exam paper through Moodle Quiz or uploads the completed exam script (PDF) as an assignment in Moodle
- XIII) Submitted exam papers are printed out by OEA and placed in envelope for collection by lecturer

The Invigilator:

- I) Authenticates the student (photographic ID)
- II) Requests sight of the exam environment (via webcam)
- III) Checks exam rules (provided by IT Sligo lecturer/exams office)
- IV) Times exam from the point at which student opens exam paper (pdf)
- V) Assists student with any technical issues
- VI) Observes student via student's webcam and student's computer screen
- VII) Advises student when there are 10 minutes remaining
- VIII) Ensures student uploads exam submission prior to disconnecting from proctor

The Institute:

- I) A Moodle 'exam' page was created specifically for online exams
- II) Only students approved to sit exams online were enrolled by COL (no self-enrolment)
- III) An overview of the proctoring service was included on the page
- IV) A link to the IT Sligo portal on the ProctorU website was provided
- V) An electronic version of the exam paper (pdf) was uploaded to the Moodle page. The paper was password protected and access restricted to the time and day as set out in the exam timetable.
- VI) Students were placed in Moodle 'groups and groupings' so they could only see relevant exam(s)
- VII) The Moodle page was monitored during exams by the Exams Office
- VIII) Completed exam papers were printed in the Exams Office and left there for collection by lecturers in line with standard examination practice

5. Advantages:

- Operates 24/7 so avoids any issues with exam times and time zones
- Deters and detects cheating
- No cost in printing or distributing exam papers internationally
- Low cost to student (€22 for a 2 hour exam) and avoids costly use of exam centres (e.g. other HEIs)

- Uses students own webcam, no software installation required
- Only one exam paper required
- Facilitates international students , Irish students based overseas and students who are otherwise unable to travel to Sligo
- May facilitate Erasmus students required to return to their alma mater prior to exam times
- Since the students exam papers are uploaded in Moodle then the recorded submission times would allow for data analysis of exams to establish average time student spends in completing module exam
- Use of Microsoft Word for written answers removes any influence on marking that poor handwriting, spelling and grammar might have and allows students to run spell checks and format text
- Typed answers are easier to read and reduce examiners assessment time
- Reduces the carbon footprint of IT Sligo's students

6. Disadvantages/Issues:

- Students need to use computer applications to complete answers and may need to spend time preparing for an online exam by familiarising themselves with software for e.g. Excel (for charts), AutoCAD 360 (for sketching). Lecturers will need to know early in a semester if a student is going to take the final exam online
- Students need to have reasonable typing skills
- Some students may have to sit exams very early in the morning or very late at night since the exam is taken by all students at the same real time
- Technology can fail. If the internet were to go down during an online exam and could not be reinstated then exam result would be deferred and student would 're-sit' in the autumn.

7. Staff and student perceptions:

Following completion of the pilot separate surveys were sent to 3 discreet groups. A summary of each survey is presented below:

1. Students who took online exams (population size 27 sample size 17)

17 of the 27 students who participated in the pilot responded to the survey. 13 said they would prefer to take online exams in the future and 16 of the 17 said they would recommend online proctoring to other students.

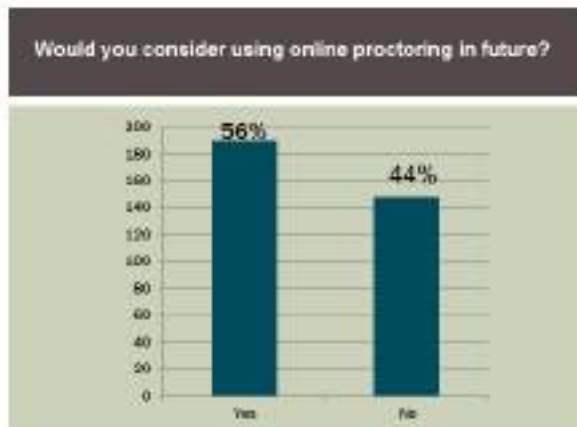
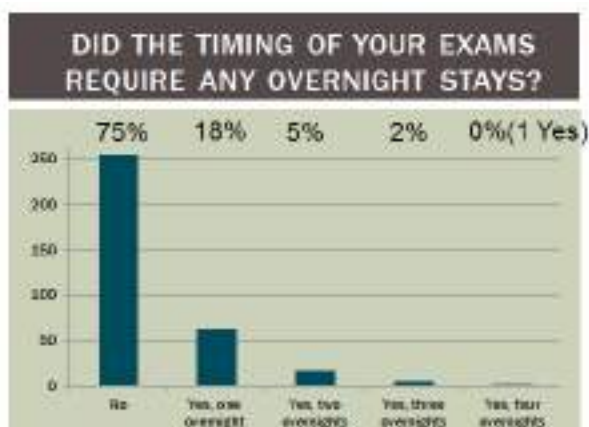
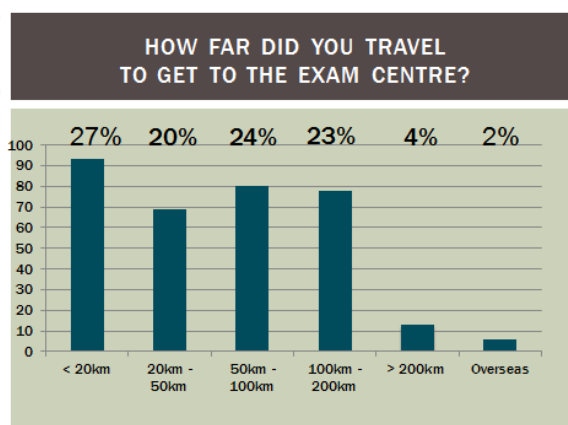
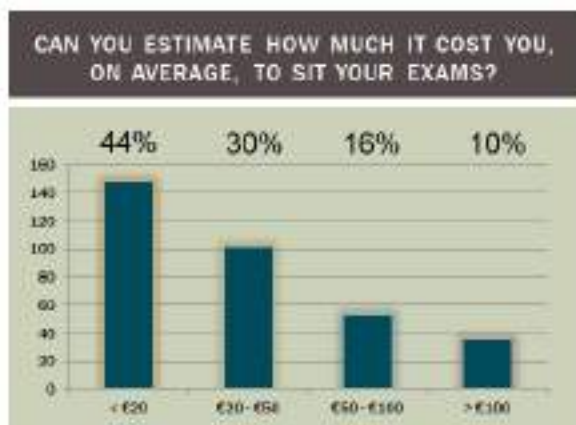
2. Lecturers involved in pilot (population 17, sample 9)

8 of the 9 respondents agreed that an online proctoring service would be a positive development for the Institute and its on-line learners.

3. Online students who attended an exam centre (Sligo, Dublin, and Cork) (population 1100, sample 341)

341 of the 1100 online students who sat exams at a centre responded to the survey. This sample size provides a degree of accuracy of ± 0.05 and a confidence level of 95%.

- 56% of students incurred costs of more than €20/ exam (online exam fee is €22)
- 53% travelled over 50 Km to get to an exam centre
- 25% were required to spend at least one night away from their residence
- 56% would consider using online proctoring



Cost comparison:

The cost to IT Sligo to invigilate a student in a traditional exam hall is €13.71 per exam. By contrast the cost per student per exam with ProctorU is approximately €22.

Latest developments:

In 2015 a Steering Committee was formed with the following terms of reference:

1. To provide oversight of the implementation of the process of on-line proctoring and identify the risks for a limited set of programmes.
2. To identify the risks at each stage and identify the mitigating actions.
3. To identify the scope, objectives and advantages of on-line proctoring.
4. To review the process and implementation of each pilot.
5. Report back to the Academic Processes committee with recommendations for further development.

Subsequent to this a draft procedure for online exams is to go to the Academic Process Committee in October, 2016 and approval is sought to mainstream the process, albeit at a limited capacity. The scope of the draft procedure is as follows:

This procedure applies to Programmes identified by Programme Boards as being delivered, assessed and invigilated online. Head of Departments to circulate list of identified Programmes by week 2 of Semester 1. Erasmus students and students with special circumstances are to be dealt with on a case by case basis

This procedure acknowledges the concerns that some faculty have expressed vis a vis the efficacy of online exams for thier subjects. Particularly challenging are exam papers requiring students to complete math equations, draw graphs or complicated diagrams. Although WIRIS (a VLE plug-in) and FastFig (an online app) provide a solution for maths they are seen by some staff to be too 'clunky' or awkward for students to use in an exam environment. The argument has been made that mathematic equations need to be worked through with pen and paper and that this is the only medium conducive to problem solving mathematics.

8. Conclusion:

Online Exam invigilation technology offers a solution to IT Sligo's growing body of international students and promises a scenario whereby students from outside the state could undertake a programme of study at Levels 6 to 9 on the National Framework of Qualifications without ever having to attend the Institute or travel to Ireland. Clearly, this would make the institute more attractive as an education provider to internationalal and overseas students and would enhance the reach and scope of the institute. However, issues remain with the existing technology and with faculty and societal concerns around authenticity and validity that threaten this future potential.

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Open education (OERs and MOOCs)

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FernUniversität in Hagen¹, TH Mittelhessen², FernUniversität in Hagen, Germany³

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James Brunton¹, Mark Brown², Gavin Clinch³, Eamon Costello⁴, Tom Farrelly⁵, Jennifer Gilligan⁶,
Antony Murphy⁷
^{1/2/4}*National Institute for Digital Learning, Dublin City University, Ireland;* ^{3/6}*Centre for Online Learning, Institute of Technology Sligo, Ireland;* ^{5/7}*Institute of Technology Tralee, Ireland*

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Carl Dawson¹, Krishan Meetoo², Adam Brown³
Proversity, South Africa¹; Proversity, United States²; Proversity, United Kingdom³

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Joost Groot Kormelink
TU Delft, The Netherlands

MOOCs in Higher Education - Opportunities and Threats

Or how small can a learning unit be in university degree programmes?

Jørgen Bang

Aarhus University, Denmark
jbang@tdm.au.dk

Christian Dalsgaard

Aarhus University, Denmark
cdalsgaard@tdm.au.dk

Arne Kjær

Aarhus University, Denmark
akjar@tdm.au.dk

Maria O'Donovan

Aarhus University, Denmark
mmdonovan@tdm.au.dk

Abstract

MOOCs and Open Online Courses in general offer new pedagogical opportunities to support student-centred learning. Since 2012/13 the focus on the learning process has increased and today the result is a number of interesting approaches with abbreviations such as: BOOC - Blending Online and On-Campus Course, DOCC - Distributed Open Collaborative Course, HOOC - Hybrid Open Online Course, SMOC - Synchronous Massive Online Course and SPOC – Small Private Online Course, among others. All are examples of innovative ways to support personalised learning adapted to the local/national educational framework. Parallel to these developments, there is also an increasing interest within Higher Education to focus on short stand-alone-courses and resource-based learning. This might support flexibility in educational programmes, but at the same time challenges the reflective dimension of degree programmes. In this paper, we discuss the pedagogical framework for integrating MOOCs and Open Online Courses in Higher Education in order to explore opportunities and to avoid threats. Furthermore, we discuss how learning units (integration of Open Educational Resources with learning activities) may support the reflective dimension in higher education offering open online courses.

Keywords: Higher Education, student-centred learning, open online courses, open educational resources, innovative teaching and learning, independent learners, skilled learners, lifelong learning.

1. MOOCs between altruism and an upcoming commercialism

In the Online Course Report 2016 “State of the MOOC 2016: A Year of Massive Landscape Change For Massive Open Online Courses” the following development is presented:

““The Big 3” providers, Coursera, Udacity, and edX are shedding their free and open roots one-by-one, all in favour of branching out for institutional and employer recognition on behalf of their learners, who are demanding credit for the work they put into their courses. This demand has made creators adopt a business model on the basis of a small fee for certain courses, a move that is slowly redefining MOOCs’ role in the global marketplace of online education. As Shah notes, this move might remove some prospects for MOOC

takers in 2016, as “early adopters [of MOOC learning models] may find that critical components of the learning experience will no longer be free.”

The introduction of fees is a clear contrast to the idealism, philanthropy and altruism of the early MOOC movement from four years earlier. In 2012, the OpenupEd network was created as the first pan-European MOOC initiative (launched in April 2013) by EADTU in collaboration with the EU) and based on the following definition of MOOCs:

“Massive Open On-line Courses are

- *online courses designed for large numbers of participants,*
- *that can be accessed by anyone anywhere as long as they have an internet connection,*
- *are open to everyone without entry qualifications, and offer a full/complete course experience online for free”.*

In a short historical perspective the MOOC initiative grew out of the Open Educational Resources movement from the first years of this century, best defined by the OECD statement from 2007:

“Open Educational Resources are digitised materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research.”(Giving Knowledge for Free. The emergence of Open Educational Resources, OECD 2007, p. 30). [OECD=Organisation for Economic Co-operation and Development].

The title of the OECD publication synthesises the basic idea behind both the OER and the original MOOC movement. Both are based on the view that knowledge is one of the few things in life that you are able to share with others without being left with less yourself. This concept works quite well within the OER movement because development of open educational resources are financed through the research and general course development for regular courses. It becomes more complicated when we look at the MOOC movement. Here the courses may build on a basis of OER, but when it comes to the teaching and accreditation dimension, the development has to be financed through external funding. This may happen through external philanthropic sources, as is the case with many American MOOCs, or with money from the marketing budget as a way of promoting the university, or financial resources may be found through alternative ways to generate money among the course participants. It is the last trend we see reflected in the present movement from free to fee in the “Online Course Report 2016”:

“So how did we go from free to fees? And why? The long and short of it is that MOOC providers realized early on that they could offer more for less by marketing courses from top-tier schools as much cheaper than universities could market a traditional college degree. In 2015, they pushed even harder for college credit through certifications like Udacity’s Nanodegree, Coursera’s Course Specialization, and edX’s Xseries, getting more private access to teachers, local cohorts, and more verified testing environments that also included anti-cheating measures and identity verification to ensure class quality”.

In order to accommodate the needs of career oriented MOOC learners, accreditation of the learning outcome has been introduced together with limited learning support from tutors. Although the move from “free to fee” is a fundamental change of the original MOOC idea of providing educational access to the masses at no costs, the development might support easier access to degrees by incorporating quality control, accreditation and learning support into the courses at a reasonable cost – established through focus on student centred learning in off-campus environments of larger audiences. During the last years – since 2013

– a parallel trend lies behind the many attempts to direct the MOOCs towards more specific learner groups and their learning needs reflected in the upcoming of new abbreviations:

Table 1. Overview of MOOC abbreviations.

Abbreviation	Name	Year	Description
BOOC	Big Open Online Courses	2013	BOOCs were introduced by Dan Hickey and had their inception at Indiana University in 2013 (Guzdial, M., 2013; Hickey, D., 2013; Hickey, D., Uttamchandani, S., 2013; Tattersall 2013)
HOOC	Hybrid Open Online Courses	2013	HOOCs were introduced by Gordon Mitchell and had their inception at the University of Pittsburgh, 2013 (Negrea, S., 2014)
DOCC	Distributed Open Collaborative Courses	2013	Distributed Open Collaborative Courses had their inception at FemTechNet in 2013 (FemTechNet Commons, 2013; Hickey, D., 2013; Jaschik 2013)
SMOC	Synchronous Massive Online Courses	2013	Synchronous Massive Online Courses were introduced by Samuel Gosling and James Pennebaker and had their inception at the University of Texas at Austin in 2013 (UTNews, 2013)
SPOC	Small Private Online Courses	2013	Small Private Online Courses were introduced by Armando Fox and had their inception at the University of California Berkeley in 2013 (Cook., M. 2016; Dillenbourg, P. et al, 2014; White, B., 2013; Bayne, S. & Ross, J. 2014; Kjeldstad, B. 2014)
TORQUE	Tiny, Open-with-Restrictions, focused on Quality and Effectiveness	2013	TORQUES first had their inception at ETH Zurich in 2013 (ETH Zurich, 2013)
BOOC	Blending Online and On-Campus Courses	2014	Blending Online and On-Campus Courses, were introduced by T.C.Pong and had their inception at Hong Kong University in 2014 (HKU, 2014)
MOOR	Massive Open Online Research	2014	MOORs had their inception in 2014 at Spark Open Research, a spinout company and partner of Arizona State University (Shecke., K. 2014; Blake, D., 2014; Hosler, A., 2014)
DOCS	Digital Open Courses at Scale	2015	DOCS were introduced by Joshua Kim and had their inception at the Dartmouth Center for the Advancement of Learning, 2015 (Kim, J., 2015)
OOCs	Open Online Courses (without the M)		Open Online Courses (without the M) were introduced by Joergen Bang and Christian Dalsgaard and had their inception at Aarhus University in 2016 (Bang et al. 2016)

A quick look at the names shows that it is the teaching and learning concepts in combination with the concept of masses that have been undergoing revision, compared with the original MOOC definition. Institutions trying to develop online courses adapted to the national/local situation of institutional financing, educational system and cultural tradition have created these courses. To build a sustainable business model for Open Online Courses, there has to be a balance between the educational system (law, institutions, degrees, etc.) and the economy (how are the educational activities financed). (see also Connole (2013); Jansen & Goes-Daniels (2016); Pilli & Admiraal (2016)).

The early clear opposition within the MOOC movement between cMOOCs and xMOOCs is becoming less dogmatic – and even overlapping in certain cases – but not taking the focus away from the fact that the different learning concepts still play a role as the decisive factor in further MOOC development.

2. cMOOCs vs xMOOCs

The first MOOC appeared in 2008 as a further development of the OER moment - organising the OER materials into courses and offering them online for free. Today we will describe these courses as cMOOCs based on a connectivist educational philosophy with focus on social interaction in the learning process of knowledge construction. But as the MOOC movement evolved towards 2012/13 another type of MOOCs appeared, i.e. xMOOCs that resemble more traditional courses with a focus on dissemination and acquisition of knowledge (the x stands for extended). Bates (2014) has given a very clear description of the differences between the learning concepts behind the xMOOC and the cMOOC:

“xMOOCs (...) primarily use a teaching model focused on the transmission of information, with high quality content delivery, computer-marked assessment (mainly for student feedback purposes), and automation of all key transactions between participants and the learning platform. There is almost no direct interaction between an individual participant and the instructor responsible for the course. cMOOCs have a very different educational philosophy from xMOOCs, in that cMOOCs place heavy emphasis on networking and in particular on strong content contributions from the participants themselves.”

The focus of cMOOCs are to create learning communities among the learners. At the same time we have to acknowledge that both types of MOOCs include on the one hand a philanthropic and innovative dimension, offering access to knowledge for free and on the other hand a more commercial dimension by branding the educational institution on the market. So far the xMOOCs have definitely been the most successful in recruiting audiences. The strength of an xMOOC is the ability to provide knowledge on a specific subject based on high level Open Educational Resources and organised in a course structure with a defined workload for free or at a very low price compared to campus-based education. In this perspective xMOOCs - and MOOCs in general - are opening up education to new audiences. But at the same time, several analyses of the completion rate among MOOC participants show that most of the completing students have completed an education already and know how to study (Jordan 2014; Christensen et al. 2013). On the other hand, this should not be interpreted that other participants are merely seen as drop-outs. As a study in Kizilcec, Piech, & Schneider (2013) shows, they might have achieved and found what they signed up for in the MOOC – and being open and free they have no obligation or commitment towards the course provider or their fellow students.

Another study Gillani et al. (2014) with the significant title: *Structural limitations of learning in a crowd: communication vulnerability and information diffusion in MOOCs*, has investigated the learning process in two Coursera courses on business strategy (90.000 + 77.000 students):

“In theory, the openness and scale of MOOCs can promote iterative dialogue that facilitates group cognition and knowledge construction. (...) We find that different discussion topics and pedagogical practices promote varying levels of 1) “significant” peer-to-peer engagement, 2) participant inclusiveness in dialogue, and ultimately, 3) modularity, which impacts information diffusion to prevent a truly “global” exchange of knowledge and learning. These results indicate the structural limitations of large-scale crowd-based learning and highlight the different ways that learners in MOOCs leverage, and learn within, social contexts. (...) Many of the tens of thousands of interactions in the forum may have little relevance to enhancing the learning process”.

These results clearly indicate some of the problems involved in big crowd learning via xMOOCs. The students have difficulties establishing dialogue and collaboration among other participants – and this becomes even worse, when we look at courses with an open upstart (in order to improve flexibility). Although there are these difficulties, we have to acknowledge that MOOCs and especially xMOOCs with the pedagogical focus on dissemination and acquisition of knowledge are efficient tools to distribute knowledge. So far most xMOOCs have been offered as Undergraduate BA or BS programmes in order to market the providing institution e.g. universities (Bates 2014), but the educational concept has a much larger potential, providing further education, lifelong learning, continuing education and instruction to a wider population.

To a certain extent the whole range of xMOOCs may be seen as a huge library of learning units in which learners may choose the topic they need, here and now. In that perspective, xMOOCs become an up-to-date online version of the ideas behind just-in-time and just-in-place learning from the 1990'ies. The advantage of the xMOOC concept is the ability to adjust the learning unit including the workload to the needs of the audience. However, what is of importance to this discussion is the *target group*. A study in Jordan (2014) shows that MOOC participants are actually primarily students who already have a former degree, whereas other participant groups find it difficult to complete MOOCs. This questions the conception that everyone should be able to follow any course on any given academic level. Rather than aiming for reaching masses or "everyone" within higher education it is necessary to consider what kinds of student qualifications are necessary to be able to complete a MOOC that is, for instance, on level 6 or 7 of the EQF. These discussions become particularly important when MOOCs are developed as small units, and also, when MOOCs are potentially to cover entire educational programmes, for instance a master's degree. From this, we will argue that the threat of xMOOCs is towards higher education – those higher education institutions where the basic pedagogical idea is focusing on dissemination and acquisition of knowledge.

3. How small can a learning unit be in university degree programmes?

Clayton Christensen¹⁶⁴ distinguishes between innovative and disruptive innovation:

"In general, sustaining innovations target demanding, high-end customers who demand better performance of an existing product or service and they are prepared to pay more for it – 'undershot customers'. Disruptive innovations, by contrast, do not attempt to bring better products to established customers. They are innovations that develop a new-market disruption or take root at the low-end of an existing market offering a low-end disruption with a performance that is less than currently available products, but at a cheaper price to customers who find this attractive. Over time, their performance improves and they move up-market, eventually competing with established market leaders. Christensen (2003) pointed out that established market leaders are often extremely good at exploiting sustaining innovations in order to achieve the short-term company growth but it is new companies that emerge to exploit disruptive innovations. The theory of disruptive innovation suggests that it is necessary to set up an autonomous unit in order to escape the host organisation's current culture, processes, systems and decision making from blocking an appropriate response to a potentially disruptive innovation, until it is too late. For HEIs, the key question is how to identify and respond to disruptive innovations, in this particular case, MOOCs". (Christensen in Yuan & Powell p. 13).

It is questionable whether the above-described potentialities of xMOOCs may be classified as a sustainable innovation or not. The customers may have a cheaper product, and it may also be more easily accessible. But is it better compared to courses offered face-to-face or in a blended mode? It is perhaps more obvious that

¹⁶⁴ For a broader introduction to the concept see <http://www.claytonchristensen.com/key-concepts/> and Conole (2013).

the introduction of xMOOCs into university degree programmes may be classified as disruptive innovations. The threat has two dimensions. Firstly, the pedagogical concept behind the xMOOCs promote knowledge acquisition instead of knowledge construction and leave the students as passive recipients of education instead of active participants in the learning process, as is the case in cMOOCs. Secondly, xMOOCs have a built-in preference for splitting topics into small learning units in order to make it easier for students to master the learning process. Instead of studying a course of 50 working hours you reduce the complexity if you study 5 courses of 10 working hours each. But together with the complexity you may also reduce the level of reflection in degree programmes at universities. The key question is: How small can a learning unit be in university degree programmes?

Interestingly, this development towards small learning units draws similarities to research in the early years of the century, where the concept of learning objects dominated the field of technology-enhanced learning. Weller et al. (2013) defines a learning object as “a digital piece of learning material that addresses a clearly identifiable topic or learning outcome and has the potential to be reused in different contexts”. Similarly, Rehak & Mason (2003; p. 21) state that a learning object is a “small chunk of learning which serves a learning objective”. In comparison to the ideas of assembling small MOOC units, learning objects were meant to be sequenced. This sequencing was compared to assembling LEGO bricks (Duncan 2003; McGreal 2004; Wiley 2002), where, in principle, you can combine the objects in any desired way. Thus, the idea of assembling or sequencing learning objects was to create small units that were independent of each other. This approach was criticised for a lack of pedagogical reflection and for not taking into account the larger context of the subject matter (Hoel 2002; Friesen 2003; 2004; Dalsgaard 2005). A key criticism is that this approach to learning objects, results in a focus on content delivery and on splitting subject areas into small pre-defined units with clear learning outcomes.

However, the essence for university education is to teach the students not only to be able to reproduce the knowledge they have picked up from the educational resources but to frame and solve problems with this knowledge. The learning outcome is this ability. According to the European Qualification Framework, Higher Education aims at providing students with problem-solving skills and reflection competencies. See for instance these descriptions of skills on level 6 and 7 of the EQF (Source: *Descriptors defining levels in the European Qualifications Framework (EQF)*, European Commission, <http://ec.europa.eu/ploteus/content/descriptors-page>):

Skills in EQF level 6: *"Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study"*

Skills in EQF level 7: *"Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields"*

These skill levels naturally call for a certain level of content within MOOCs, but more importantly they also place demands on student performance and not least on assessment forms. The latter, in particular, is of great importance when designing MOOCs. If one is to assess skills of "solving complex and unpredictable problems" or to "integrate knowledge from different fields", assessment is necessarily complex and not easily automated for instance by multiple-choice or peer-review. In relation to the EQF, for universities:

"The educational challenge is to teach the learner how to build (...) personalised learning environment and how to further develop it – to become an independent learner. For the researchers and teachers, the tasks are

to develop technologies that support the learning process and remove barriers to learning through the introduction of more engaging learning activities". (Bang et al. 2014)

Furthermore:

"Learning resources (learning objects) broadly taken only become active during the learning process when the learner is doing something useful with them. The creation of relevant learning activities becomes essential. Successful learning activities mobilise the capacities (present knowledge, cultural heritage, etc.) of learners and establish a dialogue with the new learning resource as the basis for learning. Hereby, teachers and tutors are reinstalled in a position as responsible for organising the learning process. They are choosing relevant learning resources and creating learning activities needed in order to reach defined educational objectives."(Bang, J. 2006)

Although this last quotation is written before the occurrence of the MOOC discussion, the essence is very close to the concept of the cMOOC and points towards the fundamental needs for student participation and active involvement in the learning process at university level. The threats toward university education by xMOOCs are not mainly commercial ones aimed at the business model of traditional campus-based universities. The threats are towards the academic quality (cf. level 6 and 7 of the EQF) of the learning outcome and the pedagogical model for creating independent critical learners out of the students.

By connecting MOOCs/OERs/OOCs to existing courses, we can reframe the discussion of "how small can a MOOC be?" In the end, this is an institutional decision. At the Faculty of Arts at Aarhus University the smallest unit of a course is 5 ECTS, covering 135 student working hours. Students participating in the open track attain knowledge from reading texts and discussions with other students and they can obtain a certificate, confirming their participation; but only students who participate in the examination are awarded ECTS credits.

4. Concluding remarks: Exploiting cMOOCs in HE

There are other ways to establish business models and pedagogical models for MOOCs than aiming at small units. The recent publication *MOOCs in Europe* (EADTU 2016) presents a large variety of ways in which MOOCs are used in higher education. Also, a study on European MOOCs in Schuwer et al. (2015) points towards other areas of MOOC opportunities. The paper highlights the main opportunities, such as integration of the ECTS system, cooperation between institutions and development of innovative pedagogical models.

We have elsewhere proposed a Danish model for integrating MOOCs with traditional courses that award ECTS credits and have enrolled students (Bang et al., 2016). From a Danish perspective, we have argued that there are potentialities in developing open tracks – in the form of MOOCs – as part of existing university courses. This model is currently being pilot tested at Aarhus University in two MOOCs on "Digital learning contexts" (<https://open-tdm.au.dk/dl/>) and "Post-human Aesthetics" (<https://open-tdm.au.dk/ph/blog/>). These two courses are announced on OpenupEd, and they can be followed as MOOCs. They provide 6 weeks of a 20 ECTS course that is part of a Master's degree.

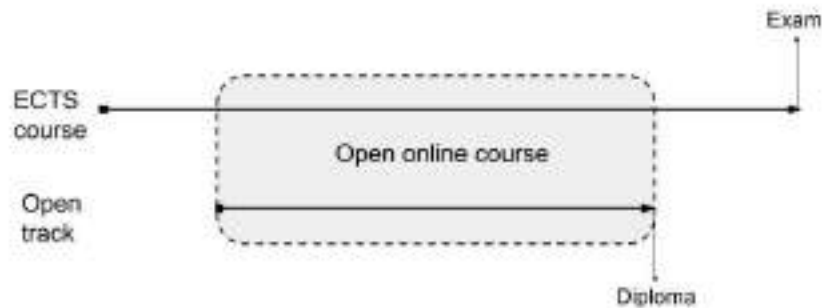


Figure 1. Open Online Course integrated in regular ECTS course with enrolled students.

Rather than developing pure MOOC programmes, we propose a reverse perspective that looks first and foremost at MOOC development from the point of view of existing courses and educational programmes. In aiming to clarify and qualify our perspective on MOOC deployments, we first pose the question - where can we find parts of existing courses that might be of value to a group of non-students that request further education, lifelong learning or continuing education? With this approach we aim at facilitating interaction and collaboration between the enrolled students and participants from outside representing institutions and industry within the subject field.

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Global OER Graduate Network: Raising the Profile of Research into Open Education

Beatriz de los Arcos

The Open University, UK
b.de-los-arcos@open.ac.uk

Robert Farrow

The Open University, UK
r.farrow@open.ac.uk

Martin Weller

The Open University, UK
martin.weller@open.ac.uk

Rebecca Pitt

The Open University, UK
beck.pitt@open.ac.uk

Abstract

The Global OER Graduate Network (GO-GN) is a global network of doctoral students whose research projects include a focus on openness in education through, for example, OER, MOOC, open data, open licensing and open access publishing.

GO-GN started as an initiative from the UNESCO Chair in OER at the Dutch Open Universiteit, in collaboration with the UNESCO / COL Chair in OER at Athabasca University (Canada). It is currently funded through the OER programme of The William and Flora Hewlett Foundation and administered by the Open Education Research Hub from the Institute of Educational Technology at The Open University, UK.

In summary the goals of the GO-GN are to substantially expand the Open Education research base; achieve this expansion mainly through good quality PhD trajectories; find these PhD trajectories distributed among universities in a variety of societies in the different continents around the world; connect the research projects and researchers through a global learning network; and provide free and easy access to the generated knowledge through papers, conference presentations, dissertations, as well as reports and publications for a broader audience.

In this presentation we will introduce the GO-GN, showcase some of the research being conducted by our members, and discuss the strategies that are helping us to build and support a community of open practitioners.

Keywords: Open Education, OER, MOOC, research, network

1. About the Global OER Graduate Network (GO-GN)

As the OER¹⁶⁵ field matures, so the need for high quality research increases. This research will aid the shift from belief-driven advocacy to evidence based decision making. In recent years some significant research

¹⁶⁵ UNESCO defines Open Educational Resources (OER) as “any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them.”

initiatives have emerged: the OER Research Hub¹⁶⁶ at the OU in the UK (funded by the Hewlett Foundation), ROER4D¹⁶⁷ (the program on Research in OER for Development, coordinated by UCT in Cape Town and funded by the Canadian IDRC), and the Open Education Group¹⁶⁸ in Utah. However, the field of OER research is still relatively new, while many research questions remain unaddressed or unanswered. There is thus a need to help establish this field and the quality of research as it grows in order to:

- develop and explore new knowledge in the broad OER field linked to a variety of disciplines;
- provide a solid foundation for the introduction and implementation of OER innovations;
- monitor and evaluate the outcomes of institutional, national and international OER initiatives;
- increase evidence and guidance for OER in practice.

The Global OER Graduate network is a global network of PhD researchers who are conducting their studies on OER. At the core of the network are doctoral students whose research projects include a focus on openness in education through, for example, OER, MOOC, open data, open licensing and open access publishing. Around these students is a network of experts, supervisors, mentors and interested parties. The aim of the GO-GN is to both raise the profile of OER research, and offer support for those conducting PhD research in this area. As well as research *into* openness the GO-GN seeks to develop openness as a *process* of research. This includes developing open dissemination approaches, releasing open data, publishing open access, and sharing findings openly.

The relative novelty of OER research often results in a lack of local expertise in open education. By connecting to the GO-GN PhD students have access to a network of experts, and a range of services. The network also connects individual PhD researchers from different regions in the world and allows them to exchange contexts and experiences. This is particularly valuable in the global context where many researchers may not have access to others in their region, but also where OER may have the greatest impact. It is not just PhD researchers that need support however. Many post-doctorate and early career researchers may still require access to a network of peers. As OER programmes are implemented at various levels, for example, Z-degrees in community colleges in the US, many teaching practitioners find themselves cast in the role of OER researcher. It is important that the GO-GN helps support these researchers so that their research is as valuable and robust as possible.

GO-GN started as an initiative from the UNESCO Chair in OER at the Dutch Open Universiteit, initiated in collaboration with the UNESCO / COL Chair in OER at Athabasca University (Canada). The network is currently funded through the OER programme of The William and Flora Hewlett Foundation¹⁶⁹ and administered by the Open Education Research Hub from the Institute of Educational Technology at The Open University, UK. In September 2016, the network comprised of forty-five PhD researchers registered at universities in fourteen countries –United Kingdom (11); USA (7); Canada (6); India (3); The Netherlands (3); South Africa (3); Australia (3); Portugal (2); Spain (2); Nigeria (1); France (1); New Zealand (1); Ireland (1) and China (1). An

¹⁶⁶ <http://oerhub.net/>

¹⁶⁷ <http://roer4d.org/>

¹⁶⁸ <http://openedgroup.org/>

¹⁶⁹ <http://www.hewlett.org/library/hewlett-foundation-publication/open-educational-resources-initiative>

additional 7 researchers –from Fiji, Sweden, Turkey, South Africa, Rwanda and Spain, have been awarded their PhD since 2015.

2. GO-GN research topics

Weller (2016) performs a content analysis of publications in the OER Knowledge Cloud repository and identifies ten categories of studies as emergent disciplines within open education practice –project case study, technical, OER as subject, research with impact data, policy, practitioner, OER in developing nations, MOOCs, pedagogy, and open data/practice/access. This section maps the abstracts of theses proposed by GO-GN student researchers against those categories to consider the scope and variety of the research being conducted.

Accordingly, we find that the largest number of studies involve *the use of OER by practitioners* in specific contexts, for example: teacher educators' perceptions and attitudes towards OER in India, with a view to determining reasons for use or non-use of OER; a theoretical explanation of why some academics in a South African institution share and others do not; the role of students' agency in their digital literacy practices, in particular in terms of using and reusing OER; students' preferences towards open textbook adoption and factors influencing their choices; or identifying and understanding the awareness, knowledge and attitudes of scholars in Portuguese public Higher Education institutions (HEIs) towards OER and open access.

A sizeable number of PhD candidates are adding to the field of *MOOC research* covering topics such as teacher and learner roles in connectivist MOOCs that use social networks as learning environments; the potential of MOOCs in Higher Education and informal life-long-learning contexts in India; suggesting adequate formative assessment and feedback models to address the low engagement of students and high drop rate in MOOCs; the challenges and opportunities that MOOCs afford in HE; or MOOCs and accessibility. A few PhD researchers have made *OER in developing nations* the focus of their research, for example, looking at the adoption of OER in HE institutions in Nigeria; examining the benefits of using OER in terms of increased accessibility, affordability, quality and relevance of post-secondary education in Kenya, Ghana and South Africa; or addressing questions such as to what extent teachers are using, adapting and sharing OER for their professional development in Ghana, and how OER for teacher education can contribute towards sustainable development goals on quality education.

Two GO-GN theses pay particular attention to *policy* issues: one, focusing on the framework of policy changes and guidelines needed for OER to be effectively adopted on a large scale, and how OER can help to increase access to education and training; the other, exploring how international organizations are influencing governments around the world in their OER policy approaches and with what impact.

In addition, we find single studies by GO-GN PhD researchers considering *OER as subject* –the contribution of OER to the social inclusion and success of learners in Australian HE programs; *technical* –identifying improvements to social semantic interactivity within repositories of OER to support the OER community; *research with impact data* – establishing whether reuse of OER has an impact on teaching practices and on professional development for online language teachers; and *open practice* –exploring the role of social networking sites in relation to academic practice.

3. Creating a global research community

The Global OER Graduate Network works towards not only connecting and supporting OER PhD researchers around the world but also establishing a community of practice. Bacon writes “It is not merely the group that generates community, but the interactions within it” (2012:5). With the aim of promoting interaction and a sense of belonging, and encouraging diversity and collaboration, we engage in the following activities:

1. An annual face-to-face seminar is normally held to coincide with the Open Education Global conference, where students have the chance to present their work, receive feedback from peers and experts, and explore together what it means to be an open researcher and how research can be conducted in the open.
2. A monthly webinar is hosted on the first Wednesday of every month, where PhD candidates and established researchers present and discuss their work. These webinars are recorded and represent an opportunity for all interested in OER to keep abreast of current initiatives and research.
3. Active collaboration with other networks, such as the ICDE Global Doctoral Consortium, with whom we share a focus of study (online, open, flexible and technology enhanced learning and open education) and the practice of doing online and open research.
4. A prize for best research paper (published by a GO-GN PhD student in an open access journal) and best open research practice (open to all GO-GN members) reward the twin aspects of open research: subject and process.
5. An active presence on social media, especially Twitter (@GOGN_OER, #GO_GN).

Our website (<http://go-gn.net>) acts as a hub for the network, containing outputs by our members (publications, blog posts, presentations, data sets, etc.) demonstrating the growing research field, and OER researcher resources produced or assembled by the community, for use by all OER researchers.

4. Becoming a member of the network

The GO-GN network benefits from all OER-related practitioners being part of the community. There are three ways to be involved with the GO-GN:

The first is if you are a PhD student, currently registered on a programme studying some aspect of OER. Please note that you need to be registered for a doctorate programme at a university, and have supervisors in place. We cannot provide supervision or organise a PhD programme for you, but we can link you with mentors in the OER field.

The second way is to be a potential supervisor or mentor to students within the network. If you have expertise and experience, it is very useful for students, who are often working in isolation in their own institutions, to have someone to talk to with OER knowledge. This commitment can vary from being an officially registered supervisor to offering occasional, informal advice.

The third way is to be an interested party. Maybe you are considering a PhD in this area but don't have arrangements in place yet, or you are an OER researcher or practitioner who wants to come into webinars, and stay abreast of what the network is doing.

If you would like to join the network, whichever of these best describes you, please apply by completing the following form: bit.ly/GOGNMembership

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Sustainable and Adaptive Integration of MOOC Videos in Distance Higher Education

Cornelia Eube

FernUniversität in Hagen, Germany
cornelia.eube@fernuni-hagen.de

Sebastian Vogt

TH Mittelhessen, Germany
sebastian.vogt@iem.thm.de

Günter Hohlfeld

FernUniversität in Hagen, Germany
guenter.hohlfeld@fernuni-hagen.de

Abstract

The numerous MOOCs produced by universities in recent years lead to a widespread offer of freely accessible videos for teaching and learning. This paper examines the question of how these videos - which can be classified as Open Education Resources (OER) - could be sustainably integrated into distance degree courses. The aims of such sustainable integration are not only to achieve frequent playing of the videos, but also to adapt the video material to the students' learning situations, thus fostering a learner-centric approach of teaching.

A corresponding pilot project was conducted at the FernUniversität in Hagen. Videos of a MOOC about statistics (#ExIF14) were integrated in the module "Quantitative Empirical Education Research". The students had the opportunity to watch the videos together with the tutors, synchronised on a freely accessible social media platform, and to comment on them in the built-in chat room. Thereby the students' questions could be answered straight away and the tutors could explain any divergences between the video content and the course-specific study material.

The evaluation of a questionnaire survey showed that active learners regarded this opportunity of synchronised watching as helpful and motivating. In addition, monitoring the frequency of access to the videos revealed effects of the project concerning students who did not participate in the online-meetings. Feedback from the students is being considered for the second pass of the project.

On the basis of the concept presented, the potentials and challenges for sustainable integration and adaptation of MOOC videos in distance higher education are discussed.

Keywords: MOOC Videos, OER, Adaptive Integration, Learner-Centric Teaching

1. Introduction

Internet-wide (freely) available teaching/learning videos (hereinafter referred to as videos) constitute an essential component of digitised education that links up with a relatively long tradition of distance studies using moving pictures (Bates, 1984; Koumi, 2006). For example, the videos of the Khan Academy and various Massive Open Online Courses (MOOC) providers attracted international attention. Furthermore, videos develop in the university context partly through recording of lectures. The particular added value of integrating videos into a distance degree course lies not only in supporting competence differentiation processes, but also in access to experiences and in promoting motivation (Vogt & Deimann, 2014).

The production of MOOC videos involves substantial effort – especially in terms of working hours for designing and producing the videos. MOOCs aim to allow open access to teaching/learning resources. This paper examines the question of how MOOC videos can be integrated sustainably into distance study courses. For this it first explores what is to be understood by sustainability and what dimensions and perspectives are addressed. (2). A look at the literature on sustainable integration of Open Education Resources (OER), MOOCs and videos leads to a catalogue of requirements (3). This is followed by the description (4) and evaluation (5) of a pilot project on sustainable integration of MOOC videos into a module at the FernUniversität in Hagen. Finally the results are discussed – the various relevant activity areas and associated factors that can promote sustainable integration of MOOC videos into distance study offerings are integrated in a graphic overview. The paper closes by sketching out approaches for further research projects on sustainable integration of MOOC videos (6).

2. Sustainability – a multi-dimensional concept

The concept of sustainability originated in the German-speaking countries in the 18th century in the context of forestry. The idea was to manage forests in a future-proof manner in order to secure supplies of wood as a raw material in the long term (Tremmel, 2004).

In the course of the 20th century, within the context of growing awareness for environmental problems, limited natural resources (oil crisis) and for global distribution of chances for the world population, a much more generalised meaning of the term sustainability has evolved. For example, the Brundtland Commission of the UN offers this definition: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). In general understanding, sustainable development affects the three dimensions of ecology, economics and social justice, and this always under the intragenerational (in other words current, global) and intergenerational (and hence future) perspective (Tremmel, 2004).

This concept of sustainability is applied – generally as a normative requirement or goal – to different areas of activity. Sub-aspects of the overall concept, which originally implied a global and long-term meaning as set out above, are transferred. Here in particular the dimensions of conscious or thrifty handling of resources and future viability can be mentioned as aspects that are repeatedly addressed. At the same time the goal of equal opportunity for users of innovations, programmes or offerings is moving into the focus of consideration. Resources here are frequently also understood to cover non-material resources such as work performance or economic assets. The future viability is partly very narrowly related to the object under consideration (e.g. in service companies customer loyalty), and in other fields to social development, e.g. in the education sector, when this is a matter of preparing individuals for lifelong learning so that they can respond flexibly and adequately to changing requirements in the working world. Equal opportunity is addressed on the one hand when the origin of raw materials or the production circumstances, e.g. in other countries, are viewed critically. On the other hand, in the education sector equal opportunity addresses access opportunities to educational offerings independently of social status, gender and home country.

Against the background of the multidimensional significance of the term sustainability briefly outlined here, the following chapter explores what requirements and goals arise from this for sustainable integration of MOOC videos into distance study offerings.

3. Sustainability in the context of MOOC videos

At the beginning of the century the OER movement started. The OECD defines OER as "digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research" (2007). Universities delivered open online access to course content material for several reasons, including enhancing their visibility and providing input for alumni. A further central potential of OER lies in improving equal opportunities as a dimension of sustainability: "OER projects can expand access to learning for everyone, but most of all for non-traditional groups of students, and thus widen participation in higher education. They can be an efficient way of promoting lifelong learning, both for individuals and for government, and can bridge the gap between non-formal, informal and formal learning." (OECD, 2007) Based on this movement, the MOOCs evolved in 2008 (Daniel, 2012). Universities started to offer free online courses to everybody wishing to participate. A central element of these online courses consists of teaching/learning videos. These frequently remain available after the end of their running time as well. They are either embedded in a (commercial) MOOC platform (e.g. coursera) with restricted rights of use, or are freely accessible as OER with rights of reuse, copying and modifying, e.g. on youtube or vimeo (Ebner et al., 2016).

Aspects of the sustainability of these MOOCs and their videos are to be considered from two perspectives – firstly that of the producers who have invested resources (including the costs of conception, production and execution), and secondly that of the learners, among whom learning processes are initiated with these educational resources.

If the producers of MOOCs have commercial interests, they try to refinance their investments in educational programmes for instance by issuing chargeable, competence-documenting certificates for the students marking completion of the course. For example, the business model of the MOOC platform iversity.org was based on this. However, the question of education economics also arises in the case of – directly or indirectly – publicly financed projects too (on which the focus lies in the present paper) (Stepanyan, Littlejohn, & Margaryan, 2013). For instance did and do the promotional measures undertaken achieve the intended objectives – e.g. improvement of education opportunities for non-traditional students, enrichment of educational offerings of (public) providers that can integrate the learning resources created by such promotion? In this sense, Wiley defines sustainability in the context of OER as follows: "[S]ustainability will be defined as an open educational resource project's ongoing ability to meet its goals" (2007, p. 5). A first requirement for this is that the videos of the MOOC are used, either by teaching staff who integrate them into their courses, or directly by the learners who use them for their individual competence differentiation processes. Here a distinction is made between various types of re-use of Open Educational Resources, from "as-is reuse", via different kinds of adaptation of the materials – from technological adjustments at an interface via language or cultural adaptations – right through to pedagogical adaptations or annotations (Wiley, 2007). The adaptation of materials is linked to conditions – the source code must be accessible and it must be possible to modify this as simply as possible in order to ensure sustainable use of OER.

From the standpoint of learners or their learning processes, it should also be taken into account how to qualify the use of MOOC videos in a teaching/learning setting as sustainable. In a theory on sustainable learning by adults, Schüßler (2007) argues that sustainable learning comprises both the permanent effect and the continuous use of what has been learned. Accordingly, studying must extend beyond learning specific knowledge and methods and instead both develop learners' competences and prepare the way for

possible transferring of the contents learned to application situations in the future. Here it is necessary to explicitly explore learning causes or occasions – by contrast with learning study material by heart for examinations. For instance Koohang and Harman point out in connection with the “pedagogical value of OER” that “knowledge construction derived from the constructivism theory is appropriate for the design of digital contents” (Koohang & Harman, 2007, p. 529). Special attention is to be devoted to exploring the learning contents, especially in teaching/learning forms with videos. If the learning topics are explained (too) understandably in videos, an “illusion of knowing” effect can result (Ertel, 2007). The integration of teaching/learning videos in a distance study course should accordingly be carried out against the background of the theory of constructivism and offer occasions for collaborative and social processes of reflection (see Vogt & Maschwitz, 2014; Eube & Vogt, 2016, on the associated seamless learning approach). Huang (2002) stresses the relevance of collaborative and interactive learning scenarios that promote learner-centred, self-steered and critically reflected learning for online teaching/learning scenarios for adults. The sustainability of MOOC videos is thus promoted when they are freely accessible and adapted in collaborative and interactive scenarios to the learning situation of the learners and thus also support learner-centric teaching/learning scenarios. Furthermore, the future viability of the learning processes, in other words the ability to transfer what has been learned, is key for future requirements in the lifelong learning process.

4. Example of application

In the winter semester 2014/15, the FernUniversität in Hagen offered an introduction into the statistics to lifelong learners in the field of empirical education research with the German-language cMOOC “Zurück auf die Insel der Forschung”¹⁷⁰ (#ExIF14) (Vogt, Hohlfeld, & Mohr, 2014). The specific, internal institutional target group consisted of students taking the BA course in Educational Science in the module “Empirical educational research – quantitative methods” and students taking the Master’s Degree course “Education and media: eEducation”.

4.1 Design of the MOOC videos

The design of the video contents already takes into account the connectivity of the knowledge to be acquired by the students. The guiding idea for the introduction into quantitative empirical education research is that of the model idea – “statistics as a model” – and the individual techniques (calculation of correlation coefficients etc.) are “only” presented as examples of tools. The strengths and limits of different models are discussed in detail. Depending on the target group, the PISA studies are a practical application example for this. The purpose is to prepare the groundwork for a conscious and critical way of handling statistics – both one’s own where these are being produced and those of others that are used for argumentations. A critical attitude of students along the lines of critical rationalism (Popper, 2005) is a key goal of #ExIF14. In this, the videos differ from other statistics videos which mainly focus on more mathematical contents.

The contents are integrated into a narrative framework of discovery of an island of research along the line of appraisal (Ellsworth & Scherer, 2009) and affective disposition theory (Zillmann, 1996). Despite this, due to their complexity the core lectures of the videos are not likely to ensnare viewers into an “illusion of knowing” along the lines of “easy listening” (see also Salomon, 1984).

This approach takes the goal of sustainability into account in several ways. On the one hand these contents teach overarching patterns of quantitative empirical education research that are connective for future

¹⁷⁰ “Back to the Island of Research”

challenges that the students may possibly encounter in the course of their lifelong learning process. The necessary thorough consideration of the demanding videos stimulates more intensive learning processes. And not least, the targeted attitude also promotes a critical reflection on research projects as well as critical grappling with research results on education realities and the associated distribution of chances. This contributes to education for sustainability.

4.2 Integration of the MOOC videos into the distance study programme offerings

The eight episodes of the #ExIF14 were published as an OER on the video platform Vimeo (Vogt, Hohlfeld, & Mohr, 2014). Furthermore, since the summer semester 2015, the cMOOC videos have been used as a resource within the module “Empirical educational research – quantitative methods” in the BA course in Education Science at FernUniversität in Hagen. For this purpose, links to the videos together with an outline of the contents were incorporated into the course learning environment and regular reference was made to the #ExIF14 videos within the framework of the online support. Despite this, students did not use the videos as intensively as expected. In addition, due to the change of a Study Letter the terms and symbols used for statistical concepts in the videos were no longer identical to those used in the course material.

In order to improve the integration of the cMOOC videos into the students’ learning process, as of the winter semester 2015/2016, students were additionally offered the option of watching these videos together with the tutors synchronised on a fixed time and day in the week on the platform watch2gether (Sailer, 2015) and of commenting on the videos and posing questions in a parallel chat integrated into the platform (Fig. 1).



Figure1: Screenshot: Episode 2 of the #ExIF14 with Günter Hohlfeld (left), chat profile (right)

The objective of this offer was on the one hand to promote a form of group activity through synchronous watching of the videos that would increase motivation to engage with the videos (Li, Verma, Skevi, Zufferey, & Dillenbourg, 2014). At the same time, the interaction with the other students as well as with teaching staff provides an opportunity for asking questions and thus of adapting the video material to the needs of the students. Not least it is hoped that the watch2gether project will increase the grasp and comprehension of the videos.

The free service platform watch2gether allows many users to receive videos in synchronised form and to discuss these on a text basis on a synchronised platform as well. The users do not have to register anywhere with their personal data for this, which is an important prerequisite in the context of data privacy in the

German university landscape. The teaching staff who facilitate the respective video (by starting, pausing and ending it) need a personalised account on the platform, however.

On one fixed day a week (Thursdays, 6:00 pm), the students were given access to the screening room via a link which was notified to them on the learning platform. In the chat, the students appear with a pre-set user name (e.g. User-EOBUZ, see Figure 1). Optionally they were able to select a name (their own name or a nickname).

After a short greeting, the video was started and the students could pose questions at any time. The teaching staff pointed out references to the current study materials. The video was stopped once or twice to provide an opportunity for queries that had accumulated. The chat proceeded in varying degrees of intensity – the more difficult the content of the video, the more questions were posed.

On the basis of student feedback, in the following semester during this project reflection questions and application tasks related to the individual videos were posted in the learning environment (Moodle) for discursive processing on the day after the synchronised watching date.

5. Evaluation

In accordance with the various sustainability perspectives, on the one hand feedback from the participants were obtained in a survey regarding the watch2gether project (5.1). On the other hand the frequency of use of the videos was evaluated on the basis of a Logfile analysis (5.2).

5.1 Survey

Directly after the last synchronised watching date in the winter semester 2015/16, a survey on the watch2gether project was started. 17 persons responded and the following results were noted:

Participation on project dates

The participants in the survey were asked how many of the eight videos they had watched in synchronised form within the framework of the project. On average each participant viewed 3.6 videos (episodes) within the framework of the project ($SD=2.1$).

By way of comparison: the observed number of attendance altogether on the eight dates (without the tutorial staff) totalled 100. The survey shows a total stated attendance of 62 on the synchronised watching dates. Accordingly the majority of the project participants were reached by the survey.

Feedback on the technical quality

It was investigated whether the videos ran without disturbance, whether the optical quality was good and whether the display in the chat was free of latency. 12 out of 17 participants rated the technical and optical quality as good.

Feedback received during the chat indicates that the internet connection was mainly responsible for stalling of the video. It was frequently possible to eliminate these disturbances if the participants reduced the resolution of the video. This option can be set individually on the watch2gether platform.

Feedback on the learning format with weekly synchronised watching times

In the survey the students were asked what aspects of the project they liked and where they saw potential for improvement, or why this project was possibly not suitable for them. For this they were asked to rate the extent to which they agreed with various statements on a scale from “don’t agree at all” (=1) to “agree fully” (=5).

The participants appraised motivational effects positively. Agreement with the statement “It was good to study ‘together’ despite this being a distance course” was rated on average $M=4.35$ ($SD=0.97$). Agreement with the statement “It was good to have a fixed date on which we could watch the videos together” was on

average $M=4.06$ ($SD=0.73$). Added value resulting from the direct exchanges on the video and hence adaptation to their specific needs was also equally relevant for the participants – agreement with the statement “It was good to be able to pose questions about the videos” showed an average agreement level of $M=4.5$ ($SD=0.78$). “The references to the current Study Letter made it easier to use the videos after the project as well” was given an average rating of $M=3.9$ ($SD=1.16$). However the additional materials from the participants of the original cMOOCs were also welcomed ($M= 3.9$, $SD= 1.1$), and not least the opportunity of trying out a new learning format ($M= 3.9$, $SD=1.4$).

The overwhelming majority (12 out of 17) stated timing difficulties as the reason for not being able to participate on individual project dates. Four people found that the format was not suitable for them – they preferred to watch the videos at their own speed (3) or found the chat confusing (1). One person decided not to participate further in the synchronised watching format due to the technical quality.

Participants’ proposals for improvement

The participants in the survey were asked for proposals for improvement. Above all additional test questions were suggested/preferred. This proposal was taken up in the following semester and integrated into the Moodle environment after the watching dates in each case.

To summarise, from the participants’ perspective it can be noted that the following factors of the project are conducive to learning and motivation:

- social (synchronised) interaction with students and teaching staff
- adaptation to student needs
- fixing of a schedule
- subsequent suggestions for reflection

5.2 Logfile analysis

Use of the #ExIF14 videos increased distinctly in the winter semester 2015/16 by comparison with the summer semester 2015. The four-month periods before the respective examinations were compared. The plays of the altogether eight videos logged in Vimeo were evaluated. The values set out in Table 1 resulted for the mean use of the videos and the standard deviation.

Table 1: Mean use (plays) of the eight videos and relative standard deviation

	SS15 (01.05-03.09)	WS 15/16 (01.11-03.03)
Mean value of the plays/video	144	244
Relative standard deviation	0.39	0.31
Number taking the examination	186	185

The following two Figures 2 and 3 show the course of use over time:

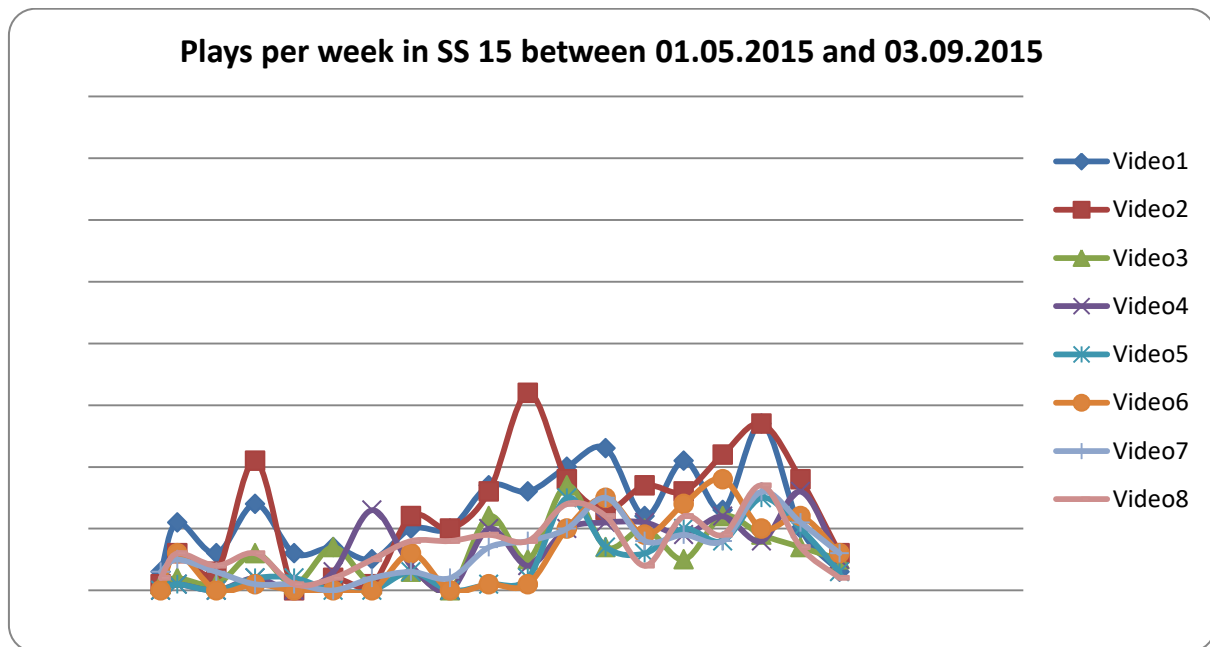


Figure 2: Plays/week summer semester 2015

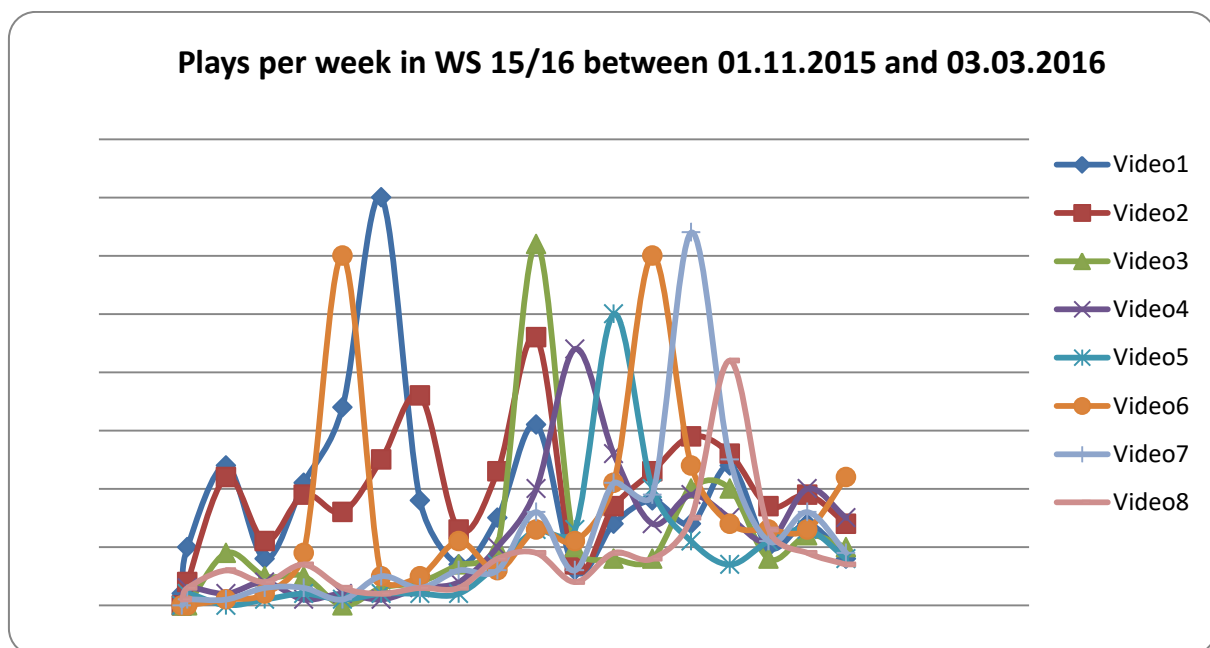


Figure 3: Plays/week winter semester 2015/2016

Whereas in the summer semester 2015 videos one and two were used most frequently virtually all the time (see Figure 2), as of the winter semester 2015/16 a course structure of the video use running parallel with the project offered can be recognised (see Figure 3). This is also noticeable in the lower relative standard deviation of use of the videos in Table 1.

The increased use of the individual videos of the “course” related not only to the actual project day (the number of times the videos were called up on the eight dates totals altogether 120). Viewings also increased slightly in the week before and after the relevant date. Furthermore, a peak can be noted in the first calendar week of 2016. It is suspected that this is attributable to a “good resolutions” effect at the start of the New Year.

As regards the frequency of use of the MOOC videos, it can therefore be summarised that integrating the MOOC videos into the framework of a visible, scheduled project increases the perception and use of the videos along the course dates well beyond the bounds of the actual project.

6. Conclusion and outlook

This paper systematises the sustainability of integrating MOOC videos not only under the generally widespread aspect of education economics, but also under the aspect of learner-centric sustainability of learning processes and it discusses a practical example within this context. The aspects of synchronised and interactive watching of the videos proved to be beneficial for sustainable integration of teaching/learning videos. The adaptation to student needs and the scheduled organised watching format were also identified as added value for this study programme. More frequent and course-oriented use of the videos on the basis of this offering was observed, extending even beyond the direct participation in the offer. It is difficult to assess the sustainability of competence differentiation processes – short-term observation is naturally not possible here, as sustainability only becomes apparent in the long term. The students gave positive feedback on aspects of motivation and social learning. This promotes learning in the sense of constructivism. It is therefore suspected that sustainable learning processes are also promoted.

The supposed barrier to the use of MOOC videos in one’s own teaching, comprising deviations in the presentation or prioritisation of contents, was converted into an advantage by the adaptive approach. As the teaching staff together with the students focus on differences by comparison with other teaching materials and clarify these, occasions arise for differentiating the understanding. In this way an “illusion of knowing” is reliably avoided.

In the long-term perspective, it appears expedient not just to leave various models of integrating MOOC videos into distance teaching to the individual initiative of individual teachers (see here also Seufert, 2012). Within the context of digitising their teaching, institutions can provide strategic incentives and support, offering both the search for adequate MOOCs and also didactic scenarios – such as the concept of synchronised watching and chatting presented here. This was also ascertained in similar fashion by Judith and Bull for OER: “Institutional strategies have the potential to incentivize collaboration around OER use and implementation beyond the level of the individual user” (2016, p. 8). In this way barriers to the (re)use of OER based on concerns about whether they match the context of the specific teaching/learning situation of the learners (Richter & McPherson, 2012) can be lowered and sustainability boosted.

Accordingly considerations and measures - as systematised in Figure 4 -regarding the planning and production of the videos, support for the teachers and didactic scenarios of integration are crucial for sustainable integration of MOOC videos.

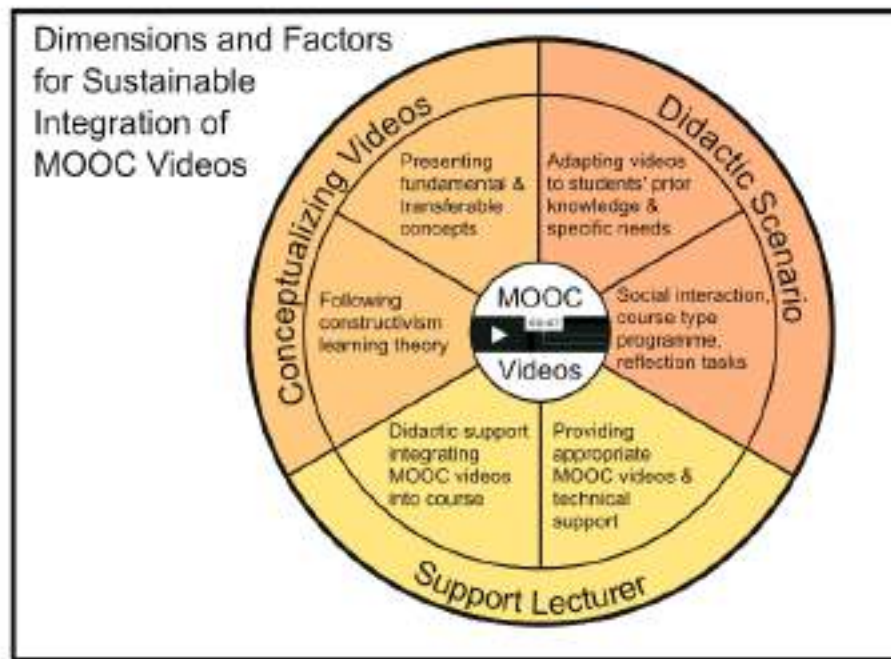


Figure 4: Factors to promote sustainable integration of MOOC videos in university teaching/learning formats

Already during the planning and production of videos it is important on the one hand to ensure editing of the contents along the lines of constructivism, which allocates an active role to learners in building up knowledge. The contents of the actual videos should stress fundamental concepts, as this facilitates transfer of the knowledge to new challenges that students encounter later. Such planning promotes sustainable learning among students in the sense of embodying and re-using this knowledge. On the part of the universities, teaching staff are to be supported in integrating MOOC videos from other universities. In this connection a central body could take over research tasks and provide training regarding didactic scenarios on how these videos can be incorporated adaptively into one's own teaching event (see here the new role of libraries in Eisengräber-Pabst, Vogt, & Deimann, 2014). These measures can attract more attention regarding theme-specific (MOOC) sources among teachers encouraging them to enrich their own teaching (rather like good textbooks) and lower the hurdle for using MOOC videos – especially when it is communicated that deviations from one's own teaching units in the contents of the videos possess didactic value, prompting differentiated examination of the contents. It is precisely these didactic scenarios which feature in the final point in Figure 4. On the one hand the scenarios should lead to a focus on adapting to prior knowledge of the students and priority areas of the specific teaching event. This is done preferably within the framework of social interactions about the videos and reflection tasks (to be processed collaboratively). A course structure of the video use facilitates self-steered learning, especially in the case of distance courses. Such didactic scenarios in turn promote a competence differentiating process in the meaning of constructivism and thus sustainable learning.

Such a (manageable) investment in integrating publicly available MOOC videos into university distance teaching embodied in university strategy appears worthwhile. Thus sustainable use of resources invested in projects can be promoted and the potentials of the long-tail age in which niche products also encounter lasting use can be exhausted (Vogt, 2012). It is important here never to lose sight of sustainable, competence-oriented learning by the students along the lines of permanent use and transfer of what they have learned in the lifelong learning process.

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‘A good start is half the work’: Developing a MOOC to aid flexible learner transition into Higher Education

James Brunton

National Institute for Digital Learning, Dublin City University, Ireland
James.brunton@dcu.ie

Mark Brown

National Institute for Digital Learning, Dublin City University, Ireland
Mark.brown@dcu.ie

Eamon Costello

National Institute for Digital Learning, Dublin City University, Ireland
Eamon.costello@dcu.ie

Orna Farrell

National Institute for Digital Learning, Dublin City University, Ireland
Orna.Farrell@dcu.ie

Abstract

This paper reports on a five week pre-induction socialisation MOOC designed to facilitate successful transition into Higher Education for flexible learners. In this context a broad definition is adopted of flexible learners, which includes adult learners engaged in part-time and/or online/distance education. Enhancing retention and completion rates of this group of flexible learners has become a significant problem throughout the world, especially with the growth of new models of online learning. Although the number of flexible learners in Ireland is relatively low in comparison to many other countries, around 17% of all undergraduates.

The MOOC targets prospective flexible learners during early parts of the study life-cycle, when they are considering entry into Higher Education, or have just made that decision and may benefit from advice about how to effectively prepare. The MOOC utilises a number of the digital readiness tools developed by the Student Success Toolbox project (studentsuccess.ie) and combines these tools with supporting materials in order to deliver a comprehensive pre-induction socialisation course. The key areas of focus in the MOOC are to:

- Present information that aids in the creation of a realistic set of expectations about flexible learning in Higher Education, especially around the importance of time-management
- Facilitate prospective flexible learners in reflecting on their readiness for study in Higher Education
- Reduce anxiety by presenting reassuring messages
- Offer opportunities for socialisation with other prospective flexible learners
- Equip these prospective learners with advice and tools on how to effectively prepare for the educational journey ahead.

Keywords: flexible learner, pre-induction socialisation, student success, retention, digital readiness tools

1. Introduction

Head Start Online was developed as part of the [Student Success Toolbox \(SST\) project](#), funded by the (Irish) [National Forum for the Enhancement of Teaching and Learning in Higher Education](#) Building Digital Capacity fund. The SST project produced a suite of digital readiness tools for the higher education sector. Head Start Online harnessed a number of these tools to create a cohesive resource for new/prospective learners. The MOOC is designed to assist flexible learners in the early stages of the study lifecycle by tackling the prominent issues of effective transitions and the foundations for student success. Although flexible learning is somewhat difficult to define; we refer to definition proposed by the Irish Department of Education and Science (2000) “mature adult participation [in higher education] through flexible options which can be combined with family and work responsibilities” (Flannery and McGarr 2014, p. 424). Head Start Online utilised an inclusive definition of a flexible learner, portraying such a learner as an adult engaged in part-time or online/distance learning.

The creation of Head Start Online was vital as flexible learners have significantly lower completion rates than their on-campus counterparts; this emphasises the need to enhance the retention rates of this vulnerable student population. This represents overriding issues both on national and international levels. Ireland’s undergraduate students are comprised of 17% flexible learners, which is lower than the majority of other countries (HEA, 2012), and there is increasing concern about this significant subset of students’ ability to complete higher education remains.

Head Start Online holds the primary aim of providing a supportive resource for flexible learners during the key transitions in the earliest stages of the study lifecycle. These initial stages are represented by thinking about study, making choices, registration and the first few weeks of the course. This MOOC fills a void as the stages prior to flexible learners formally beginning their undergraduate studies have been largely ignored both within institutions and in empirical research. The specially designed digital readiness tools along with the additional specific content (e.g., videos, text) within the MOOC are readily available and provide these flexible learners with much needed support at a crucial stage.

2. The National Forum for the Enhancement of Teaching and Learning in Higher Education

The Irish Minister for Education and Skills announced the creation of a new body, the [National Forum for the Enhancement of Teaching and Learning in Higher Education](#), in November 2012. The role of the Forum is to enhance the teaching and learning experience for all students in Irish higher education. Since that time the Forum has been involved in many different activities in the pursuit of that goal, for example organising [national seminars](#), celebrating innovative and inspiring teachers through a [teaching hero campaign](#), launching a [national professional development framework](#), directly coordinating [a number of projects](#) focused on specific sectoral priorities, and funding a number of projects and initiatives through themed teaching and learning enhancement fund calls.

In 2014 the National Forum for the Enhancement of Teaching and Learning in Higher Education issued a call for projects under their Teaching and Learning Enhancement Fund to support a theme of ‘Teaching for Transitions’. This theme aimed to inform the focus of activities in Irish Higher Education by changing the pedagogical landscape when it comes to supporting transitions through effective teaching and learning. The call acknowledged different types of transition: transition from secondary level into Higher Education; transition from one culture to another; or transition of adults into Higher Education. The enhancement theme also sought to improve teaching and learning culture and digital capacity.

3. Method

As part of the Student Success Toolbox project Head Start Online was developed using a design based methodological approach. Such a process is iterative in its nature; it does not only evaluate an innovative intervention, but also systematically enhances the innovation while also producing guiding design principles for subsequent associated research and development endeavours (Wang & Hannafin, 2005). Vitally, especially in the context of this MOOC, design-based research strives toward establishing a link between educational research and real-world environments. Firstly, a comprehensive analysis of existing empirical work was conducted in order to establish “what tools work?” relevant to offering support to flexible learner success during the initial stages of the study lifecycle. The aforementioned principal question could only be appropriately answered after addressing the related sub-questions: 1. Who are flexible learners? 2. What do we know about learner success? 3. How does what we know about supporting transitions relate to the above? Once answers were obtained for these queries the approach then scrutinised 4. What connection exists between the literature and what institutions are providing to flexible learners? 5. What tools could usefully be developed in this project? (Brunton et al., 2016).

Numerous tools emerged from the literature analysis. In a comparison study, Nichols (2011) discussed the utility of support measures, for example compulsory support survey, orientation course, general messages of support, and personal contact with students. Also established as effective tools for encouraging student satisfaction, and increasing their likelihood to successfully progress, were discussion forum platforms, active emails, and time-limited lecture postings (Gallie, 2005). Murphy, Politis and Slowery (2015) emphasised the importance of assisting mature learners in those early stages by highlighting the benefits of offering the relevant information to help course choice, early access to timetables, and activity based learning to improve academic ability. Additionally the researchers reiterated the benefit of providing entrants with a digital environment on which new learners can interact with each other and existing adult learners. Undoubtedly the analysis revealed some interesting insights; however the amount of relevant tools identified was restricted.

Accordingly, a database of existing readiness tools was developed in order to support the literature analysis. Preparing such a database involved analysing 22 websites of worldwide universities to identify the readiness tools they offer to prospective learners or those thinking about study. The next step involved the thematic coding of these tools according to their main function; the following themes emerged: 1) Course match; 2) Preparation for higher education; 3) Orientation; 4) Addressing personal circumstances; 5) Community; and 6) Satisfactory student experience. Conspicuously, the above themes agree with Jones’ (2008) principle factors that, when there is an evident shortage, lead to student dropout, thus preventing progression. Associated empirical work was then paired with these thematic clusters, allowing for the clarification of points of convergence between the relevant research and the tools in use internationally.

The aforementioned process lead to the creation of the relevant digital readiness tools, and established the foundations from which Head Start Online was developed. However, when it came time to build up from those foundations we were on less firm ground with regard to having a specific, identifiable methodology for building a MOOC. The final presentation of Head Start Online was influenced by a number of factors such as: pre-existing knowledge of how to create larger credit-bearing online courses; MOOCs that team members had taken on different platforms; review of other pre-induction socialisation MOOCs specifically; advice from our MOOC platform (see below) contact; an intensive MOOC design workshop with Yishay Mor; and trial and error while developing the MOOC on the platform. While this approach fits with the spirit of a design based research approach reflection is needed on what the best methodological approach is for developing a

MOOC. The decision to have the first run of the MOOC be a pilot with a small number of participants (approximately 150) allowed that pilot to itself be part of the MOOC development process, and this is something that the development team found valuable.

4. The Structure of Head Start Online

The Head Start Online course is developed on a new Moodle-based platform, DCU Academy. The MOOC runs over a total of five weeks. Before Week One is officially launched, a welcome area is provided. This area contains a brief course overview and instructions relating to setting up a course profile. The total time commitment for participants is two hours per week; this may vary as there are additional optional activities at the end of each week. At the beginning of each week, a new section of the course is released and made available to participants. Even though the sections of the course are released on a weekly basis, participants are not expected to complete the course so stringently. Participants are free to complete the course at their own pace, or begin the course later than the initial launch.

There are five sections to the course:

1. A good beginning - What is this course about? Who else is here?
2. What to expect - What should you expect of part-time/online learning?
3. Time is precious - How much time do you have for study? What supports do you have in your life?
4. Skills for success - What computer skills do you need? What is required to produce a successful assignment in your first semester of study?
5. Next steps - Where next? Is online learning for you? What will you decide to do?

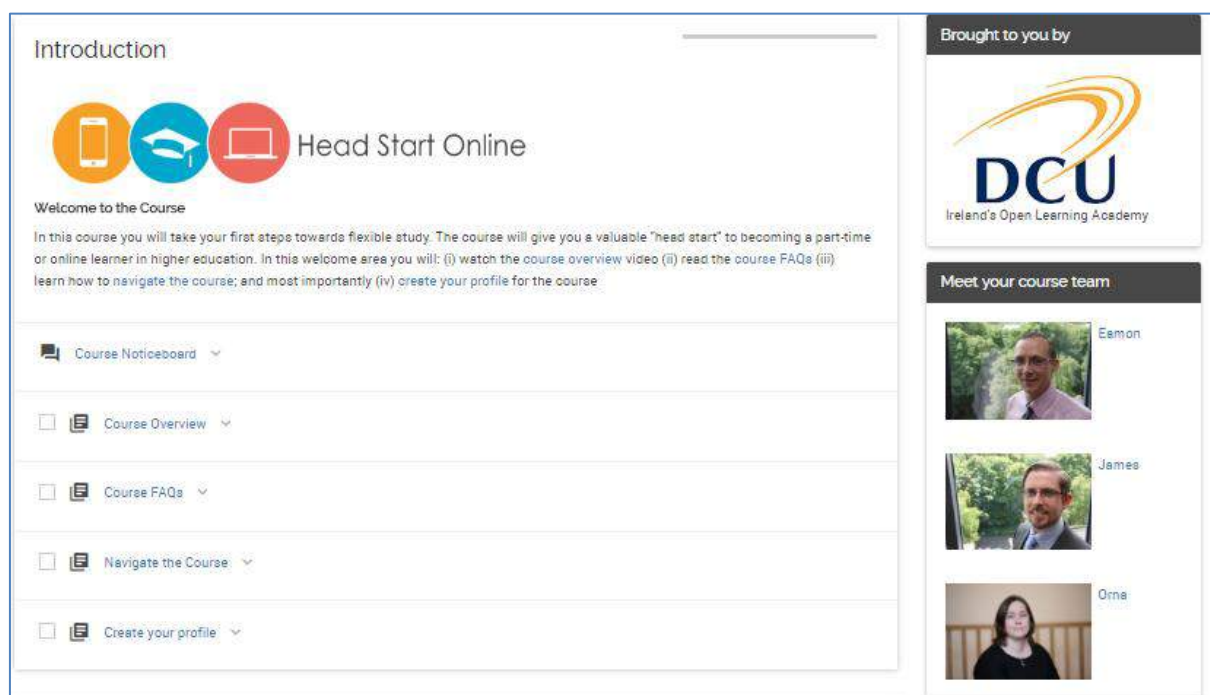


Figure 2: Head Start Online main page

Student Success Toolbox Activities

Am I Ready for Study?

Contained within Week Two of Head Start Online, this activity enables course participants an opportunity to self-assess whether they are ready to commence part-time online/distance study. A quiz consisting of six sections addressing relevant issues is presented: (i) Previous Study, (ii) Work and Family, (iii) Study Intentions, (iv) Study Skills, (v) Computer Skills and (vi) Work Habits. Upon finishing each of the aforementioned quiz sections and the quiz in its entirety, personalised feedback is delivered to participants (e.g., “you probably need to talk with your close family and friends. It’s really important that they understand why you’re thinking about undertaking further study...”). Essentially feedback is provided from two distinct standpoints: (i) the educational institution and (ii) former/current flexible learner.



Do I Have Enough Time?

Week Three offers a self-reflective ‘life calculator’, helping the course participants to assess the amount of the time they spend on various activities during a typical week. This helps them to gain a realistic perspective on whether they have enough spare time for study whilst balancing their current life, work and family commitments. Having calculated how users spend their time currently under six sections (i) Work, (ii) Family, (iii) Household, (iv) Hobbies, (v) Leisure and (vi) Sleep,

feedback is then provided as to whether they have adequate time for flexible study (e.g., You can probably go ahead and register for your course but don’t forget to talk with the staff and check the requirements for the particular programme of study you wish to undertake).

Who Can I Ask?

Also within Week Three participants interact with a tool designed to get them thinking about their support network and how they might garner support in order to assist them in their progression through their studies. Information slides detail methods of finding support from Friends, Family, Employers, Universities and Other Students. Examples of students in both supported and unsupported scenarios are displayed, and advice for those lacking in support is also provided. Lastly, a series of typical student support problems coupled with information on how various support outlets may be of assistance are demonstrated (e.g., Problem: I am struggling with the technology on this course, Other Students



Solution: Other students may be a good source of help with technology problems as they may have experienced similar problems themselves. However be careful not to share your user name and password with anyone.)

My Computer Skills: Am I Computer Ready to Learn?



Week Four grants course participants the opportunity to hear from a student narrator regarding the vital computer skills required for higher education. The guidance is personalised, in that the user indicates their level of computer skills at the beginning of the tool. Both the technology services offered by higher education institutions and the necessary technology flexible learners typically use are communicated. Prior to starting the computer skills quiz itself, participants can access four student stories detailing first encounters with email services, online reading materials, Microsoft Word, and

Microsoft PowerPoint. The first section of the quiz itself contains three fundamental questions, if a participant answers no to any of these questions; they are directed to online resources that can help learners improve their computer skills. Those who answer yes to all three of the fundamental question are directed down an alternative pathway with questions relating to word processing, file management, and using the internet.

My First Assignment

Also within Week Four, participants are guided by a student narrator in relation to what it is like to tackle a first assignment in higher education. Four different navigation pathways through the tool are provided for users depending on their previous experience with higher level assignments. Helpful information on developing and planning an assignment is communicated. Other students' perspectives are also given throughout the tool through quotes in order to heighten participants' sense of what it is like to be faced with an assignment in higher education for the first time.



5. Other Features

Graduate Voices



During the development stage of Head Start Online, members of the research team observed similar MOOCs (e.g., Australian Government funded “What’s Uni Like?” and Future Learn’s “Get Started with Online-Learning”) in order to gain insight into what elements were necessary to include. Continually, from the team’s own perspective and also from that of course participants’ view displayed on various forums, Vox Pops detailing the stories of real university students were extremely beneficial. With this in mind,

the “Graduate Voices” videos were developed to establish a comparable advantageous element to Head Start Online. Here, via YouTube videos embedded in the platform, course participants can access advice from flexible course graduates and learn how they managed to navigate their progression through online study. The videos are situated appropriately in the course so that they complement the respective week’s theme. For instance, in Week Two: What to Expect, a graduate details her online study story from the beginning when she did not know what she was facing into, and in Week Three: Finding the Time another graduate discusses how she had to become more organised in order to be able to study, and gives some advice on time management.

Live Discussions

It was decided that a live discussion, whereby three of the course facilitators would interact with course participants, would be conducted every Friday at 14:00 for the duration of the five week course. The chat sessions last 30 mins and provide a platform for the participants to raise any queries they have and get an immediate response. Equally it grants course facilitators the opportunity to access immediate feedback about various elements of the course (e.g., What aspects of the course are you enjoying? What could be improved about the course?). The chat sessions prove to be an appropriate way to round off each week of the MOOC and they also motivate participants to complete the week’s previous activities and fully interact with its content, as they will more fully benefit from the chat sessions having done so.

Recap Videos

At the start of each new week, before the participant explores that week’s content, they encounter a recap video. The video is a reminder of what was covered in the prior week and allows users to reflect on their previous completed activities and what they have learned. The recap video also aims to ease participants into the new week as opposed to immediately presenting them with new content. Within the video, a course facilitator summarises: the amount of activities completed, what these activities entailed, the messages communicated in videos and interesting content contributed by participants. This element of the course was also used as an opportunity to remind participants to use the Share with Others box should they have any queries for the course facilitators or their fellow prospective learners.



6. Next Steps

This pilot phase testing of Head Start Online is crucial for the continual enhancement of the platform. A data collection and analysis strategy has been prepared in order to elucidate salient questions related to the course (e.g., What activities did people complete vs not complete? What type of participant was more likely to progress fully through the course?). All of the above findings will inform the first full running of Head Start Online in early 2017. Disseminating MOOC information and results related to the pilot testing has also been established as a top priority by the research team. National and international conferences have been attended in order to garner interest in the MOOC over the past year and a similar strategy will continue to be employed over the coming months. What's more, Head Start Online and the associated findings will produce a considerable amount of published empirical work. This is an important contribution of the MOOC as there is an evident gap to be filled in the literature in relation to the use of digital tools to facilitate flexible learner transition into Higher education

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Blended learning with MOOCs: towards supporting the learning design process

Laia Albó

Universitat Pompeu Fabra, Spain
laia.albo@upf.edu

Davinia Hernández-Leo

Universitat Pompeu Fabra, Spain
davinia.hernandez@upf.edu

Abstract

For some time now, universities have been making a significant effort to develop Massive Open Online Courses (MOOCs). One way to leverage the effort invested in developing and carrying out MOOCs is to use the online courses or parts of them in traditional brick-and-mortar courses that are delivered on campus. There are several learning design strategies that consider the combination of face to face (f2f) learning in university courses with one or more MOOCs, though teachers are generally only familiar with the most typical approaches – for instance, the flipped classroom. The variety of combinations and possibilities offered by this type of education constitutes a new learning design space whose full potential is underexplored. The aim of this research is to present and explore the affordances offered by an authoring tool devoted to support the design of blended uses of MOOCs and its impact in the resulting learning designs. A workshop has been carried out with the objective of supporting participants in exploring the possibilities of using MOOCs in combination with the courses typically offered on university campuses. Participants were mainly university teachers as well as academic and administrative staff responsible for supporting the development of MOOCs. Results indicate that the authoring tool can support the process of learning design involving blended learning scenarios with MOOCs and can contribute to expanding the knowledge of this type of learning in teachers.

Keywords: MOOCs; blended learning; blended MOOCs; bMOOCs; hybrid MOOCs; hMOOCs; learning design; higher education; teachers

1. Introduction

Massive Open Online Courses (MOOCs) are shaking up institutions of higher education, forcing them to rethink their traditional face to face (f2f) teaching practices, and pushing them to increasingly consider new educational scenarios in which blended learning approaches make use of MOOCs (Andone, Mihaescu, Ternauciuc, & Vasiu, 2015; Bruff, Fisher, McEwen, & Smith, 2013; Holotescu, Grosseck, Cretu, & Naaji, 2014; Rayyan et al., 2016; Emanuel & Lamb, 2015).

The use of MOOCs in blended learning practices can bring pedagogical benefits to students as well as offer challenging opportunities to teachers “for improving their knowledge in their own area of expertise and for improving their competencies and skills for adopting new models of open educational practices” (Holotescu et al., 2014; Dunn, 2015). Although universities are the ones who usually provide some of the resources and part of the support to carry-out new MOOCs, most of the time professors themselves are the ones who first propose the idea and lead the development – often without receiving any recognition for the extra work. Moreover, the costs of developing MOOCs are much higher than the costs of developing most f2f classes. Therefore it makes sense to take advantage of these investments by amortizing or reusing the

materials of the online course in traditional brick-and-mortar courses delivered on campus as a way to achieve a blended class (Dunn, 2015).

There are several learning design strategies that consider this combination (Delgado-Kloos, Muñoz-merino, Alario-hoyos, Ayres, & Fernández-Panadero, 2015; Albó, Hernández-Leo, Barcelo, & Sanabria, 2015), though generally professors are familiar with only the most typical approaches – for instance, the flipped classroom (Tucker, 2012). The variety of possibilities offered by this type of education constitutes a new learning design space whose full potential is underexplored. The hybridization can range from a teacher who has her own MOOC and wants to use it in her classes on campus, to more complex forms of blended learning in which the teacher has no MOOC of her own and the required course materials are drawn from multiple external MOOCs, as well as from other online sources (Bruff et al., 2013). Moreover, there is a need for sharing educational practices involving the use of MOOCs in blended practices in order to offer more quality learning opportunities to learners since few cases comparing the results of such experiences have been documented (Rayyan et al., 2016; Albó, Hernández-leo, & Oliver, 2015).

Furthermore, we are facing a new stage in which teachers have begun to act as learning designers – designing their own teaching experiences according to the specific educational needs and objectives of their teaching contexts and needing some guidance in the reflective practice of teaching (Laurillard, 2008). Aligned with the emergence of this new stage, the field of learning design (LD) specifically addresses these challenges by providing guidance of how to implement and adapt a particular LD as well as facilitating the sharing of best educational practices (Dalziel, 2015). A LD which comes in many forms and levels of detail provides a model through which the specific intentions of a particular learning context are articulated (Lockyer, Heathcote, & Dawson, 2013). Specifically, this approach has been found useful “for faculty to document their own practice, for instructional designers to document the practices of those they may work with, and for both faculty and designers to interpret the practices of others” (Agostinho, 2011). Educators intending to use MOOCs in blended classes “should consider how to best incorporate each online element into their overall pedagogical strategy, including how interaction with those elements is to be incentivized” (Emanuel & Lamb, 2015).

In this context, this paper explores design elements which may be helpful in supporting teachers during the process of designing hybrid experiences using MOOCs, and contributes to research upon which an authoring tool devoted to supporting the design of blended uses of MOOCs will be built. A workshop – “the most common way of attempting to develop academic capability” (Salmon & Wright, 2014) – was offered to teachers with the aim of testing a proposed design workflow which will form the basis of the authoring tool. The workflow presented was centred on the LD in order to spur the thinking of teachers surrounding how new strategies could be applied to existing subject designs (Bennett, Lockyer, & Agostinho, 2004).

2. Purpose of current study

The aim of this research is to study what variations of blended learning with MOOCs are emerging from the higher education context as well as which design elements – including existing hybrid MOOC frameworks, models, patterns and metrics – are necessary in order to build the basis for an authoring tool that can help professors during the learning design process.

3. Methodology

This study was conducted using convergent mixed methods research design (Creswell, 2002) – due to the nature of the data collected, which were both quantitative and qualitative – to analyze the workshop results and understand the research problem. In the following paragraphs the context of the workshop as well as the instrumentation, data collection and analysis will be discussed.

3.1 Participants and sample

This paper presents the results of a workshop held at the University of Barcelona at the UCATx 2016 annual conference. UCATx is a MOOC platform resulting from a joint venture between the Catalan government and universities. Among the 24 people who attended the workshop, 52% were staff responsible for supporting the development of MOOCs in their universities; 33% were university teachers from ten Catalan universities; 5% were university students; 5% were researchers; and 5% were university staff with no direct responsibility around MOOCs. Out of the 24 participants, ten were involved in f2f teaching and seven in MOOC production or instruction.

The sampling technique used was not probabilistic as the participants at the workshop attended voluntarily when they registered for the conference. Despite the sampling being accidental, the group's main characteristics are shared with those of the population of interest of the current study: people connected and experienced with MOOCs who are interested in learning how to use them in blended learning approaches on campus, which was the main topic of this year's UCATx conference. On the other hand, the size of the sample is not large enough to draw general conclusions and must be taken into account in the possible generalization of the results. However, the main purpose of the study is to ensure that the results obtained from the field work are consistent and coherent, which then maximizes internal validity as it is a first iteration of an ongoing design-based research within a larger research project.

3.2 Procedure and materials

The workshop lasted two hours and participants were divided into seven workgroups. The workflow of the activity was a five-step process (see Fig. 1.) based on the H-MOOC framework by Pérez-sanagustín, Hilliger, Alario-Hoyos, Delgado Kloos, & Rayyan (2016). This framework assesses the MOOC-based hybrid initiatives based on two factors: the institutional effort to apply the initiative and the alignment with the curriculum. Once the framework is defined, the authors place the four basic hybrid models within the four quadrants of the framework: (1) MOOC as a service; (2) MOOC as a replacement; (3) MOOC as a driver; and (4) MOOC as an added value. Additionally, using the same H-MOOC framework, they also classify the six models of Delgado Kloos et al. (2015) plus two more models (Pérez-sanagustín et al., 2016), resulting in eight models in total: (1) Canned digital teaching with remote tutoring; (2) Canned digital teaching with face-to-face (f2f) tutoring; (3) Local digital prelude; (4) Flipped classroom; (5) Canned teaching in f2f course; (6) Remote tutoring with f2f course; (7) Canned teaching with remote course; and (8) Remote tutoring in remote course.

The aim of the workshop activity was to challenge each participant to design a blended-learning university course using MOOC(s) assuming that the MOOC(s) used during the design are already available. The course could be either online or face to face. The possibilities for using massive online course(s) in the blended-learning approach were totally free and ranged from the MOOC(s) being only an optional supplement to the basis of the university course. Materials used during the workshop were: at least one LD template for each participant (see Fig.1a); three H-MOOC frameworks (see Fig.1b, 1c, and 1d) printed on A3 sheets in order to share them with the rest of the members of each workgroup; and at least one LD example for each of the 8 hybrid models mentioned above per workgroup. The three framework sheets were placed one above the other according to the workshop workflow order. Also, each workgroup had a translucent A3 sheet placed on top of the three framework sheets, which allowed participants to draw on it during the different stages of the activity. Next, the five-step workflow process is described:

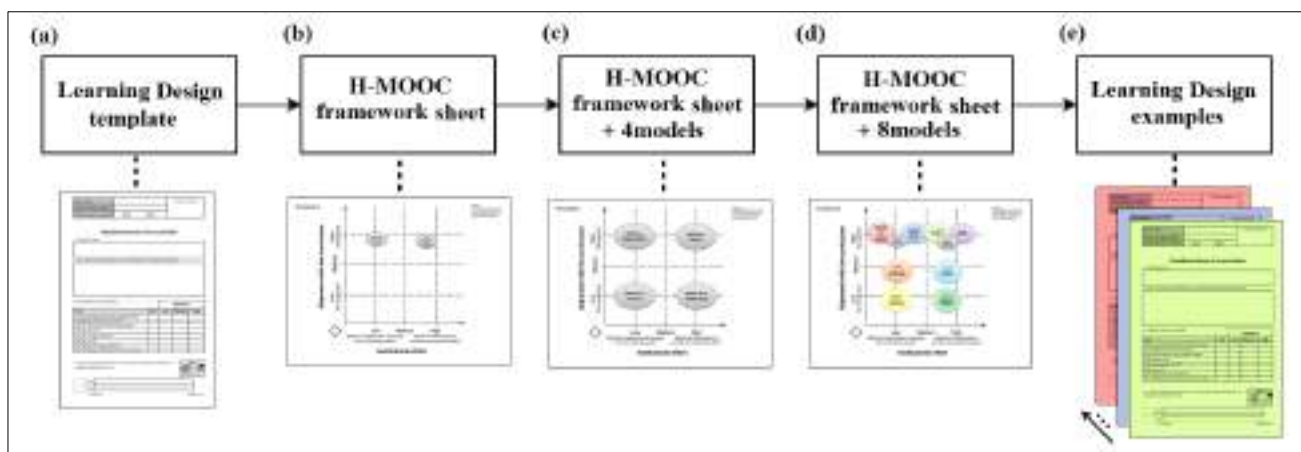


Figure 1: Five-steps workshop workflow and materials.

(a) Learning Design template. During the first step, participants had to think about their own blended learning design with MOOCs. The LD template, which was divided into six sections, was provided in order to help them during this process of getting the first idea for their learning designs. Participants had to fill out the first four sections of the template: (1) describing the context of the course; (2) specifying how the combination between the MOOC(s) and university course will be made; (3) evaluating the proposed design by indicating the relevance – low, medium, high, does not apply – of the following specific metrics: number of student credits; learning gains and student achievement (from doing the MOOC); online tutoring and f2f time; f2f teaching time; planning hybrid course development and use of university infrastructure and services; and (4) drawing a temporal diagram indicating the online and f2f teaching time. Each participant had to try to fill out at least one LD template with one idea. Afterwards, they had to share their designs within the workgroup and discard the designs that were very similar.

(b) H-MOOC framework sheet. In the second step, they had to place the resulting designs from the previous step in the H-MOOC framework sheet by drawing an identification number inside a circle for each LD. It is worth noting that they were not drawing directly onto the framework sheet but instead on a translucent sheet placed on top of that.

(c) H-MOOC framework sheet + four models. In this step, first of all, participants had to put the second sheet under the transparent one: the H-MOOC framework with the four hybrid models. Thus, after changing the sheet, they could see the positions of their designs in relation to the positions of the four models and check whether, in some cases, designs and models overlapped. After checking if they agreed with the model or models closest in the framework to each LD, they could adjust the LD positions to get closer to the desired model – drawing the ID number again inside a circle and indicating the change in position with an arrow.

(d) H-MOOC framework sheet + eight models. As before, it was time to switch to the third sheet while keeping the translucent sheet above. After the sheet change, they could see the positions of their designs in relation to the positions of the eight models and check whether, in some case, designs and models overlapped. A short description of the eight models was provided to participants to check whether they agreed with the results. After checking if they agreed with the model or models nearest to each LD, they could adjust the LD positions again in the framework to get closer to the desired model – drawing the ID number again and indicating the change in position.

(e) Learning design examples. Finally, real examples of the eight hybrid models were provided in order to provide more information about the applicability of the models. Participants were invited to consult the examples of the closest models to the positions of their LDs and adjust the characteristics of their design

by filling out the last two sections of the LD template and editing the other sections from the first step of the process.

3.3 Data collection and analysis

First, this study used an online questionnaire to gather the data from the participants throughout the workshop activity process. After completing each step of the workflow, participants had to answer some questions from the questionnaire. Additionally, the completed LD templates as well as the translucent sheets – with the participants' LDs and changes in position within the framework sheet – also provided useful data. Finally, five researchers took notes throughout the design process while they were observing the activity. In order to ensure that our findings and interpretations were accurate, this research uses triangulation of the data – both quantitative and qualitative - gathered from all four sources.

4. Results

Before discussing the specific results, it is necessary to note that each participant completed one LD template. However, after they shared their designs within the workgroup and discarded those which were very similar, the participants worked with, in the end, 20 LDs, on which the following results are based. Furthermore, the context of the results, where participants received support from three types of analytical instruments characterizing the learning design in progress – the H-MOOC framework; the models, either in groups of four, or eight; and real LD examples of the eight models – should be highlighted.

4.1 Providing design support from an holistic framework and models had an impact during the design process

Based on the questionnaire responses and the translucent sheets where all participants placed their initial designs in the H-MOOC framework depending on its two dimensions – the institutional effort to apply the initiative and the alignment with the curriculum – during step (b) of the workshop workflow, it can be stated that 11 participants out of 20 (55%) completed this step without reporting any issues, whereas nine of them (45%) had some problems during the process. Among the challenges that they encountered, it is worth noting their difficulties in understanding the x-axis, representing the institutional effort to apply the initiative, of the H-MOOC framework. Moreover, it was found that the y-axis, representing the alignment with the curriculum, was not relevant for some groups such as those, for example, in lifelong learning contexts.

Fig.2 is a visualization of the positions of all 20 LDs as well as their changes in position in the seven translucent sheets collected. In addition to the drawings – and in order to crosscheck the data related to the design locations – the questionnaire included specific questions in each step on whether they had changed the positions of their designs in the framework after consulting the models. As a result, in step (b) of Fig.2, it may be observed that the initial positions of the LDs, which were placed before the models had been revealed to the participants, in the H-MOOC framework were well distributed. However, after the 4 models were revealed and discussed during step (c), 18 out of 20 (90%) of the participants changed the position of their designs in the framework (see Fig.2 step (c)). Finally, after doing the same with the description of the 8 models, 15 out of 20 (75%) changed their positions from the previous step (see Fig.2 step (d)). It can be stated that, after this step, most of LDs were placed in the upper-right corner of the H-MOOC framework, were *Flipped Classroom* and *Local Digital Prelude* models were situated.

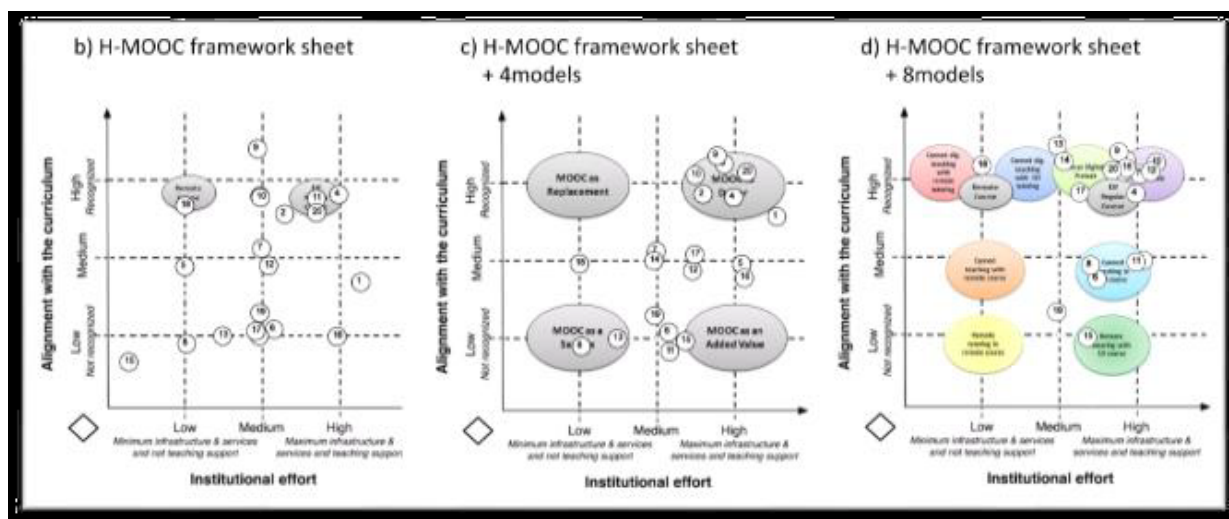


Figure 2: Participants' learning designs (LD) positions within the H-MOOC framework during the steps (b), (c) and (d) of the workshop workflow. Each LD has been represented by an identification number inside a circle.

The movements of participants' LDs in the templates during the steps (b, c, and d) of the workshop workflow can be interpreted as a process of rethinking, recognizing and repositioning their initial LDs 'ideas whereas they are taking into account the information provided by the H-MOOC framework and models. Aligned with this finding, after participants completed the step (d), they had to indicate in the questionnaire the level of utility of the models consulted during the design process (see Table 1). Most of participants agreed (40%) or strongly agreed (30%) that models had been useful help them in redesigning or being convinced with their LDs – with a resulting average of 3.85 points out of 5.

Table 1: Utility level of the models

Models have been useful help me in redesigning or being convinced with my LD		
Level of agreement	#	%
5. Strongly agree	6	30
4. Agree	8	40
3. Neither agree nor disagree	4	20
2. Disagree	1	5
1. Strongly disagree	1	5
Mean: 3.85 out of 5	n=20	100

4.2 Providing design support from LDs examples of the models had an impact on the final designs

Fig.3 shows the behaviour of the participants during all the steps of the workshop workflow – the results from the steps (a-d) have been described above. How it can be seen in the graph, after consulting the LD examples during the step (e) of the design process, four out of 20 (20%) participants changed their LD's positions in the H-MOOC framework sheet. Moreover, 13 out of 21 (62%) wrote modifications on their LD templates regarding their initial designs. They adjusted the characteristics of their design by filling out the last two sections of their LD template and editing the other sections from the first step of the process adding small changes, deciding between two models, changing the initial model, redefining metrics and so on.

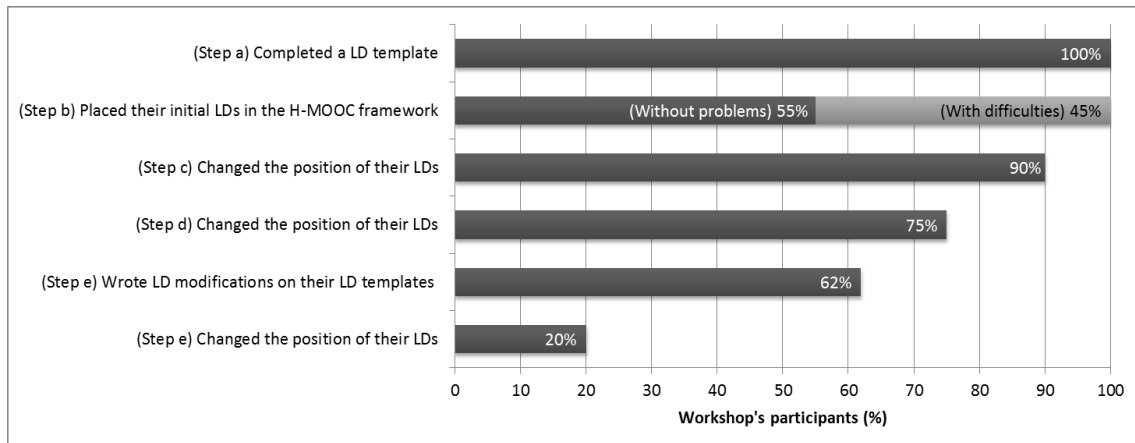


Figure 3: Participants' behaviours during the 5 steps of the workshop workflow.

In addition to this, it has been found significant differences (*t-test* for equality of means was performed with a two-tailed value of p being 0.027) in behaviour between different participants' social profile. The number of LD's movements on the sheets during the design process was higher in the case of university teachers. University staff – responsible for supporting the development of MOOCs – did 1.2 movements on average whereas university teachers change their LD's positions 1.86 times.

Returning to the analysis of the impact of the LD examples, once participants completed the step (e), they had to indicate in the questionnaire the level of utility of the LDs examples consulted during the design process (see Table 2). Most of participants agreed (30%) or strongly agreed (45%) that LDs examples had been useful help them in redesigning or being convinced with their LDs – with a resulting average of 4 points out of 5 – these are better results compared with the level of utility of the models. This result is supported by the LD movements done after the step (e) as well as the annotations in their LD templates mentioned before.

Table 2: Utility level of the LDs examples

LD examples have been useful help me in redesigning or being convinced with my LD		
Level of agreement	#	%
5. Strongly agree	9	45
4. Agree	6	30
3. Neither agree nor disagree	2	10
2. Disagree	2	10
1. Strongly disagree	1	5
Mean: 4 out of 5	$n=20$	100

Fig.4 presents the LD's positions regarding the models during the step (d) – where participants had known the eight models – and the step (e) – where real examples of the models had been provided. As it can be seen in the graph, after the step (d), 45% of the participants had their LD overlapping one model whereas 50% of them were hesitating between two models. Moreover, 5% had their LDs between more than two models. However, after participants consult the LD examples of the models, 75% of them had their LD overlapping a unique model and only 25% had their LD between two models. This result indicates that LD examples of the models had an impact in the final decision of choosing the model to use in their LD, supporting the above findings.

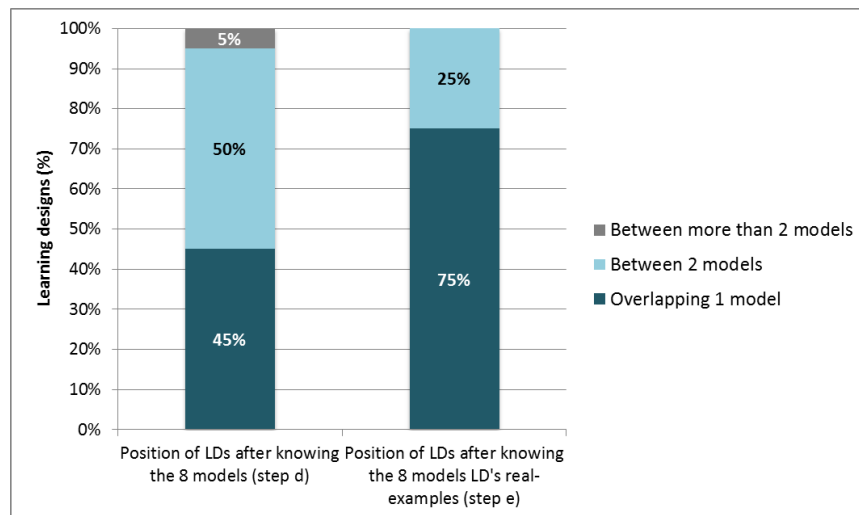


Figure 4: LD's positions regarding the models during the steps (d) and (e) of the workshop workflow.

The Table 3 shows the final models selected after consulting real examples of LDs. Flipped classroom (FC) and Local digital prelude (LDP) were the two models more selected by the participants – 25% of the participants selected the first one and 20% the second. Moreover, 20% of the participants end the workshop activity placing their LDs between these two models. At the end, it can be seen that 65% of participants selected one or both models – FC or LDP – after consulting the examples. The third model selected by more participants was Canned teaching in f2f course (20%), followed by Remote tutoring with f2f course (5%) and Remote tutoring in remote course (5%). Finally, one participant placed their LD between Canned digital teaching with remote tutoring and Canned digital teaching with f2f tutoring.

Table 3: Models selected after the step (e) of the workshop workflow

Models selected after the step (e)	Frequency	Percentage	Accumulated percentage
Flipped classroom (FC)	5	25	25
Local digital prelude (LDP)	4	20	45
Between FC and LDP	4	20	65
Canned teaching in f2f course	4	20	85
Remote tutoring with f2f course	1	5	90
Remote tutoring in remote course	1	5	95
Between Canned digital teaching with remote tutoring and Canned digital teaching with f2f tutoring	1	5	100
Total	20	100	

5. Discussion

Although this research is still in its early stages – it is a first iteration of an ongoing design-based research within a larger research project – results indicate that the five-step design workflow presented can be used as a basis for supporting teachers in the design for blended learning experiences using MOOCs. Providing three types of analytical instruments characterizing the learning design in progress (H-MOOC framework, models and real examples) can support the design process and help teachers in redesigning or being convinced of their initial LDs. The workflow introduces a process that goes from a broad – general framework – to specific – real examples of the models. This way of working is used by other disciplines that use design processes (Laurillard, 2008). If the process would had begun backwards, teachers would had to

consult all the models and examples from the beginning – without knowing the learning context – with the result of increased time consuming and less understanding of all the possibilities. The five-step workflow acts as a filter, by guiding teachers towards providing the most relevant information for them during the design process, at the same time that promotes design thinking.

In the first step of the process, all the participants completed an LD template to write the first sketch of their LD. During the second step of the workflow, the H-MOOC framework presented has provided to them a holistic context where teachers have placed their LDs. During this step, teachers were placing their LDs on the framework while at the same time they were reflecting about the objectives of their LDs regarding the two dimensions of the framework. Basically, the difficulties found in this step are related to definition of the two dimensions of the H-MOOC framework, as they address issues related to institutional concerns. Further research is necessary in order to find other dimensions of possible frameworks focused on teachers' interests as well as informal learning contexts.

During the third and fourth steps, participants were moving the positions of their LDs around the framework, whereas they knew the different models provided. The movements can be interpreted as a result of design thinking, process of reflection about their own designs while they are designing. In each step, teachers had to think if they agreed or not with the new information characterizing the ongoing designs – which it was changing in each step – and act in consequence – moving or not the positions of their designs. In line with this result, participants stated that models had help them to redesign or being convinced of their LDs. Supporting this finding, Laurillard (2008) suggests the use of models, arguing that “any theory of learning will necessarily generalize at some level, leaving to the teacher the task of interpreting the general for the specific case”. In addition to that, results indicate that the variations of blended learning with MOOCs emerging from the higher education context are the most known models: basically the flipped classroom and Local digital prelude. Despite this, highlight that seven out of eight models were considered at least by one participant - only the model Canned teaching with remote course was not finally selected. Moreover, is necessary to add that those who placed their LDs between two models could be a sign of hesitating but also a possible intention of wanting to combine both in one single LD – which presents a need for exploring new models.

In these steps, some behavioural differences have been found depending on the social profile of the participants. Teachers could be more motivated to participate in the workshop as they could apply the knowledge learned directly in their classes or in real blended learning experiences – as a result they did more movements of their designs showing this motivation. On the contrary, university staff may assist the workshop to get knowledge in order to help other teachers in their universities during the learning design process – so they had no classes to directly apply their blended LDs done during the workshop. As a consequence, they showed less motivation and did fewer movements of their LDs.

Finally, in the last step, it has been proved the usefulness of the LD examples of the models provided acting as a trigger for thinking about adjusting – writing modifications in their LD templates and selecting their ultimate models – their final LDs. Results indicate that teachers have been found more useful the LD examples than the models provided. Some authors have been reported similar findings, Bennett et al. (2004) states that “teachers seem to find specific examples of learning designs –those that retain information about the original context for the design– more valuable than generic designs”. Whereas Lockyer et al. (2013) interprets this statement suggesting that “teachers can use specific, detailed learning designs as examples and are able to adapt the ideas to their own context”. To sum up, models have provided more specific context of the shape of teachers' designs whereas considering the real LD examples have been decisive to them to define the final design and wrote the final ideas to the initial LD templates.

6. Conclusions

The preliminary study presented in this paper shows that the use of design elements characterizing the design in progress – including existing hybrid MOOC frameworks, models and examples – can support the process of learning design of blended learning scenarios with MOOCs contributing to expand the knowledge of this type of learning to teachers. Moreover, the five-step workflow presented can be the basis of an authoring tool to support the learning design process as well as promoting design thinking.

However, further research is necessary in order to provide different hybrid MOOC frameworks depending on the educational contexts and stakeholders as well as considering new variations of the FC approach. Also there is a need of identifying the most relevant design elements for different domains in order to provide standards required for evaluating the quality of blended courses (Antoanela, Mustea, Holotescu, & Herman, 2015). Further studies with more participants can provide more evidence of how the behaviours differ in varied types of participants with the aim to offer personalized support to each social profile group. Moreover, it is necessary to explore more documented case studies of blended learning designs with MOOCs (Rayyan et al., 2016), which can act as new shareable examples of LDs – in this line, more investigation is needed into how generic versions of LDs are abstracted from the contextualised exemplars (Bennett et al., 2004) - and some of them probably can become future models. On the other hand, connected research has been done in the area of connecting LDs examples with Learning Analytics (LA) of the real experiences (Michos & Hernández-Leo, 2016) to support re-design processes.

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Learning to Learn Online: A MOOC with a difference

Martha Cleveland-Innes

Athabasca University, Canada
martic@athabascau.ca

Nancy K Parker

Athabasca University, Canada
nancyp@athabascau.ca

Nathaniel Ostasewski

Athabasca University, Canada
nostasewski@athabascau.ca

Daniel Wilton

Athabasca University, Canada
dwilton@athabascau.ca

Abstract

This research identifies the relationship between Massive Open Online Course (MOOC) design and delivery and long-standing and well-researched principles of an Online Community of Inquiry. The emergence of MOOCs rekindled a commitment by universities to increase access to knowledge validated and created by academic researchers. Because the MOOC initiative emerged ahead of the normal rigorous evaluation that accompanies design and delivery in higher education, many questions remain unanswered. This research seeks to answer the questions: Will online and distance instructional design (ID) and delivery principles be applicable to MOOCs, given increased class-size, unpredictable, wide ranging academic backgrounds of learners, availability of open education resources, and varied purpose among learners? Which ID principles are relevant and what might be added in consideration of unique MOOC characteristics?

The MOOC studied for this research is entitled Learning to Learn Online, delivered in 2015 and revised and delivered again in 2016. This course is a public offering by Athabasca University, Canada's Open and Online University. Athabasca University is committed to offering affordable, high quality, inclusive education. Learning to Learn Online (LTLO) allows novice online learners to explore how online education differs from traditional classrooms while they develop personal strategies for online learning success, and beyond. The course reviews common misconceptions, frustrations, and fears about online learning and introduces techniques to help overcome learning obstacles.

This paper and presentation describes activities and experiences of a MOOC targeted at novice online learners in reference to principles of Presence from the Online Community of Inquiry framework.

Keywords: Community of Inquiry, Online Learners, Instructional Design, MOOCs

1. Introduction

Athabasca University in Canada has been providing open learning opportunities since the 1970's and it has been offering fully online programs for more than 25 years. Each year half a dozen of its undergraduate courses have more than 1,000 students enrolled, and another sixteen have between 500 and 1000 students. It is therefore not surprising that there would be some scepticism given to claims of disruptive innovation being attached to Massive Open Online Courses (MOOCs).

The potential for MOOCs to be “centres of innovation and exploration” for new pedagogical approaches and advancing understanding about effective learning environments (Kilgore & Lowenthal, 2015; Macleod, Haywood & Woodgate, 2015) remains largely untapped. Despite attention in the popular press and fulsome, if contradictory, predictions about the whole phenomenon, research on MOOCs is still relatively immature with initial reports lacking methodological or theoretical rigour (Gasevic, *et al.*, 2014).

Athabasca University's first official foray in offering an instructionally designed MOOC was the Learning to Learn Online (LTLO) offering on Instructure's Canvas Platform. This initiative reflects the confluence of a maturing research agenda and the core value of the University to remove barriers to access and success in university level studies. The interdisciplinary MOOC advisory group identified an outreach gap; in recent years digital divide appears to be less about access to technology and learning resources and more about the attitudes and skills it takes to access available opportunities.

This study presents the design choices, learner characteristics, and the resulting experiences in order to discuss instructional design principles which take into consideration unique characteristics of MOOCs. It places these observations in the wider contexts of the shifting terrains for post-secondary institutions in anticipation of high participation and significant demographic shifts.

2. MOOCs and the challenges facing higher education

After the initial experiments with connectivist (Siemens, 2005) or cMOOCs with their decentralized, network-based, and non-linear discursive structures, commercial platforms like Coursera and Udacity began to broadcast highly centralized, content focused, xMOOCs based on “behaviorist pedagogy” (Rodriguez, 2013, p. 71) typically focused around a set of short video-lectures followed by multiple-choice testing. Both approaches have been shown to fall short of ideal instructional design principles (Margaryan, Bianco & Littlejohn, 2014) and not well matched to commonly deployed quality frameworks for online courses (Lowenthal & Hodges, 2015).

The promise of vastly expanded access through scalable flexible delivery has also fallen flat in a number of ways. The completion rates (certificate earners/total registrants) have typically ranged from 2 to 10 percent and although those rates should be tempered by the intention of participants early drops and failing to engage are common features in many MOOCs (Reich, 2014). The reported patterns of participation in MOOCs show that most students already have tertiary education backgrounds (Macleod, Haywood & Woodgate, 2015; Reich, 2014) and a recent U.S. study confirmed that younger participants were likely to have a high social economic status (Hansen & Reich, 2015).

Although the media hype has diminished since the “Year of the MOOC” (Pappano, 2012) the courses being offered on various platforms continues to increase. According to Class Central (<https://www.class-central.com/report/moocs-2015-stats/>) over 35 million individuals enrolled in MOOCs in 2015. Globally providers in the United States seem to dominate (Coursera with 35%; edX with 18%; Canvas with 7%; and Udacity with 3%) but European providers are growing (Future Learn with 6%; Miriada X with 4%; and France

Universite Numerique with 3%). It is striking that participation in MOOCs is in step with the rapid expansion of participation in higher education world wide but may not, in fact, promote inclusivity. In stratified post-secondary systems where reputational markers for quality are closely associated with selectivity (Marginson, 2016), freely available materials are not likely to enhance the standing of online providers.

Structuring opportunities for informal learning and providing ways to bridge the gaps in skill acquisition helps shape some of the demand for new courses. MOOCs, whatever their iterations, seem to underscore earlier principles of adult learning: 1) adults can plan their own learning if they are provided reasons for specific things being taught; 2) offerings should include task oriented instruction to support experiential learning; 3) material should be relevant to the circumstance of different learners; 4) be problem-centred rather than content centred (Knowles, 1984). By choosing MOOCs over just reading books or blog posts, adult participants are selecting learning experiences and dedicating time in pursuit of relevant materials.

As the size of the traditional cohorts entering post-secondary institutions continue to shrink the importance of providing adaptable learning opportunities for adults is likely to increase. This necessarily assumes that learners will be taking more control over their experiences and that they will have higher levels of networked literacy and time management skills and institutions will be able to organize support for networked lifelong learning (Miyazoe & Anderson, 2013).

3. Design intentions

In keeping with Athabasca University's commitment to high quality open educational opportunities the primary design goals were to support learner choice based on individual levels of knowledge and computer experience. Learners were free to choose their learning path and could move through the LTLO course at the rates they wished and at whatever level of engagement they chose (Cleveland-Innis, Briton, Gismondi & Ives, 2014). The optional sections on Computer and Internet Basics were created to provide scaffolding for novice computer users as an effort to reduce barriers to entry. The heterogeneity of the potential student cohorts was accommodated by multi-modal design with various types of content representation and a variety of participation and assessment methods such as quizzes, practice and explore activities, and e-portfolio entries. The design and delivery models were also informed by the well-established Community of Inquiry (Col) framework (Garrison, Anderson, & Archer, 2000).

3.1 Applying the Col Framework

In the Col framework, Teaching Presence is associated with the elements of design and organization, facilitation, and direct instruction. It is the "design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001). Social Presence is signalled by affective expression, open communication, and group cohesion. Cognitive Presence, demonstrated through stages of triggering events, exploration, integration, and resolution, is the "extent to which learners are able to construct and confirm meaning through sustained reflections and discourse" (Garrison, Anderson, & Archer, 2001).

In keeping with research that demonstrates teaching presence as a key to success in online learning (Garrison & Cleveland-Innes, 2005; Akyol & Garrison, 2008) LTLO was designed with three levels of teaching presence as represented by instructors. First, the lead course instructor offered direct instruction and consistent presence through the use of a combination of pre-recorded video and pre-set text segments. This instructor acted as the figurehead of academic quality and offered continuity throughout the course. This

served as the element of direct instruction. The second layer of teaching presence guided participants through the design and organization of the course, reviewing direct instructions, and responding to common themes or discussion threads. This “Inspirer” role had both cognitive and social elements in the presentation style and content. The third level of teaching presence were “Facilitators” who responded to learner emails, discussion board posts, and activities. The aim of the facilitated forums was to help establish focused learner support networks within the MOOC. Instructor-student interaction and student-student interactions, on both social and academic topics, were encouraged throughout the course. In the first offering of LTLO the planned amount of instructor initiated activities from both the “Inspirer” and “Facilitators” was scaled back toward the end of the course to encourage students to increase interactions. In the second offering of LTLO the number of Facilitators was reduced from ten to four and techniques to encourage more student-to-student interactions were employed.

Cognitive presence was animated in the design of LTLO by offering progressive chunks of material with learners provided with opportunities to practice and apply each section of content. In keeping with the requirements for fostering an online community of inquiry (Vaughan, Cleveland-Innes, & Garrison, 2013) opportunities for engagement through *triggering events*, activities that offered *exploration* and *integration*, and assessment that encouraged the finalizing or *resolution* of the learning process, were part of the learning environment in this MOOC. In addition, learners were led through constructivist activities designed to facilitate strategy development for adapting to the online learning environment.

Video announcements, the use of multimedia, and forum discussions were intended to increase the social aspects of the course. Shared tasks and spaces provided room for social presence to evolve but the short duration of the course and the wide dispersion of the learner population naturally limited this aspect of the online learning experience. The heterogeneity of MOOC participants presents a significant challenge to the creation of group cohesion, which normally emerges through open communication and student-to-student interactions.

4. Learner Activities and Demographics

The number of individuals enrolling was higher for the first offering than the second. In both cases approximately half of those who expressed an interest actually followed through to sign into the course once it had opened (Table 1 --also see LTLO.ca). The first offering realized a greater proportion of students agreeing to participate in the research studies and complete the pre- and post- course surveys. Even among those completing the survey there were many who were intending to review the materials without actively participating in the course. There are two approaches for determining the number of active learners. The first is from the pre-course survey the second is from course based activity tracking for students having at least one discussion post. It is notable that in the second offering there were twice the number of students with posting on the discussion boards than who declared an intention to be active learners. The completion rate of both LTLO1 and 2, based on the proportion of students completing all the quizzes out of the number who actually signed into the course the completion rate was 16% but compared to the number of self-declared active learners the rate was 68.5% in 2015 and 83.5% in 2016.

LTLO had demographic patterns similar to other MOOCs. Approximately one third of the participants (33.9% in 2015 and 32.4% in 2016) indicated they held a Master’s degree or higher but one quarter had not completed college (25.1% in 2015 and 26.8% in 2016). The 2016 offering had a slightly higher proportion of male participants (34.9%) than the 2015 offering (32.1%) but these levels are not uncommon for open learning. It is also notable that less than 10% of the participants for both offerings were under the age of 25.

Table 1: LTLO Activity Summary

Activity	2015	2016
Enrolled on Canvas	1,825	1,262
Signed in	916	655
Completed Pre-Course Survey	487	289
Intended to be active learners (per survey)	216	127
At least one discussion posts	310	265
Passed all quizzes	148	106
Completed user experience survey	120	68

Although a majority of the participants were from North America there is still a wide geographic distribution (Table 2). The proportion of participants from Europe declined from 16.7% in 2015 to 12.6% in 2016. However, it should be noted that a Greek cohort of graduate students studying distance education participated in 2015. The proportion of students who reported English to be their first language increased from 64% in 2015 to 70% in 2016.

Table 2: Locations of LTLO Survey Respondents

Activity	2015		2016	
	#	%	#	%
Africa	25	5.1%	11	4.1%
Australia & South Pacific	10	2.1%	5	1.9%
Caribbean	4	0.8%	5	1.9%
Central America	1	0.2%	5	1.9%
East Asia	10	2.1%	5	1.9%
Eastern Europe	31	6.4%	13	4.8%
Middle East	13	2.7%	8	3.0%
North America	292	60.1%	169	62.6%
Russia	8	1.6%	2	0.7%
South America	18	3.7%	10	3.7%
South Asia	8	1.6%	7	2.6%
Southeast Asia	16	3.3%	9	3.3%
Western Europe	50	10.3%	21	7.8%
Total	486	100%	270	100%

From the survey information on the backgrounds of the participants it appears while the target audience was novice online learners, first-time online-learners were in the minority. Only 30% of the pre-course survey respondents in 2015, and 25% in 2016, indicated that they had not taken any previous online courses. However, the learner role adjustments required to become a competent online learner takes more than just a few online experiences (Cleveland-Innes, Garrison, & Kinsel, 2009). Those never having tried to study online may be reluctant to try to learn about online learning via the internet. It is more likely that the course also attracted those who have tried and failed at online learning.

5. Learner Experiences

The post-course user experience survey gathered qualitative data on which activities in the course were the most helpful, suggestions for improvements, and space for additional observations. The comments from

survey were analyzed and grouped by themes and reviewed by the design team. Six months after the first delivery of the course five of the 2015 facilitators and eleven of the students were interviewed to gather retrospective views. These semi-structured interviews were transcribed and coded for emergent themes.

The facilitators observed role adjustments among the participants:

Facilitator Eight: The most popular activities were the kinds of things that allowed people a tool to reflect about themselves as learners. People love learning about themselves and, often, can be pleasantly engaged by discovering something about themselves that surprises them.

Facilitator One: People in the forums seemed to be grappling with the ideas presented to them about themselves as learners in this space.

Facilitator Four: I truly believe that almost everyone started off with some degree of fear. You know, fear of the unknown, fear of making a typing mistake, fear of feeling dumb, fear of other people judging them, fear of success, fear of not being successful, and developing, getting confidence to take that first step and to try, that's really important, that's like overcoming this mountain.

These observations were confirmed with the feedback from student surveys and the semi-structured interviews. In responding to a question about the opportunities for peer-to-peer learning one participant observed:

It was my own personal challenge to myself to get out, to publish something online. Normally I won't because I don't want to be in that digital world. Like that, I forget what it is called, in where you're exposing yourself in a public forum, that privacy thing. I just don't like it but I am starting to see the value in it. That you can really learn by sharing a lot of ideas and I can't just take, I have to give back too.

Another participant indicated that although he had attempted courses on a variety of other platforms he had never finished, was always late and did not participate. More powerfully, an experienced online learner reported:

This course has restored my faith in myself and I am motivated to finish my degree. This course was advertised at the exact same time as I thought I had lost hope in studying as it has taken me almost nine years of continuous part time education ... to try and get my degree. There have been insurmountable barriers and I am happy to report that I have a smile again.

The importance of the different streams of teaching presence was confirmed with both the post-course and retrospective follow-ups. The lead instructor videos were cited as one of the most helpful activities in providing context. The videos "gave it a personal touch, just because we are not in a classroom, so it made me connect with a face" and they made the course much more "welcoming". These materials appear to have met the design intention of offering aspects of both teaching and social presence to the course.

Cognitive presence was also confirmed with post-course acknowledgements of the helpfulness of the "self-test" activities and quizzes helping an individual to monitor "my understanding of the topics." For one participant with an education background it was the first time they were able to test some of the technologies and where they were "learning something with an application, a real application."

Another noted that they “went in with no expectations and came out with really seeing how technology can be used in different ways.” Experiential learning was another part of the design validated in the participant comments; “I loved your course because you gave us actual examples that we could play with.”

A crucial difference in trying to provide a more humanized MOOC was the addition of facilitators to promote all types of presence through the discussion forums. From the interaction patterns and from the observations of the facilitators this had mixed results:

Facilitator Seven: ...generally the students were connecting with the facilitators rather than with each other so the collaboration wasn't there as much as I had expected. But sometimes people think that an online course is just an isolated thing, maybe even between themselves and the computer they forget that there are actual live people there. And it's part of the learning. It is the acceptance of the technology that it's a way of learning like a classroom, it's just a virtual place where we can still speak to each other and we can still interact and we can still work collaboratively and learn from each other.

The strategy of gradually withdrawing the facilitator's interventions toward the later stages of the course did not encourage more student-to-student connections. Some of the students greatly valued the discussion forums:

I like the [facilitators] because it makes you feel real...like there's people at the other end. And I really like it when people post the question and the answer or that every once in a while they'll comment on somebody else's comment. So you know they're really following the course.

In the retrospective view of one of the 2015 participants underscored this in a different way:

the facilitators are only beneficial if their presence is really, really there. So if there's a discussion going on and they've only posted once and there's like 30 learners who have posted, then you kind of feel like they're not really there. And it's hard, I know how hard it is to check all the post[s] and reply and what not, but I think as a learner, it makes you feel that what you're posting on there is important and validated.

The 2016 offering had fewer facilitators and different strategies were deployed to encourage more student-to-student interaction. Some students did find the forums helpful, especially “what other people posted to the boards on certain topics (i.e. how to stay motivated).” Others found them less helpful:

I tend not to like the discussion posts – just found it too time-consuming to read other people's comments. This is where face-to-face works better for me. I like to engage with others, but I don't seem to like reading posts!

It is interesting that the explicit encouragement for students to participate was cited by one participant as a helpful activity: “I almost felt guilty if I didn't participate, and the times that I did, it challenged me to reflect on what I was reading/learning.” It was suggested that both the instructors and the facilitators could present, with their roles identified, in the discussion. One student regretted not reaching out during the class knowing they would have enjoyed the experience of “getting to know the instructor”.

The feedback provided by the participants indicates that teaching presence and cognitive presence were realized in LTLO and there is some evidence of social presence in the responses as students described some of their role adjustments. Further analysis of the patterns of interaction and the posts is still needed.

6. Conclusion

The affordances of open online learning means that learner contexts and expectations are likely to be varied and dynamic. It also means that design features cannot be held static over time if quality is to be maintained. Indeed, one of the hallmarks for quality in both online and campus based delivery is regular updates, informed by assessment results, student evaluations, and instructor reflections. The combined pressures of wide participation and a shrinking 18 to 24 year old cohorts means that post-secondary institutions need to find ways to support increasingly diverse student populations.

Widening participation requires much more attention to the design qualities of courses. The development team at Athabasca is reflecting on the experiences from the first offerings and suggestions from the facilitators and participants. The multi-media rich environment presented a barrier to some of the international participants with lower bandwidth access. The suggestion for downloadable packages is not fiscally viable if there are no student fees assessed but alternative resources can be explored. There were also some concerns with the accessibility of materials and the need for more captioning. Opportunities to provide some support in languages other than English, and ways to better support cross cultural interactions also need to be explored. Having a significant number of professional educators participating in the MOOC along with much less experienced students presents some challenges but also provides an opportunity to encourage more student involvement in supporting the teaching presence to improve connections and ultimately the likelihood of participants completing the course.

The participant reactions to the LTLO MOOC confirmed that there is a need to pay attention to the skills students need to develop to become successful online learners. It also underscored that prior levels of education and even previous course attempts may not have helped students to develop these essential skills.

Instructional design focuses on learner experiences and is necessarily informed by the characteristics of expected participants as well as the content. The most challenging element of ID for MOOCs is the heterogeneity of the potential student cohorts. The variety in student aims, locations, and prior and current educational experiences needs explicit attention. The implications of the global reach of MOOC offerings has been noted to be both a challenge and an untapped opportunity by other researchers (Macleod, Haywood & Woodgate, 2015). The need to confront North American centric approaches has been acknowledged but not explicitly addressed, as Olds observed in 2012.

Surely, with open-access courses that are designed to reach across global space there should be more visible information that flags how appropriate or relevant the content might be to students outside of the nations the course professor(s) are situated in. Of course this is not a simple thing to do but one way or another those working with MOOCs need to grapple with the myriad of challenges associated with teaching students from contexts very different than the ones their regular students are embedded in.

Expanding the platforms available in different regions, and the languages they can function in is an important step to support both reach and relevance for learners.

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How to develop a pedagogic and workable MOOC

Päivi Kananen

The Open University of the University of Jyväskylä, Finland
paivi.kananen@jyu.fi

Liisa Kytölä

The Open University of the University of Jyväskylä, Finland
liisa.kytola@jyu.fi

How to develop a pedagogic and workable MOOC

Finnish education system has been successful at PISA –research (The Programme for International Student Assessment) for the last sixteen years. Our MOOC will describe the success factors behind the Finnish Education. The Open University of University of Jyväskylä in Finland is developing a MOOC in cooperation with the Faculty of Education, Finnish Institute for Educational Research and with JAMK University of Applied Sciences. The Open University coordinates the development process, including the pedagogical solutions, and is in charge of the whole production process. The purpose of this paper is to present the process of creating MOOC. The aim of the MOOC is to offer a new possibility for anyone to study academic education. MOOC will be used at the continuing education, with the exchange students and as a part of international training programmes. We can also offer higher education for minorities through this MOOC. The Open University has a long experience in online education and training, but this MOOC, launched in October 2016, will be our first one.

Keywords: MOOC, Finnish Education, PISA, Production Process, Online Pedagogy, Online Course, Open Education, VLE

1. Introduction

In this article we will describe the process of creating a MOOC. The first MOOC at the University of Jyväskylä will be opened on October 17th, 2016. The development and building of our MOOC is still going on. We explain the Finnish education system briefly because the understanding of the Finnish education system is an important part of our MOOC. We tell about the cooperation between the MOOC partners and explain how the collaboration in the MOOC process started. Then we concentrate on the production of the MOOC: the curriculum process is explained and the selection of the MOOC platform is introduced. We also tell about the planning of the content and discuss its production briefly. The Open University of the University of Jyväskylä has been working in the field of online education and training the last twenty years. For us it is important that pedagogy guides everything we do. We ponder the use of online pedagogy in MOOCs and discuss our possible target groups for these MOOC modules. In the end of the article we take a glance to the future and think what will the role of open and online education be in the future in Finland.

2. Background of the regional cooperation

2.1 Finnish higher education system

The Finnish higher education system consists of two complementary sectors: universities of applied sciences (UAS) and universities. The sectors have different objectives. The mission of universities is to conduct scientific research and provide instruction and postgraduate education based on it. Universities of applied sciences train professionals in response to labour market needs and conduct R&D&I (Research, Development

and Innovation) which supports instruction and promotes regional development in particular. Universities of applied sciences are multi-field regional institutions focusing on working life contacts and on regional development [1].

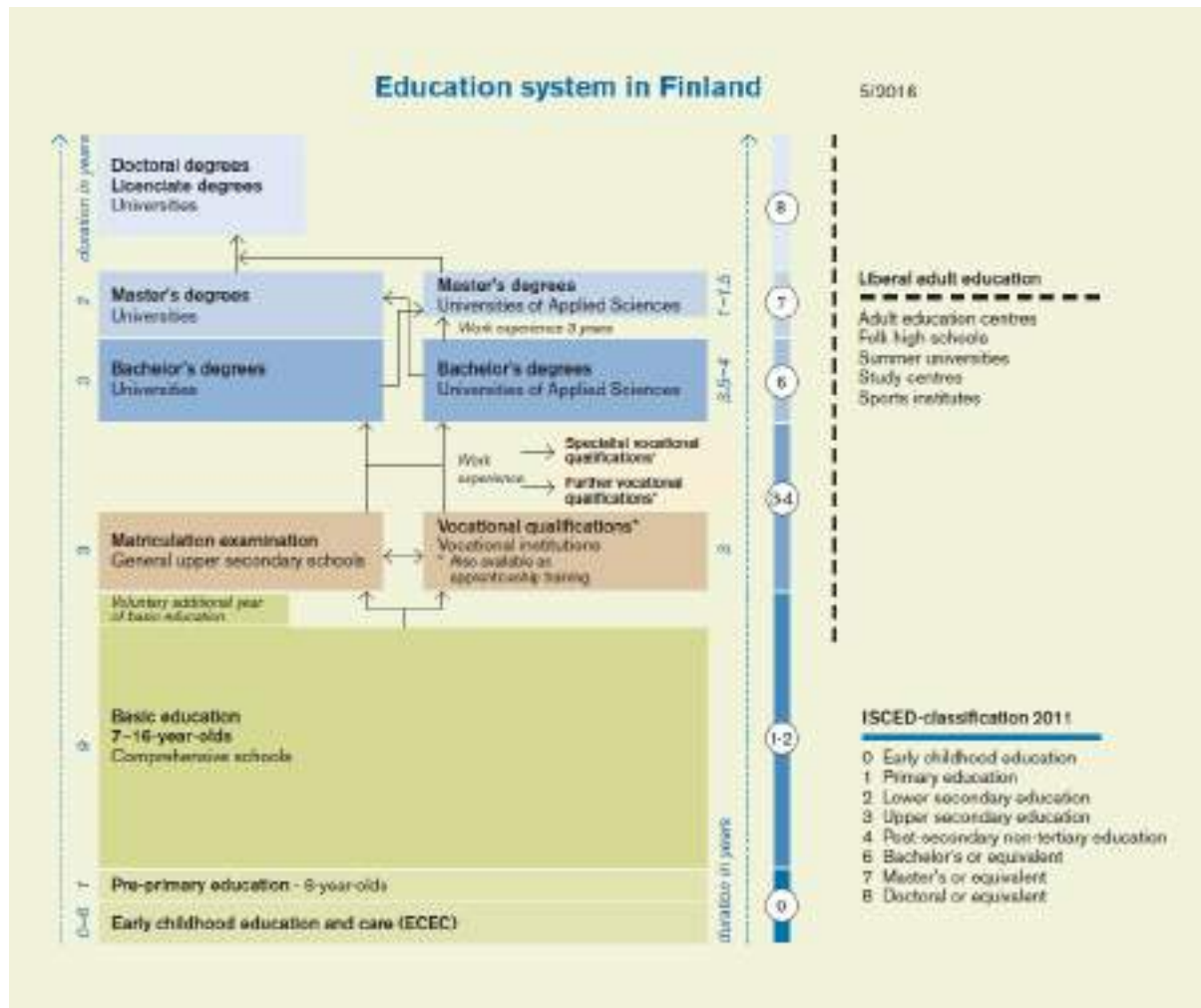


Figure 1. The Finnish education system. Ministry of Education and Culture.

2.2 Cooperation in Ruusupuisto building

The University of Jyväskylä is Finland's leading expert in teacher education and adult education, as well as a major exporter of education. The Rector of the University of Jyväskylä wanted to strengthen this center of expertise further and decided to build a new building where experts on this field could be brought together in a new way.

In the autumn of 2015 the Open University, the Faculty of Education and the Finnish Institute for Educational Research moved in to a new building called Ruusupuisto (Rose Garden). The Open University of the University of Jyväskylä is an independent institute that operates in cooperation with the University's faculties and other units. Open University is specialized in the methodology of adult education and distance learning. Web-based learning environments play a significant role in most of the studies at the Open University. The Faculty of Education offers training in the following fields: early childhood education, primary school teaching, subject teaching, school/study counselling, sign language teaching, education and adult education, special education and educational leadership. The Finnish Institute for Educational Research (FIER) is a multidisciplinary Centre for educational research, assessment, and development. All the three partners attended to the planning

process of the building. Aim of the planning process was to create a modern and innovative learning environment which enables everyday cooperation.

At present the directors of the three units meet on a regular basis and discuss how to develop common research and joint teaching in Ruusupuisto building. The cooperation has been successful. Nowadays we use the term Ruusupuisto Concept when we talk about common cooperation. Rector of the University of Jyväskylä has appointed a steering group to enhance the Ruusupuisto Concept. The purpose of the steering group is to promote the interaction between the operators of Ruusupuisto and external parties [2]. Many new projects have already been created and implemented. One of the new openings is Ruusupuisto MOOC which we currently develop together with JAMK University of Applied Sciences.

2.3 The start of MOOC collaboration

The MOOC process started in the autumn of 2015 in a brainstorming session between the Open University Director, the Dean of the Faculty of Education and the Director of the Finnish Institute for Educational Research. The directors wanted to develop and test new modes of teaching and learning in online and virtual learning environments and in open and distance education in particular. University of Jyväskylä has been following the development of MOOCs the last few years. Rector, Vice-Rector and Director of Strategic Planning and Development of the University of Jyväskylä supported the idea and thought that it would be a perfect time to develop our own MOOC in the field of Finnish education. Learning, teaching and information technology are our core fields and pedagogy and digitalization in increasingly multimodal learning environments are our emerging fields in the future [3].

Directors of the three units decided that the Open University would be the home for MOOC because the Open University had the necessary infrastructure already available. For that reason, the production team was established to the Open University, too. Directors also decided that MOOC collaboration had to be regional, instead of being located only within the University of Jyväskylä. The JAMK University of Applied Sciences was a natural partner in this MOOC project because JAMK's Teacher Education College had already produced some MOOCs earlier. JAMK University of Applied Sciences provides higher education based on the requirements of working life. Directors of the Open University and The Finnish Institute for Educational Research and the Dean of the Faculty of Education wanted to support the regional development by working together with JAMK University of Applied Sciences.

3. Production of the MOOC

3.1 The designing of the MOOC Curriculum

The University of Jyväskylä wanted to launch its first international open education product and MOOC was a suitable way to reach this goal. Contents of the MOOC, the Success Factors Behind the Finnish Education, were selected because Finnish education has been in the centre of attention since PISA started. Small group of people analysed what should be presented in our MOOC. The analysis was based on the research of the PISA success [4]. Curriculum of the MOOC was based on these analysis results. The planning group decided that the MOOC would have five different topics.

All the studies offered at the Open University are accepted by the Faculty Councils. For that reason, the official Curriculum was essential part of the planning process. The Curriculum was planned together by the Faculty of Education and the Open University. One part of the Curriculum was planned at the JAMK University of Applied Sciences.

For the Curriculum, the Faculty of Education named the persons in charge for every study module. All the study modules at the Curriculum were planned so that university teachers from the Open University and the Faculty members work together. The university teachers from the Open University were selected based on their online skills and experience in the VLE (Virtual Learning Environment). In the beginning of the MOOC project there was prejudice and uncertainty towards the MOOCs purpose. The staff members were questioning why they should build a MOOC. The hectic timetable also caused uncertainty and suspiciousness. Nonetheless the planning time of the Curriculum was used effectively. Cooperation was fluent. The Curriculum process started in October 2015 and the Faculty Council of the Faculty of Education accepted the Curriculum at the end of April 2016.

3.2 The Curriculum of the MOOC

The focus of the MOOC will be on introducing the success factors behind the Finnish education. Equity in education, trust and responsibility in Finnish education system, highly educated teaching staff and life-long learning from early childhood education to adult education are important factors behind the Finnish education [\[5\]](#).

The secrets behind the Finnish Education start from the childhood. That's why one part of the MOOC will present Early Childhood Education in Finland: What, Where and How? Learning outcomes of this module familiarize students into Finnish early childhood education system and its main principles and values. The students learn different levels of early childhood education and care (ECEC) curriculum. They will also learn the meaning of play, the principles of child-centered pedagogy and the importance of teamwork and learning environment in the Finnish early childhood education.

One important part of our MOOC will be the success story of Finnish basic education. In this module students will learn operational principles and structures of the Finnish Education System. They will also understand the importance of Finnish teacher education and the role of the teacher [\[6\]](#). Finnish teachers are autonomous reflective practitioners. There is a high confidence in teachers and principals in Finland. Finnish society is based on a culture of diversity, trust, and respect [\[7\]](#).

Educational Support and Guidance Services in Finland MOOC will introduce Finnish legislation on support and guidance. It will present best practices in special education and guidance and counselling in Finland. It will also familiarize students with Finnish special teacher and guidance education [\[8\]](#) [\[9\]](#).

The First MOOC which we will release is about Educational Leadership. It will describe the status and function of education policy in Finnish society. Students will get to know the importance of educational leadership in Finnish education system. They will also learn what kind of education educational leaders must have and they will familiarize themselves with the tasks of educational leaders in Finland [\[10\]](#).

One MOOC will describe the Vocational Education and Training (VET). In this MOOC students will familiarize themselves with the Finnish upper secondary education and training system and various pathways for the students. Furthermore, recognition of competences and prior learning, personalized study paths and learning and assessment of vocational knowledge and skills are described [\[11\]](#).

Director of the Finnish Institute for Educational Research, Professor Jouni Välijärvi has done the research in the secrets behind the Finnish Education. He says that it is important that trust in education is profoundly in society. Teachers are appreciated professionals and the young apply eagerly for departments of teacher education in different Universities. In Finland we can select the best candidates for teacher training programmes. The public school tradition is strong in Finland. There are only few private schools available in the country, but they are mainly specialized in something (Montessori and Steiner schools, Christian school

etc.) and they don't function like companies. The school reforms are not political issues in Finland. They are led by experts who are specialized in education. All the children have equal opportunities for learning in Finland. It does not matter where a family lives, because the schools are equally good all over the country. The school works together with the health and social services. The school meals, health care and physical examinations, books and other school materials are free of charge in Finland [\[12\]](#). Many of the above-mentioned topics concern also vocational education and training.

3.3 Selection of the online platform

The important part of the MOOC production process was the selection of the MOOC platform. This was a complicated matter because the decision had to be made at the University level. In Finland the university level decisions and processes are always carefully prepared. That meant a long waiting time for our MOOC process. To help the selection process, the Open University staff members benchmarked the available platforms and they also discussed the choices with some other Universities in Finland, for example with University of Helsinki.

After the careful selection process, it was clear that there were two suitable MOOC platforms for our use. The Open University arranged presentations for all the university teachers who would be using the platforms. After the presentations teachers were asked to tell their opinions about the presented online platforms. Our production team also researched how both platforms were used elsewhere. We weighed up the pros and cons of the platforms. The final decision was made by the IT Services of the University of Jyväskylä. The process took quite a long time. One important factor which affected the selection of the MOOC platform was the possibility to use the Learning Analytics. The University of Jyväskylä selected Blackboard's solution Moodlerooms for MOOC platform. The collaboration agreement was signed at the end of May 2016.

3.4 Planning and production of the content

Before we could proceed into planning and production of the content, it was clear that the IT Services of the University of Jyväskylä had to train their staff on how to use the new Moodlerooms platform. The training was offered by Blackboard in June and July 2016. IT staff members trained the university teachers at the end of the August and the training is still continuing until the end of the year.

The training on how to make a script for MOOC was offered for all the MOOC developers in September. The script for recordings is under construction. The university teachers are building the online courses during this autumn and in the beginning of the year 2017.

The Lawyer of the University of Jyväskylä is developing a new copyright agreement for MOOCs. It is already agreed on that we will not pay any fees for the experts in the MOOC recordings. All the materials of the MOOCs will be available for anyone to use.

4. Pedagogic and workable MOOC

4.1 Pedagogy guides the planning process

The Open University has a long tradition in online teaching and learning. For us it is important that pedagogy leads the way when we are planning and building the online courses. We are aware that the pedagogy in MOOCs is not exactly the same than in traditional online courses [\[13\]](#). We want to test a new way of offering open education for everyone all over the world. The teacher's role will be different in MOOCs, being more counselling than teaching. For university teachers it is not always easy to give up the "traditional" online teaching methods where teacher supports the students' learning process all the time during the online

course. In MOOC teachers should accept that they can't support the students the same way as usual. In the MOOCs the assignments should be self-directed, but the elements of peer support and peer-assessment have a great value. The assignments should be motivating and inspiring. This means that university teachers have to plan their MOOC courses differently but still keep in mind the importance of pedagogy.

Platform's possibilities should be used widely and functionally. It is important that course modules differ but the learning process should be continuous. The purpose and the target of the course should be kept in mind all the time. The MOOC needs a clear and consistent production script. Because MOOC is a kind of a glimpse into the university studies, it is important that the course modules are so captivating that students would like to continue their studies. Some tools for achieving this purpose are gamification and brief, clear and concise video recordings.

During this pilot project we have the same amount of resources available on online teaching as usual, but of course there is some flexibility on the working hours. There are a few ways how we can minimize our efforts. We will use clear instructions and icons on every module. This way we will make sure that students know what to do, when and why.

4.2 The target group: to whom are we offering our MOOC?

At the Open University we are used to offering education to different kinds of students because we don't have any entry requirements for our studies. Our study options are flexible and suitable for different kinds of learners. Accessible education is a core principle at the University of Jyväskylä. Our MOOC is targeted to anyone who is interested in Finnish Education [\[14\]](#). Exchange students and international visitors are an important target group for our MOOC. There is also a growing heterogenic student group which consists of immigrants and refugees. Nowadays it is an important social issue to offer possibilities of study for refugees also at university level. The main problem is that at the moment there are few suitable courses available in our University. Language is one of the primary problems with our studies which are mostly offered in Finnish. To respond to this request we decided to build our MOOC so that the teaching language is English. Students can choose whether they wish to study on their own or if they wish to earn credits out of the MOOC. If they choose the latter, they have to register to the Open University study modules.

5. Conclusion

The formal education is changing in the future. We need to develop new openings and new educational products to be available in Finland. The international cooperation is highly appreciated when we develop and create new educational openings. The Vision 2030 of the University of Jyväskylä says that the University will be one of the world's leading universities in the fields of learning and teaching [\[15\]](#). For that reason, internationalization is in the centre of our development.

It is important that we think what the University's mission is in the future. The crucial question is whether Universities are able to process knowledge better than the other institutions and companies. Nowadays there is this absorbing discussion going on robotics. It will be interesting to follow how artificial intelligence and robotics will change educational sector globally. Learning analytics and robotics are good tools for online education and especially MOOCs. We should take care that teachers are needed also in the future and robotics will be used wisely.

There is national concern whether Finnish schools use information technology (ICT) sufficiently in all the subjects. In our new National Core Curriculum for Basic Education information technology is widely used in every school grade. Online teaching and education is a workable method but sometimes it is used to save

teaching expenses. If students are left alone in online studies to study by themselves, it is not a suitable method for all. Pedagogical solutions and teachers' online presence are important when online education is considered.

The teachers' continuing education is a critical question in Finland. Many teachers educate themselves but we need an extensive national continuing education programme. Ministry of Education and Culture and Finnish National Board of Education have started the Teacher Education forum to renew the teacher education and the teacher continuing education. There is a proposal for action that MOOCs and online courses would be used in teachers' continuing education [16]. There is a working group which is creating a new vision for the future of the Finnish Education. The work will be ready in the autumn of 2017.

MOOCs will be a recommended way to offer trainings for different kinds of students. One problem is that at the moment Finnish MOOCs are invisible and unknown at the European level. We would like to get more visibility for our online courses and MOOCs. For that reason, it is important that Finnish Higher Education institutions network with European MOOC producers.

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Online Education Resources as supports for blended degree learning and flexible continued education in University College Cork

Patrick Kiely

Office of the Vice-President for Teaching and Learning, University College Cork, Ireland
Patrick.Kiely@ucc.ie

Darrelle Keegan

Disability Support Service, University College Cork, Ireland
D.keegan@ucc.ie

Abstract

In 2012, a combination of academic, technical and support staff formed a project team which, with the support of senior University College Cork management, developed an Open Educational Resource for UCC students called RED – Resources for Education (<http://www.ucc.ie/en/red/>). RED was developed on the core principles of Creative Commons licensing (OER), accessibility, universal design for learning and responsive design. In the last four years the project team which has included representatives from UCC Students' Union, Teaching and Learning, Disability Support Service, UCC Library and individual academic schools has served as custodians to the RED mission informed by these four principles.

This paper will outline how the project team have used staff and student feedback together with usage analytics to develop and supplement the resource from 2012-2016. These iterations took RED from a text based resource hosted on a Joomla CMS platform to a more eclectic selection of multimedia resources developed for the proprietary TerminalFour CMS used by UCC.

As UCC has committed in a thoroughgoing fashion to the design, development and delivery of online and blended learning postgraduate degrees and CPD courses, RED has been adopted as the de facto support tool for those students seeking information which would typically have been available from on-site services at face to face sessions – academic writing skills, financial planning, guides to critical thinking, technical skills etc.

Finally, this paper will outline the planned developments for the 2016-17 academic year and the research and analytics that has underpinned these initiatives.

Keywords: Open Education Resource, Study skills, Universal design, Responsive design, Collaboration, Blended Learning, Higher Education

1. Introduction

University College Cork has a rich history with open and accessible research. The Corpus of Electronic Texts (CELT) <http://www.ucc.ie/celt/> was a standard bearer in the use of text encoding and making historical documents available to all online. Likewise CORA: the Cork Open Research Archive has championed openly licensed and publicly available research output. In 2012, a combination of academic, technical and support staff formed a project team which, with the support of senior University College Cork management (Vice-President for Teaching and Learning Prof Grace Neville, Head of Disability Support Service Ms Mary O'Grady,

Director of Ionad Bairre the Teaching and Learning Centre, Dr. Marian McCarthy) , developed an Open Educational Resource for UCC students called RED – Resources for Education (<http://www.ucc.ie/en/red/>). There were both staff focused and student based rationales for the creations of RED.

2. The origins of RED –www.ucc.ie/en/red

From the staff perspective the delivery of academic and student supports was fragmented and led to much duplication of effort. The students lacked a single place to go to receive the academic and holistic supports they required - the much vaunted 'one stop shop'. The RED project team viewed this an opportunity to embed good practice in content creation in UCC. To this end, RED was developed on the core principles of Creative Commons licensing (OER), accessibility, universal design for learning and responsive design. In the last four years the project team which has included representatives from UCC Students' Union, Teaching and Learning, Disability Support Service, UCC Library and individual academic schools has served as custodians to the RED mission informed by these four principles.

RED has undergone many iterations with a variety of topics and formats in the past four years. This paper outlines how the project team have used staff and student feedback together with usage analytics to develop and supplement the resource from 2012-2016. These iterations took RED from a text based resource hosted on a Joomla CMS platform to a more eclectic selection of multimedia resources developed for the proprietary TerminalFour CMS used by UCC. RED did not escape the decline the staff numbers and funding that befell Irish higher education due to Ireland's economic difficulties from 2011-2016. In order to maximise the return on investment, data analytics were used as a lodestar for additional content development.

3. The process of change

From 2012-13, RED solicited qualitative student feedback via open text feedback forms and gathered user data using the basic page hit stats available from the Joomla Content Management System and the more detailed data available via Google Analytics. The six original sections of RED were predominantly text based and were: 1) Reading, Note-making and referencing, 2) Critical Thinking, 3) Writing and Plagiarism, 4) Exams and assessment, 5) ICT skills and 6) Health, Welfare and Additional information. Our attempts and promptings to receive qualitative feedback via a Google Forms survey were largely unsuccessful. In Year 1, the few forms submitted addressed very specific errors such as the occasional typo and did not give us much insight as to the future development of the resource. We did however use the number of page views as an indicator of topic popularity and student interest. On that basis it was apparent that the areas of main interest were Writing and Plagiarism, Critical Thinking, Reading, Note-making and Referencing. This prompted us to redouble our efforts in these areas while also interrogating why content in what we considered to be pertinent sections such as Exams and Assessment yielded fewer hits. Numbers for the first year were steady but not spectacular with 10,377 pageviews from 2, 736 unique users from December 2012 to August 2013. Given the cyclical nature of student enrolments usage jumped at exam and mid- semester assessment time and fell sharply during the summer.

The 2013-14 Academic Year presented significant challenges to the RED team with team members This prompted a rationalisation of our 'digital estate'. Platforms which were not yielding a return on our time investment were jettisoned - Google Plus, Apple iBooks and Blackboard Learn or placed in a 'freezer' - Twitter. Despite our curtailed efforts we did engage in additional marketing of the RED through poster runs and email campaigns. Our presentation of RED at the Association of Higher Education Access and Disability yielded very positive feedback. Despite the precipitous decline in our active collaborators on the project, the

numbers visiting the RED website remained steady with 4607 unique users and 12,017 pageviews from 1 August 2013- 31 July 2014.

4. Collaboration

4.1 Student Counselling and Development

In 2014 RED was moved UCC's official content management system - TerminalFour. While this was a more restrictive format that necessitated a redesign, it proved to be successful as the page numbers almost doubled. This move also coincided with a move to a less text heavy means of presentation with a focus on immediately accessible information at point of need. The subsections of RED were also updated to include: Getting Started, Tech Tips, Reading and Note-making, Critical Thinking, Writing and Referencing and Exams and Assessment. During the 2014-15 academic year there was strong anecdotal evidence suggesting that students were struggling with preparing and giving presentations. This was understandably the cause of much anxiety. The RED team approached Student Counselling and Development who agreed that this was a growing issue within the University. They had contracted a member of their staff to give workshops on presentations but with differing timetables, increased workloads, and more frequent exams meant many students were unable to attend. Marian Bourke from Student Counselling and Development was approached and this led to the production of a video on giving presentations entitled 'Speak Confidently'. In 2014-2015, 8,208 individual users visited RED, viewing 20,763 pages of which 81.1% were classified in Google Analytics as new users.

4.2 First Year Experience Co-Ordinator

In addition to this, the section on Getting Started was not garnering huge pageviews, largely because the included information was basic and generic. After a discussion with the First Year Experience Coordinator, the "Getting Started" section was fleshed out to specifically address the needs of first year students coming into UCC. This included information including embedded Google Maps of the locations of buildings, a list of all available student services and downloadable resources such as a blank timetable. A walkthrough resource on the UCC Book of Modules was also created showing students detailed information on each of their academic modules such as how many credits (ECTS) the module was, the mode of assessment and who their lecturer was. It provided a plain English guide and was deemed to be an important asset as many students were unaware at the time of registration what was required in each of their modules.

4.3 Student Budgetary Advisor

The following year in 2015, a section on Financial Resources for Students was created at the request of the University's Budgetary Advisor. The Budgetary Advisor role within the university is to provide information on the Student Grant and the Student Assistance Fund. The engagement with the UCC Students' Union on this resource proved informative as it became apparent when speaking to students do not respond well to non localised content. A UK provider, BlackBullion, was being explored as a commercial option for similar financial skills training and lack of Cork and specifically UCC examples was considered a deal breaker by students. Students have been hard hit by the impact of the recession and struggle to manage their finances and this resource addressed this need.

4.4 School of History

In 2015, the RED team collaborated with the School of History to develop a bespoke, interactive section on writing skills. Observations from academic departments listed this as a key student skill deficit. Dr Sarah Thelen, of the School of History and the Office of the Vice-President of Teaching and Learning, had extensive experience providing academic writing support which she brought to bear in the drafting of the

resource. The end result was a comprehensive interactive suite of writing skills lessons with various examples which are not discipline specific so as to maximise their utility to students of various disciplines.

4.5 Fees/Records and Exams Office

During the summer of 2016 the RED@UCC team was approached by the Fees office, Records/Exams Office and the First Year Experience Coordinator to develop a video for first year students. This video was to give them information on how to register and pay their fees online and therefore avoid the common mistakes or omission of details. This led to delayed access to student services such as printing and to the library, so it was imperative to design a walkthrough that was easily followed, and which impressed upon students in importance of getting it right. This was published during the first week of the new academic term.

5. Marketing Campaign

In the Academic Year 2015-2016, the team decided to engage in digital marketing to complement the content development work. Using Facebook, and by boosting specific posts, the team increased their Facebook reach from an average of 450 to over 3000. This marketing campaign in April 2016 led to an increase in the number of users to the RED website by 91.5%. At the same time page views increased by 100.56%. The Facebook page Likes increased by 15%, so we considered the campaign to be a successful as it drove users to both the RED@UCC Facebook page and the RED@UCC website.

6. Plans for the future and Conclusion

Going forward, the team plans to develop the Reading and Note-making section to become more interactive and practical. We also plan to use the Facebook advertising as a marketing tool again. This will dovetail with RED's first foray into Snapchat in collaboration with the UCC Students' Union on a vox pop series entitled 'If I knew then what I know now'. Further content will also be added to the "Tech Tips" to educate students on data security and privacy online. An assignment calculator is also in the works, as is further information on preparing for your placement.

So far in this 2016-17 Academic Year it certainly feels as if RED@UCC is having a long awaited 'moment'. At technology enhanced learning training for staff in August it was apparent that academic staff were both recommending RED to students but also using it themselves. The external partner for online learning academic programmes, Wiley, has used RED content extensively to provide academic skills training for students returning to formal study after years in the workplace. The Instructional Design team in the Office of the Vice-President for Teaching and Learning are developing a resource which will sit on RED@UCC which will map on to student experience from the pre-university academic programme application stage all the way through to their entering the workforce and engaging with continuing professional development. The Head of Student Experience is appointing an Academic Support Coordinator who will be tasked with accelerating the collation of the various strands of student supports across UCC. This role expressly mentions the hosting of all said information on RED. The challenge for RED project team is to marry these increasing requests and increasingly positive feedback with the quantitative data of Google Analytics to best chart a productive course for RED and our growing user base into the future. It is a different but entirely welcome challenge.

The University of Geneva's humanitarian interpreting module: A case study in offering OERs as rapid responses to meet immediate, large-scale educational needs in emergency settings

Barbara Delahayes

University of Geneva, Switzerland
barbara.delahayes@etu.unige.ch

Emmanuela Sebastiani

University of Geneva, Switzerland
emanuela.sebastiani@etu.unige.ch

Abstract

InZone, a research centre at the University of Geneva, recently launched the “Rapid Response Module for Humanitarian Interpreting” (RRM). This open educational resource (OER) leverages the potential of e-learning technology to provide a rapid orientation for staff deployed on short notice to work as interpreters for humanitarian organisations. In about one hour, the curriculum covers the knowledge and interpreting skills needed in disaster zones and other humanitarian contexts. The RRM includes readily achievable learning objectives and is geared towards target audiences including internally displaced people (IDPs) and refugees. After completing this initial module, learners are encouraged to pursue formal interpreting training opportunities.

The course is divided into sections that present, exemplify, and consolidate basic interpreting concepts, methods and tools; their cultural and ethical implications; interpreting-specific psychosocial stressors, potential health issues; and self-care strategies. It is structured around a series of realistic interpreting assignments that prompt learner choices, and is framed by an orientation and a debriefing.

This paper presents the RRM as an example of how to successfully design and develop this type of short e-learning course. It discusses how learning technologies, networks, and distribution channels can be leveraged to quickly provide mission-critical concepts and information to large audiences, and concludes that in addition to short, introductory rapid response OERs, more comprehensive higher education offerings must also be made available to empower IDPs, refugees, and migrants in emergency settings.

Keywords: InZone, interpreting, flexible and large-scale e-learning courses, higher education in emergency settings, refugees, IDPs, migrants, OERs, empowerment, social inclusion

1. Introduction

The number of refugees and migrants in need of protection climbed sharply in 2015, reaching the staggering figure of 63.91 million worldwide. (UNHCR, n.d.) Regardless of whether they become refugees due to conflict, natural or man-made disasters, international aid is essential to support the local humanitarian response, especially in developing countries where the capacity to address such crises is frequently insufficient. In order for aid to be provided efficiently, however, clear communication with the affected populations is vital. In light of the increasing number of migrants, the linguistic needs of humanitarians are

on the rise, and major relief agencies are currently seeking ways to deploy interpreters faster and more effectively.

As Moser-Mercer & Bali (2008) note, “interpreters are often recruited because they ‘know’ both the local language/dialect and English, the language of international relief operations, and not because they have been trained as translators or interpreters.” Over the years, the University of Geneva’s InZone centre has worked with major humanitarian actors including ICRC and UNHCR to develop training programs for interpreters in conflict and crisis settings. InZone’s Basic Course and Certificate of Advanced Studies in Humanitarian Interpreting are designed for learners in protracted conflict settings and require a long-term involvement of one to four months for the former and of one year for the latter. Yet, as Businaro (2012) observes, the time required to develop and deliver contextualized training programs may be incompatible with the immediate international action necessary in emergency situations.

To address this issue, InZone has recently created and piloted an e-learning self-study module for humanitarian interpreters. The Rapid Response Module (RRM) aims to provide an orientation for humanitarian interpreters in disaster zones and other fragile contexts, in accordance with the fundamental humanitarian principles (Code of Conduct of the International Red Cross and Red Crescent Movement, n.d.). It covers basic interpreting concepts, including the role of the interpreter, the use of memory and note-taking, the cultural implications of interpreting, interpreting-specific psychosocial stressors, potential health issues, and self-care strategies. The RRM also encourages learners to seek advanced training after completing the module, describing a path that may lead to a full-fledged career as a humanitarian interpreter. Such a profile is in demand in numerous emergency situations where international organisations operate. In fragile contexts, where career opportunities are chronically scarce, becoming a trained language professional may open up paths to livelihoods.

This article describes how to successfully develop, test, and scale up short e-learning courses - in this case, to address the increasing need for humanitarian interpreters.

2. The need for a basic orientation in humanitarian Interpreting

As underlined by Moser-Mercer, Class and Kherbiche (2014: 4) “there are large numbers of interpreters working in conflict or disaster areas, or serving in emergency interventions or more long-term preventive actions. They are rarely called ‘interpreters’ because they work on an ad hoc basis and are usually labelled linguists, fixers, translators or cultural advisers. Even if they are called ‘interpreters’, they are usually untrained in the skills of cross-cultural and cross-linguistic communication and have only a limited understanding of their role as language and cultural mediators.” They generally work in contexts where “poor communication can lead to a waste of resources and even harm” (Dmitracova, 2009). In the immediate aftermath of a crisis, rapid response is needed and international relief agencies deployed on site must be able to communicate efficiently with the local populations, who often do not speak the working languages of humanitarian actors (generally English and/or French). In large-scale emergencies, where it would be nearly impossible to offer face-to-face, scalable training on very short notice, the last-mile orientation offered by the RRM represents an immediate solution.

The RRM’s expected learning outcomes are to: (1) gain a basic understanding of the roles, skill set, and tools of professional humanitarian interpreters; (2) gain a basic grasp of professional expectations, cultural issues,

and ethical principles in humanitarian interpreting; and (3) gain awareness of self-care and psychosocial aspects.

In light of the urgent need for humanitarian interpreters, the RRM's primary target audience comprises bilingual nationals who are on site and readily available in the wake of an emergency. The RRM is also designed for humanitarian interpreters without formal training who are working internationally and have some interpreting experience; the module aims to foster awareness of key issues which arise during their daily work. On a secondary level, the RRM is also designed for local authorities and all stakeholders working with humanitarian interpreters, including international relief workers. In the near future, the RRM will be made available free of charge through an open online learning portal, thus making it accessible to an even wider audience.

3. Core features of the RRM

The contents of the RRM are based on the limited body of research describing the interpreter's role in humanitarian contexts, which includes articles on communication in the aftermath of natural disasters in Haiti (Powell & Pagliara-Miller, 2012) and the official guidelines provided by UNHCR (2009) and other major international interpreting associations (AIIC, FIT & Red T, 2012).

The developers began the design process by interviewing humanitarian professionals with experience working with interpreters in fragile contexts. By consulting with these individuals, the developers gained insights into the interpreters' professional environment, typical challenges faced on the job, and interactions with relief workers. This information was used to identify the main elements to be included in the module and to create the RRM's overarching narrative framework.

The RRM is offered in English, the most widely spoken language in relief operations. Vocabulary and register have been designed to be accessible for speakers with limited English proficiency. The RRM is user-friendly, requires only limited IT proficiency, and can be accessed using low-bandwidth. It is also compatible with mobile devices, such as tablets and smartphones, which may be the only platform available to interpreters in post-disaster and humanitarian contexts¹⁷¹.

In terms of design, the RRM colour palette provides a strong contrast with on-screen text to ensure visibility in the glare of the sun at the equator. Several developing countries that are recipients of international aid are located in this region, where, OERs such as the RRM might represent cost-effective educational resources. Images were selected based on three main criteria: respect for ethnic and racial diversity, gender representation and consistency with the narrative framework, particularly the fictional location of an island (located in the Indian Ocean).

The design and development of the RRM presented a variety of challenges. First of all, content had to be adapted to the e-learning format. Complex dimensions of language interpretation, such as the cultural implications of interpreting, had to be summarised and conveyed using visuals and interactive features¹⁷².

¹⁷¹ Furthermore, migrants and refugees rely ever more heavily on mobile devices to access crucial information during their journey and once they settle in a host country.

¹⁷² The module was designed using Articulate Storyline 2, which allows for such interactive features.

Time and technical constraints determined the initial selection of content. Concise storyboarding and rigorous editing were necessary to keep learning time within the one-hour limit¹⁷³, which was deemed coherent with the aim of providing a rapid orientation to humanitarian interpreting.

4. A day in the life of a humanitarian Interpreter

The module is designed as an immersive learning environment, where the learner is confronted with the fictional yet realistic situation of being deployed to a disaster zone. It adopts “one day in the life of a humanitarian interpreter” as its narrative thread, and is set on a fictional island off the coast of Eastern Africa, which has recently been struck by a powerful earthquake.

In the initial orientation meeting, the participant receives a briefing from the three characters who narrate the RRM: a relief coordinator, a senior interpreter and a recent recruit. Subsequently, the learner completes three different scenarios: a doctor’s visit, a family interview and a focus group at the relief camp. Each situation requires learners to make informed choices based on their understanding of the key concepts and principles presented in the orientation scene. After making each choice, learners receive feedback from the characters, who provide comments and advice on various interpreting dilemmas. The interactive feedback is designed to contextualise and revise key concepts presented in the orientation scene and to stimulate reflection on the nuances of each interpreting situation - which is particularly relevant in light of the fact that a clear-cut distinction between the right and wrong approach is not always evident in the field. Given this, the ultimate aim of the RRM is to equip interpreters with a compass to make their own informed judgments based on principles widely accepted within the interpreting community, thus preparing them to confront a range of tough cases on the job.

The interpreting day ends with a debriefing scene, where key takeaways are recapped and further training resources are discussed. Additional learning resources are available in a separate section of the RRM¹⁷⁴. Twelve concise articles shed further light on language proficiency, note-taking, glossary making, principles of interpreting, bridging the cultural gap, coping strategies, empathy and interpreting, body language and voice, belly breathing, warning signs, moral efficacy and InZone’s courses. A video demonstration shows three interpreting modes: consecutive, simultaneous and whispering.

The RRM was designed and developed as a last-mile orientation module which would be scalable in the face of humanitarian disasters. Consequently, it does not include interaction with interpreter trainers or peer feedback. However, learners are encouraged to pursue formal training after completing the module and are given detailed information about how to access such training.

5. Beta-testing & pilot phase

The RRM was beta-tested by professionals with humanitarian, pedagogical and interpreting backgrounds. After receiving their feedback - which primarily concerned how to navigate the module and its presentation and structure - the developers adjusted the graphics, text and voiceovers.

¹⁷³ Learning time may range from 45 to 90 minutes depending on the individual learner profile, the extent to which learners explore the additional resources section, and whether learners repeat any of the three scenarios.

¹⁷⁴ The resources section, accessible as a tab leading to the 11 downloadable PDFs and 1 video file.

Subsequently, the RRM was piloted in collaboration with Translators without Borders in August 2016. Participants included 31 learners deployed to Greece to interpret for refugees in reception centres across the country. All participants interpreted between English and one or more of the languages relevant in this context: Arabic, Dari, Farsi, Greek, Kurdish and Urdu.

The pilot allowed the developers to gather data on the impact of the RRM on untrained interpreters and to assess course strengths and weaknesses in a refugee context. A pre-course questionnaire assessed learners' motivation for taking the course, as well as their background and familiarity with basic interpreting concepts, methods and tools. A post-course questionnaire allowed the developers to assess whether the RRM met its purpose of introducing the basics of humanitarian interpreting and whether its design and format were adaptable to such particular context. Of the 31 participants in the pilot, 15 took part in this study. (Delahayes, Goldsmith & Sebastiani, 2016)

The results show that all participants completed the entire module and the majority of them considered the design choices made in terms of interactivity and logical progression of the narrative to be a source of motivation to explore the module's content. Although 93.3% of participants found English to be a suitable medium of instruction for the course, 33.3% would like to see the course translated into another of their working languages. The same results suggest that after taking the RRM learners grasp the basics of humanitarian interpreting and feel more prepared to take on assignments, and that the RRM's interactive nature supports self-study and motivated learners to complete the module.

Given the positive response to the pilot, it can be estimated that the RRM would likely scale well with similar learners. In the future, the RRM will be made available through DisasterReady.org, an open online learning portal providing training resources for humanitarian aid workers and volunteers worldwide. This will offer humanitarian interpreters working in emergency settings a compact, downloadable self-study module covering the fundamentals of interpreting skills, ethics and self-care strategies.

6. Conclusion

The RRM has the potential to help meet humanitarian language needs in disaster and post-conflict situations. Since this technology-enhanced training is a stand-alone module that will be freely distributed via an e-learning platform, it will be available to a wide variety of audiences. For learners with limited internet access, the developers envision frontloading the RRM on flash drives or tablets.

Given the positive response to the pilot and the ongoing need for humanitarian interpreter training, InZone is considering potential solutions to scale up and broaden its reach, including localizing it into other languages used in humanitarian settings, such as French, Arabic and other major languages spoken by the refugees currently arriving on Europe's shores from the Middle East and Africa. (UNHCR, n.d))

In a broader perspective, leveraging e-learning to provide basic orientation for humanitarian interpreters may, if supported by a comprehensive training offer, be a first step towards professionalising their role. The recognition of interpreting in humanitarian contexts as a profession may contribute to changing the situation of affected communities. As the Sustainable Development Goals indicate, ensuring inclusive and equitable quality education for all is currently considered as a priority for the international community. (Sustainable Development Goals, n.d.). More higher education offerings must therefore be made to empower IDPs, refugees and migrants: humanitarian interpreting may become both a viable education and a potential career pathway.

The spread of new technologies allows for the development of creative and adaptable solutions which promote more efficient communication in fragile contexts. Each emergency situation is unique and tends to evolve over time. However, online learning solutions can provide one cost-efficient and scalable solution to respond to emergency situations. Academia can also play a meaningful role in humanitarian response by providing its multidisciplinary expertise to humanitarian actors and contributing to the dissemination of the RRM and other similar OERs.

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An examination of anxiety towards a MOOC educational approach: the case of the MOOC of the Alhambra

Esteban Romero-Frías

Medialab UGR, University of Granada, Spain
erf@ugr.es

Jose L. Arquero

University of Seville, Spain
arquero@us.es

Salvador Del Barrio-García

Medialab UGR, University of Granada, Spain
dbarrio@ugr.es

Abstract:

MOOCs, one of the main innovations in digital education in recent years, are based on the idea of freely accessible open education. Big platforms (edX, Coursera, Udacity, OpenupEd...) have emerged offering courses organized by universities worldwide. Higher Education institutions compete to gain attention and prestige either by signing agreements with these platforms or by developing their own to deliver courses.

The University of Granada (Spain) set up its own platform, Abierta (<https://abierta.ugr.es/>), where a massive course about the Alhambra is delivered in Spanish and English to more than 7,000 registered users. This study examines the second edition of this MOOC (spring 2016) including a sample of 2,823 students.

Our analysis focuses on the anxiety experienced by the students towards this model of education, a factor that could affect the final acceptance of this educational approach. The results indicate that Millennials (adults ages 18-35 in 2016; n=2099) experience higher anxiety levels than Generation X (ages 36-51; n=391); a result that could be counterintuitive with the idea of “digital natives”. Men (n=1008) also experience higher anxiety than women (n=1815). Finally, anxiety is negatively correlated with the technical support received during the course.

Keywords: Educational technology, MOOC, anxiety, open education

1. Introduction

MOOCs are massive learning experiences with generally thousands of registered users. Barriers of entry to follow a MOOC are very low as long as there is no cost to register in the course. This implies that the very high numbers of registered users might be an indicator of interest in the topic or the result of marketing campaigns, but not a real commitment to follow the course. Porter (2015) reported that approximately half of the registered users in a MOOC do not get into the platform once the course has started and that only around 10% complete the course. As Gütl et al. (2014) highlighted high drop-out rate is a major concern particularly to those who invested time and effort but were not able to complete the course.

Among the various reasons that might cause the attrition rates, anxiety could be one important factor affecting the success of the MOOC experience. Some strategies are required to curtail this problem that includes providing adequate support to students.

Our study explores how anxiety is perceived by different generations and to what extent anxiety and technical support are related. We investigated a MOOC carried out by the University of Granada in its own platform, Abierta. This is a first step of a project that will combine data about students' perceptions collected through questionnaires and behavioural data from the platform.

The paper has the following two objectives:

1. to examine how anxiety is perceived by the different generations, and
2. to determine to what extent anxiety and technical support are related.

2. The relevance of anxiety and technical support on the success of the MOOC experience

Learners in MOOCs, particularly if they do not have previous experiences with this educational approach, face a very complex environment made of contents in diverse formats, comments, forums, messages, etc. This complexity could produce high drop-out rates that, according to Gütl *et al.* (2014) might have manifold causes that require a deeper investigation. Anxiety is considered one of these causes, among others, such as frustration or confusion (Dillon *et al.*, 2016). The learner's inability to identify the multiplicity of issues surrounding eLearning, and particularly a MOOC, could increase his/her levels of anxiety (Tyler-Smith, 2006). Learners may feel overwhelmed by unfamiliar modes of learning.

Venkatesh *et al.* (2003: 432) explained *anxiety* as "evoking anxious or emotional reactions when it comes to performing a behavior." As Calisir *et al.* (2014) noted anxiety is a personal trait, and when it comes to IT systems, computer or technological anxiety can influence the acceptance of technology in a negative way (Raaij & Schepers, 2008).

Chua, Chen and Wong (1999) defined *computer anxiety* (CA) as a fear of computers when using one, or fearing the possibility of using a computer. Barbeite and Weiss (2004) note that it should not be confused with negative attitudes toward computers which entail beliefs and feelings about computers rather than one's emotional reaction towards using them (Heinssen *et al.*, 1987). Therefore, Barbeite and Weiss, indicate that CA is characterized as an affective response: an emotional fear of potential negative outcomes such as damaging the equipment or doing something similar (lose data or advances in a project or a module, in the case of IT based courses).

Barbeite and Weiss (2004) noted that literature has reported the relationship of high level of computer anxiety with undesired consequences, such as resistance to the use of computers (Torkzadeh & Angulo, 1992; Weil & Rosen, 1995), poorer task performance (Heinssen *et al.*, 1987) or increased difficulties to the acquisition of computer skills (Harrington, McElroy, & Morrow, 1990; Jackson, Voller, & Stuurman, 1985; Marcoulides, 1988). Venkatesh (2000) found that the negative effect of anxiety on perceived ease of use of the technology is significant, especially in the early adoption period.

In our case, anxiety to MOOC, adapted from the concept of CA, could be described as the emotional fear of potential negative outcomes when participating in a MOOC, such as doing actions that they cannot undo or looking foolish in a complex and massively populated digital environment.

The perception of likely negative outcomes associated at the use of technology (that is central in the definition of anxiety) could be linked to the perception of technical support. Therefore, the perception of technological support by a technical staff able to help reducing the consequences of any probable mistake could act reducing the anxiety, and therefore improving the level of acceptance. Results by Gütl *et al.* (2014) pointed to the perception of lack of technical support from the staff as one of the causes of dropout or low satisfaction. In this line, results by Ozkan and Koseler (2009) support this idea. Their focus group showed that learners in IT based courses often face technical problems which influence their overall satisfaction level negatively, and also reported a positive link between overall satisfaction and service quality in terms of assistants' attitudes, and the services provided by the administrative staff.

Therefore the perceptions about technical support in a course of this kind are essential to understand the levels of acceptance and in some cases the completion or dropout rates.

To accomplish the objectives stated in the introduction it is necessary to know the specific MOOC experience that we examine in this study.

3. The platform Abierta and the MOOC of the Alhambra

The University of Granada (Spain) developed its own model to offer MOOCs by creating a Moodle-based platform called *Abierta* (<https://abierta.ugr.es/>). Moodle, a free software platform designed for eLearning, was conveniently adapted to incorporate the features required by a MOOC experience in order to facilitate a more autonomous and social learning. So far the most important course produced by Abierta is "The Alhambra: history, art and heritage", a MOOC offered in English and Spanish by the University of Granada, CEIBioTic Granada and Escuela de la Alhambra (see Figure 1).

Figure 1. MOOC of The Alhambra in the Abierta platform (English version).



The course, as indicated in its website¹⁷⁵, provides “a concise and simple, but not simplistic, learning tool, with all the scientific rigour of a university course, about the group of monuments known as the Alhambra”. The aim of the course is to facilitate the acquisition of deeper knowledge about the monument from a multidisciplinary perspective. The course could be taken by anyone interested in the topic with no pre-requisites. Learners who follow the weekly schedule and complete the activities proposed in the course will be entitled to receive a certification. Students at the University of Granada could recognised optional credits for their degrees after paying a small fee.

The Alhambra MOOC is organised over a period of six weeks, with 75 hours of work distributed in six modules. The course was comprised mainly of videos: around 50 short videos of approximately 3 minutes were recorded by a team of more than 30 professors and researchers. The evaluation of the course was based in self-assessment tests (one for each module and a final test).

The MOOC was devised with a *conectivista* philosophy and designed combining, on the one hand, quality contents and tests and, on the other hand, a more dynamic, emerging and social student participation model (Rojas, 2016). The MOOC implemented different strategies to achieved this approach:

- The MOOC generated Open Educational Resources. The content produced by the team of teachers was licensed with Creative Commons in order to facilitate a free sharing and higher impact.
- The promotion of debates and social activities within the platform (thematic forums and coffee forums) and outside (using the Twitter hashtag #MOOCalhambra or Facebook) were intended to generate a sense of community and to increase engagement with the MOOC.
- Teachers proposed activities that promote teamwork and collaborative work. Student sometime organised themselves to work collaboratively.
- Gamification was used to increase the engagement of the participants and to promote social participation. A badge was given to the students when they passed a module to acknowledge the progress in the course. Some additional badges acknowledge participation, for example, in social media. The image in Figure 2 shows the badges used in the course.
- Social Media were used to open up the course. A Twitter hashtag was proposed by the organisers to follow the conversation in this network and a Facebook group was set up by the participants.

Technical support was provided through a specific forum established with this purpose and via email. In addition the teachers in the course attended many questions and incidences in social media.

Figure 2. Messages in Twitter using the hashtag of the MOOC.

¹⁷⁵ https://abierta.ugr.es/la_alhambra/index_en.html?lang=en



The first edition of the course was delivered in Spring 2015 and had more than 10,313 registered users, of which 4,492 participants completed the whole course (approx. 44% of completion rate). The second edition, in Spring 2016, showed higher results: 11,100 registered users, 7,200 completed the course (approx. 65% of completion rate).

Methodology, Data Collection and Measures

This study is based in the second edition of the MOOC. A questionnaire was distributed in the last week of the course via email through the platform to all the registered users and also through the Facebook group used in the MOOC. We could collect data with the permission of the Virtual Learning Center (CEVUG) of the University of Granada.

Our final sample is composed of 2,810 people (39% of those who completed the MOOC), of which 64% are female and 36% male. The breakdown of the sample by gender and age is presented in Table 1. Vast majority of participants (around 75%) are Millennials (age between 18 and 35 years old).

Table 1. Cross table - Age by gender

		Female	Male	Total
Millennials (18-35)	N	1393	706	2099
	%	77,00%	70,50%	74,70%
Generation X (ages 36-51)	N	234	157	391
	%	12,90%	15,70%	13,90%
Baby Boomers (ages 52-70)	N	173	131	304
	%	9,60%	13,10%	10,80%
Ages 71 and older	N	8	8	16
	%	0,40%	0,80%	0,60%
Total	N	1808	1002	2810
Chi square test sig: .001				

All measures were obtained by adapting scales previously used in relevant studies to the educational context.

Four Likert-scale items were used to measure anxiety to MOOC, based on the approach proposed by Ventakesh (2000) and applied in various studies of the educational context (Calisir *et al.*, 2006; Nordin *et al.*, 2016; Yoo *et al.*, 2012; Xu, 2015).

Technical support was measured using a three 3 Likert-scale items adapted from the work of Ngai *et al.* (2007) and Sánchez and Hueros (2010).

4. Results

Prior to data analysis we checked that the scales had good psychometric properties (see Table 2) (Del Barrio & Luque, 2000), which allow us to create an indicator variable as the average of the items.

Table 2. Psychometric properties of the scales

	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Anxiety	0.900	0.920	0.745
Technical support	0.931	0.956	0.878

Table 3 presents the main descriptive statistics for the variables anxiety and support (calculated as an average of the score of the items comprising each scale, and therefore ranging from 0 to 10)

Table 3. Main descriptive statistics

	support (0-10)	anxiety (0-10)
Mean	8,15	2,35
Median	8,33	1,25
S.D.	1,66	2,73
Percent. 33	7,67	0,25
Percent 66	9,00	2,75

In general terms, participants report low levels of anxiety (mean of 2.35) and perceive a high level of technical support (mean: 8.15) for the course.

Table 4 presents the results of the difference of means tests (anxiety by age). The results (Anova sig.: .000) indicate the existence of significant differences in the levels of anxiety depending on the age classification. Millennials and older participants report the highest average levels of anxiety, whereas participants ascribed at Generation X group show the lowest.

Table 4a. Anxiety mean by age

	N	Mean	S.D.	Min	Max
Millennials (18-35)	2099	2,5582	2,78865	0	10
Generation X (ages 36-51)	391	1,5882	2,36153	0	10
Baby Boomers (ages 52-70)	304	1,8536	2,49801	0	10
ages 71 and older	16	2,5156	2,50078	0	7,5
Total	2810	2,3468	2,72561	0	10
Anova sig.: .000					

Table 4b. Anxiety by Age. Post hoc differences of means (Tahmane test)

(I) age group	(J) Age group	Mean diff. (I-J)	Tip. Error	Sig.
Millennials (18-35)	Generation X (ages 36-51)	,97001(*)	,13404	,000
	Baby Boomers (ages 52-70)	,70462(*)	,15566	,000
	ages 71 and older	,04262	,62815	1

Contrariwise to what could expected (table 4, panel b), Millennials present higher levels of anxiety than older participants [Generation X (ages 36-51) or Baby Boomers (ages 52-70)]

Participants were ascribed to groups depending on the score in (I) perceived support and (II) anxiety. The percentiles 33 and 66 in Table 3 for each variable were used for this purpose. Participants scoring equal or below 33 percentile were ascribed to *low* group, those scoring equal or higher the 66 percentile were classified as *high*. Central intervals were excluded for comparison purposes. Therefore two different classifications arose: *high - low support* and *high - low anxiety*.

Table 5 compares the anxiety score between the high – low support groups. Those participants perceiving lower levels of technical support (Low support group) also present significantly higher levels of anxiety than their colleagues that perceived higher levels of support.

Table 5a. Anxiety mean by support group (t-test)

Classification of support	N	Media	Standard Deviation	Tip. Error	t-test sig.
Low support	975	2,5423	2,35511	0,07542	.000
High support	1190	2,0553	2,98256	0,08646	

Table 5b. Cross table support group by anxiety group

Classification of support	Low anxiety	High anxiety	Total
Low support	229	392	621
High support	542	312	854
Total	771	704	1475
Chi square sig: .000; Spearman Rho .000			

The cross table in table 5, panel b, confirms this result. There is a significant higher concentration of respondents on the combination high support / low anxiety and low support / high anxiety, than in the other cells (Chi square test sig: .000, confirmed also by a ordinal correlation analysis, Spearman Rho sig: .000).

5. Discussion

In broad terms, learners report low levels of anxiety (mean of 2.35) and a high level of technical support (mean: 8.15) in the MOOC. However a more detailed analysis can be done after segmenting the learners according to their age.

Contrariwise to what could be expected (table 4, panel b), Millennials present similar level of anxiety than learner of 71 and older. Levels that are higher than those of Generation X (ages 36-51) and Baby Boomers (ages 52-70). Although further qualitative research is needed to clarify this point, a possible explanation is that Millennials and learners of 71 and older have different motivations to follow the course. Most of Millenials learners are students at the University of Granada and follow the course not only for vocational motivations but also for gaining the final certification that allow them to obtain credits for their degrees. This motivation adds an extra pressure to their performance that, together with the unfamiliar mode of learning (for 74,5% of respondents this was their first MOOC), might explain the high anxiety reported. Recent studies have explored the relations between motivations, performance and MOOC completion (de Barba et al., 2016; Pursel et al. 2016).

Although technical support correlates negatively to anxiety, it is to be noted that 44,3% of learners experiencing high anxiety also perceive a high technical support in the MOOC. In line with the previous argument, this anxiety could be related to the pressure of passing the course and not to problems with technical issues. Millenials represent 75% of the sample.

If we examine possible explanations to the high levels of anxiety experienced by participants of 71 and older, technical issues are likely to be the main cause.

One of the challenges in MOOC education is the reduction of anxiety and uncertainty. This reduction tends to increase the students' motivation and satisfaction with the learning process (Holland & Muilenburg 2011). Knox (2014) indicated that MOOCs could provoke a sense of losing identity and individuality and that "many students responded to massive participation in ways that can be interpreted as overload, anxiety, and a sense of loss" (p.173). Ramirez et al. (2014) indicates other causes of anxiety in a MOOC that they studied: lack of structure, grand amount of resources and repetitive information, doubts about reading only recommended pages or all of the available content, etc. Although each MOOC is organised in very different ways, its massive nature could provoke confusion and anxiety in learners particularly when it is the first time that they experience one. Providing introductory guidance to behave in a MOOC and to manage the

overflowing of information could reduce anxiety. Experienced MOOC learners are expected to have lower levels of anxiety than beginners.

6. Future research

This is an exploratory analysis based on students' perceptions captured through a questionnaire. Our research project will be complemented by the collection of log information covering the activities done by the participants in the platform. Perceptions and behaviour in the platform will allow us to pose new questions that at this point can not have an objective measure.

The nature of the information provided by the platform is characterised by its variety and quantity. Just a single day of activity in the MOOC (i.e. 15 May 2016) generated approximately 60,000 entries with information about actions such as "modules seen", "user evaluation activities", "attempt done", "completion of the course", etc.

Future research possibilities are numerous and diverse. In the discussion section we suggested explanations that need to be tested in future studies: the link between motivations and anxiety, the relation between the level of experience in MOOCs and anxiety, etc.

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Comparing Institutional MOOC Strategies: Lithuanian Case

Danguole Rutkauskiene

Kaunas University of Technology
danguole.rutkauskiene@ktu.lt

Daina Gudoniene

Kaunas University of Technology
daina.gudoniene@ktu.lt

Reda Bartkute

Kaunas University of Technology
reda.bartkute@ktu.lt

Abstract

Massive Open Online Courses (MOOCs) have been the main topic in the field of education for the last few years. Every year a number of organizations enter the MOOCs market. Newly entered organizations bring new winds in the field of MOOCs and change the strategies of previous MOOCs providers. A big part of organizations newly entering MOOCs market adapt the methods of MOOCs provision from other organizations who have successful experience in MOOCs provision, however, some of them create new ways to deliver MOOCs. For this reason, the research was performed in order to find out the present position and strategies of MOOCs providers in Lithuania and compare results with the European context. The research in Lithuania was initiated and carried out in 2015, the obtained results were compared with the results of research carried out in European countries. The aim of the paper is to at the present the results of the research on institutional MOOC strategies implemented in Lithuania.

Keywords: MOOCs, Research, Strategy, Comparison, Lithuanian case.

1. Introduction

The education of the 21st century has become complex and diverse. Due to the changing environment in the field of education, education providers are changing the ways and traditions of education delivery to the end users and try to make education more open, flexible and accessible for everyone willing to learn.

According to the UNESCO guidelines (2015), many institutions adopt information and communication technologies (ICT) in their management, administration and educational programmes in order to serve their students more cost-effectively and to prepare them for the world into which they will graduate. In many developing countries, however, access to hardware, software and connectivity remain challenging. It is therefore critical to adapt pedagogical approaches and learning materials to this environment while ensuring high quality and relevant educational opportunities.

Teaching staff naturally uses what is available to develop courses and learning resources. The increasing pool of MOOCs not only widens their choice, but also creates opportunities for new ways of learning delivery, i.e. massive open online courses might be integrated in higher education.

The results of primary research in Lithuania showed that most of academic institutions use e-learning tools and methods in their institutions. Moreover, some of them provide online courses or online study programmes. However, none of them provide MOOCs (except KTU, which has provided 2 MOOCs earlier). The main reason for this is that MOOCs require much experience, preparation and resources.

2. The importance of institutional MOOCs in Lithuania

The importance of online learning will increasingly grow in the future education system. Online accessibility is one of the defining features of MOOCs, therefore respondents had to evaluate which dimensions regarding this aspect are relevant or not to their institutions. Respondents had to react to the following statements: “MOOCs should offer a course completely online”, “The final exams of a MOOC for a formal credit should be offered online as well (with respect to quality procedures, authentication, etc.)” and “MOOCs should support off-line access for those with weak network connectivity”.

Figure 1 provides a graphical overview of the answers to the above mentioned questions.

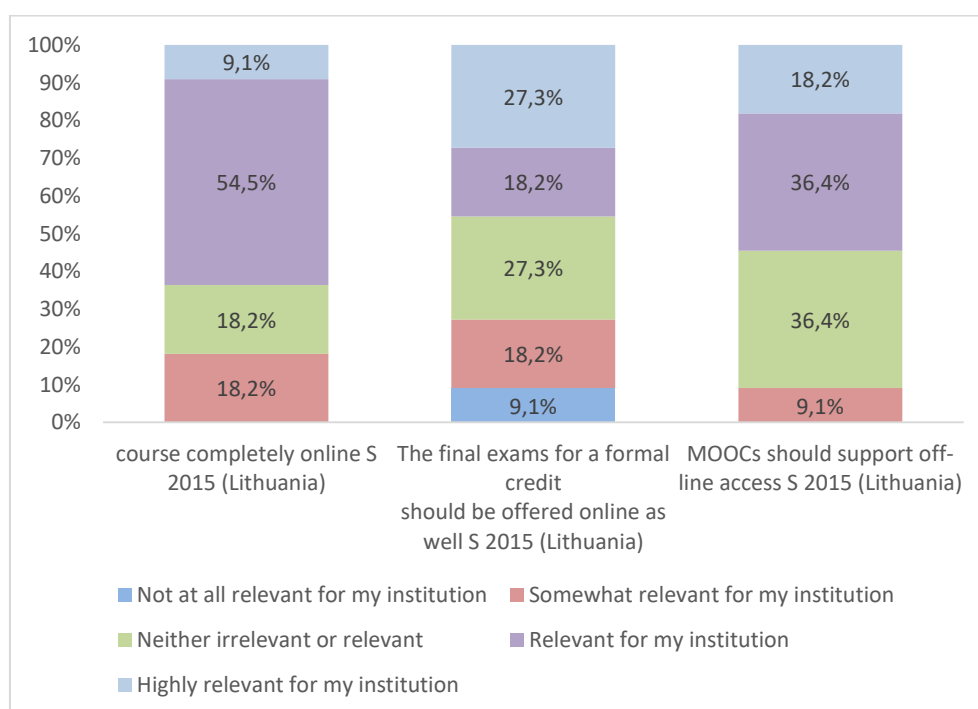


Figure 1. Importance of the online dimension in MOOCs compared among institutions of Lithuania (S 2015).

To conclude, it might be stated that it is important to have the courses completely online for Lithuanian institutions (63.3 % of Lithuanian respondents indicated this dimension as relevant or highly relevant to their institution). More than 18.0 % of respondents declared that this dimension is not at all relevant in Lithuania.

Similarly, considering the question “final exams for a formal credit should be offered online as well”, around 46 % of Lithuanian respondents thought it is relevant or highly relevant to their institution. Totally, 27.0 % of respondents mentioned that this dimension is not at all relevant in Lithuania and 9.1 % chose that it is not at all relevant to their institutions.

Respondents express a high need to have an off-line access to MOOCs (54.6 % chose that this dimension is relevant or highly relevant to their institution).

The results of the research reveal the need to have and provide MOOCs for institutions. The strong interest in online courses shows the need to consider MOOCs more seriously than before. However, educational institutions are not very concerned about providing any MOOC.

3. Policy activities for MOOCs in Lithuania

3.1 Policy strategies for MOOCs in Lithuania

The main problem is that there is no clear policy on MOOCs in Lithuania. According to the Law on Education (25 June 1991 No I-1489, as last amended on 15 October 2013 – No XII-553) (1991), education is a priority area of societal development that receives State support. Every person has an inherent right to learn. The Law establishes the goals of education of the Republic of Lithuania, the principles of the educational system, the foundations of the structure of the educational system, educational activities and educational relationships as well as obligations of the State in the area of education (Rutkauskiene, Butkeviciene, 2014). Another document – The State Education Strategy 2013-2022 (2012) – indicates the right to provide a wider spectrum of educational activities due to engagement to the educational system. The document describes various actions and activities that would help to engage early school leavers and adults as well as social exclusion groups. In addition, the Strategy enables “flexible learning method” and “life-long learning” but it is not detailed how it should be provided and what methodology the providers should follow. However, none of the documents mentions MOOCs as an alternative way of learning for reaching the aims designated in the documents. The Ministry of Education and Science (2015) points to the importance to pay more attention to e-learning activities as they could become key activities for reaching bigger number of people willing to participate in the learning process. The paper of Ministry of Education and Science indicates that e-learning is not used fully and it is important to initiate more actions related with it, e.g. guarantee financial support .

As it was mentioned above, there is no clear policy as to which MOOCs provider one should rely on while designing a MOOC. This might cause a negative reaction of MOOC providers towards MOOC provision in Lithuania. In addition, MOOC providers must take more financial, technological and other responsibilities for providing a high quality MOOC. Hence, as long as Lithuania has no clear strategy for MOOCs, educational institutions are not willing to take a part in MOOCs provision.

3.2 Recommendations for MOOCs providers in Lithuania

As long as Lithuania has no National policy for MOOCs, the institutions rely on policies, recommendations and experiences from other countries. One of the most popular policies is UNESCO Guidelines. The guidelines highlight the factors that are important for a quality online course. UNESCO remarks that when institutions make good quality courses and materials available for public online, they can attract new students, expand their institutional reputation and advance their public service role. Therefore, the UNESCO guidelines give the following recommendations for academic institutions (UNESCO, 2015):

1. Develop institutional strategies for the integration of MOOCs.
2. Provide incentives to support investment in the development, acquisition and adaptation of high quality learning materials.
3. Recognise the important role of educational resources within internal quality assurance processes.
4. Consider creating flexible copyright policies.
5. Undertake institutional advocacy and capacity building.
6. Ensure ICT access for staff and students.
7. Develop institutional policies and practices to store and access MOOCs.
8. Review institutional MOOCs practices periodically.

Another publication on MOOCs that provides some guidelines on it is “E-learning in European Higher Education Institutions” (2014). The document provides information on experience of Higher education

Institutions providing MOOCs in various perspectives: provision of courses, platforms, language, participation and others. The document also gives some recommendations for MOOC providers in order to avoid the challenges faced by European Higher Institutions while providing MOOCs.

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MOOSL - Democratizing Education with Social Learning MOOCs

Ove Christensen

Assistant professor, University College Zeland, Denmark
och@ucsj.dk

Abstract

When Clayton Christensen labeled MOOC as a 'disruptive innovation' he was only referring to the changes MOOCs represented for the business models of the education industry (Christensen et.al. 2014). When it comes to the perspective of pedagogy or the perspective of democratizing access to high quality education there is yet to be seen any disruption caused by MOOCs.

In my paper I'll focus on what it takes for MOOCs to truly become an element of the democratizing of education. I will analyse different barriers in most existing MOOCs whether they value flexibility in access to learning resources (aka xMOOCs) or participation in an active learning community of knowledge construction (aka cMOOCs). The MOOCs' prerequisites for inner motivation, knowledge construction, and study techniques creates together with the lack of guidance insurmountable obstacles for many potential learners.

Next I'll look into the different pedagogical approaches in online learning that are focused on engaging students facilitating and scaffolding a learning community. I'll focus on how social learning can become part of a MOOC pedagogy drawing on 'social learning theory' (Bandura), 'pedagogy for a digital age' (ex: Beetham, Conole), 'community of inquiry' and online presence (Garrison), and social media in education (ex: Nussbaum-Beech et.al.). Besides the two existing models xMOOC and cMOOC I'll suggest a third: the MOOSL (Massive Open Online Social Learning Course) and demonstrate how it might come about. Add the abstract you submitted here.

Keywords: MOOCs, Social Learning, Scaffolded Online Learning, Open Education

1. Introduction

In this paper we will take a look at the social element of learning in the context of MOOC-designs and a MOOC pedagogy. We will place the MOOC phenomenon in a broader societal context with democratic access to education as a focus point. This focus point highlights the relationship between MOOCs and pedagogy. We will argue that there are a number of specific barriers to MOOC participation for many. But we will also highlight opportunities for a more democratic access to MOOCs through the inclusion of social aspects of learning, and we will argue that beside xMOOCs and cMOOCs there is a third model MOOSL (Massive Open Online Social/Scaffolded Learning), which is more in tune with the requirements of formal education and education for the many.

2. Disruption?

Clayton Christensen has labeled MOOC a 'disruptive innovation' (C. Christensen et.al. 2014) referring to the changes MOOCs might represent for the traditional educational model with highly subsidised and public funded brick and mortar schools. The online delivery model has the capacity to generate fundamentally different business models for education and, thereby, changing the 'industry'. However, judged by most MOOCs Christensen's concept of disruption doesn't apply to the learning models. The pedagogical promises of the early MOOCs that they were part of a learning paradigm transformation for the digital age soon vanished in the rhetoric of disruption (Moe 2015, Stacey 2014).

Christensen's disruptive MOOCs are not as such new models of learning and pedagogy, but merely new way of 'content' delivery and a widening of accessibility for students. The MOOC model celebrated by Christensen

is by now known as the ‘traditional’ xMOOC (Rodriguez 2012) that represents a continuation of a teaching model where teachers hand over information to students; learning as mere acquisition. The Internet makes it easier to scale this delivery model beyond the classroom or lecture hall to the world as such. xMOOCs consist primarily of video lectures, reading material, quizzes and assignments as illustrated by Yousef and colleagues (Yousef et al. 2014 p.13):

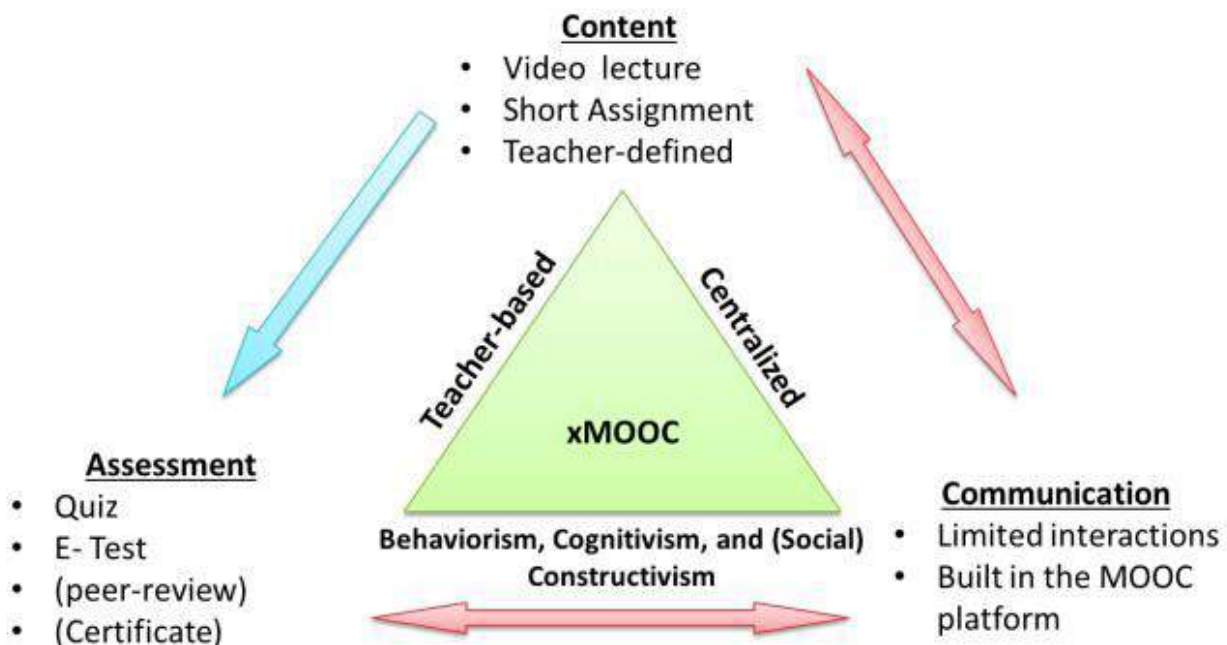


Figure 1: xMOOC

The benefit of this model is that it is flexible and adaptable to students’ personal needs. The model makes studying independent of time and place. It is possible for students to participate whenever and wherever convenient. By this MOOC design lots of students will have access to education that otherwise would not have been possible. Access to education for potentially more students is one parameter for educational quality of online learning. (O. Christensen et al. 2014 p.27).

The question remains, however, if this ‘disruptive business model of education’ has the capacity to disrupt access to education for the many in need of education, and if it has the capacity to ‘disrupt’ a model of teaching as ‘delivery’. If online learning is or should be designed to widen accessibility to education in general, it is important that it is based on knowledge about how different online designs affect learning processes, learning outcome, student engagement and knowledge acquisition, knowledge construction and knowledge generation.

Educational researchers question if a pedagogy of delivery and acquisition is, actually, in sync with the digital age. (Ex: Beetham et al. 2007; Sharpe et al. 2010; Nussbaum-Beach et al. 2011, Laurillard 2012).

3. MOOCs and learning in the digital age

When MOOCs first arrived around 2008, they were seen as a pedagogical model that was part of a greater shift in the way in which learning and education take place. The educational models were changing due to societal changes. MOOCs were seen an integrated part of the developing *network society* (Castell 1996, Siemens 2005).

The network society has a huge impact on society and its basic institutions, and it reinforces a lot of societal phenomena in modernity such as democratizing access to information and knowledge, diminishing the dependencies of time and space, lowering the barriers for access to media etc. Knowledge is no longer 'a secret for the few' (the intellectual priesthood) in that most information and 'knowledge' is available with a few operations on an Internet connected computer. This changes to some extent educational needs from knowing as possessing knowledge to knowing as connected to knowledge - from possessing to networking or being networked. The role of the knowing experts diminishes as a consequence of the *wisdom of the crowd*. (Surowiecki 2005)

For learners growing up in today's connected society, a passive approach to learning can be seen as more problematic than ever. Rhona Sharpe ascertains that education to meet student needs will have to adopt the idea of active, social learning: "...learners are becoming active participants in their learning experiences and are shaping their own educational environment." (Sharpe et al. 2010 p.2)

In an even wider perspective the need for 'Rethinking pedagogy for a digital age' (Beetham et al. 2007) is also a societal need. In a knowledge society (Bindé 2005) new competencies are needed. In the current society there is a need for collaborative problem solving without knowing all the details. Something that can only be taught by doing. That is why we are talking about 21st century competencies (Ferrari 2013): critical thinking, creativity, collaboration, networking and communication amongst others. These competencies are not new in the sense that they were not needed in the past. What is new is the number of professions and jobs where the skills and competencies are needed. New is also the fact that we educate to a job market unknown in that the transformations of jobs are changing at an ever increasing pace.

MOOCs were originally a response to some of these societal changes as illustrated by the claim in *The MOOC Model for Digital Practice*: "MOOCs integrate social networking, accessible online resources, and are facilitated by leading practitioners in the field of study. Most significantly, MOOCs build on the engagement of learners who self-organize their participation according to learning goals, prior knowledge and skills, and common interests". (McAuley et al. 2010 p. 10)

Some of the basic ideas in the original MOOC model: networked learning, self-organized, learner generated content, open learning environment etc. are illustrated by Yousef and his colleagues in this model:

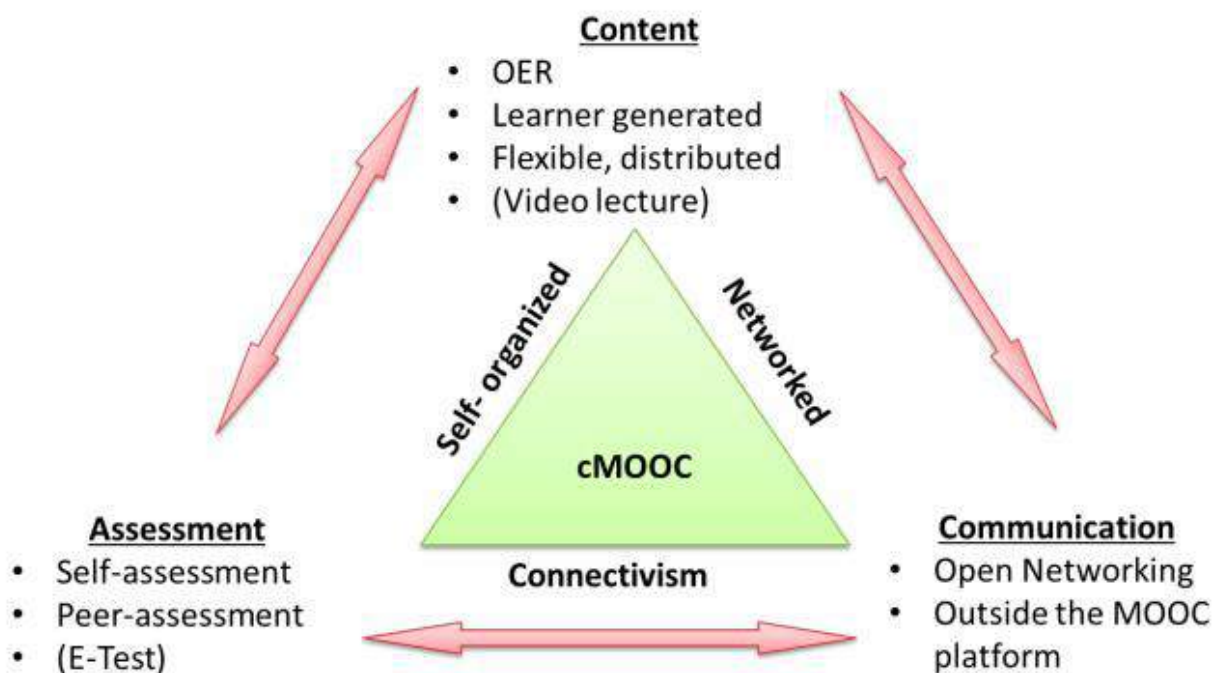


Figure 2: cMOOC

4. Barriers to MOOC participation

The discussion of MOOCs has to some extent focused on the differences between instructional design xMOOCs and cMOOCs that are connected to connectivist or networked learning theory (Siemens 2005, Jones 2015). In both types of MOOCs the learning outcome is determined by the self-direction of the learner. The two types of MOOCs can be seen on a scale from high to low structuration and also from individual to collective-based participation:

1. Individual acquisition from pre-established curriculum and resources (xMOOC)
2. Self-organized and networked participation in collaborative communities (cMOOC)

Option 1 and 2 both require a high level of intrinsic motivation and provide a high degree of flexibility. 1 and 2 differ when it comes to the social aspect in participation. cMOOCs integrate the social aspect of learning and reciprocal collaboration is part of the learning as well as the learning process. Collaboration is paid with a decreasing degree of flexibility and heightened interdependence, which exactly emphasizes the social element of learning and teaching.

However, far from all - or most of - the potential participants have the necessary prerequisite skills for participation either in one or the other types of MOOCs, which Gráinne Conole shows in her article 'MOOCs as disruptive technologies: Strategies for Enhancing the Learner Experience and Quality of MOOCs'. Participating in a cMOOC can be a very confusing experience if you are not very apt in online networking and knowledge co-creation in advance. There are a lot communication options available that you as participants will have to relate to and utilize in order to benefit from the networked learning environment. The proclaimed autonomy also means that individuals risk feeling lost and overwhelmed - frustrated with too many options and the vast complexity of 'the whole network as a learning environment'. The opposite is the case with xMOOCs where there is no autonomy when it comes to the knowledge offered. It is often a 'take it or leave' with no space for negotiating the educational resources or the sensemaking of the knowledge. The educational means often neglect current ways of learning (collaboration, sensemaking, learning as situated

etc) and are indeed often ill-suited to many participants and potential participants' specific learning needs (Conole 2013 p. 11).

According to Conole, we are dealing with a design challenge when it comes to exploiting the media-related options for the design of web-based teaching. Some participants may have been able to exploit the highly individualized form where MOOCs mainly consist of instructional videos and individual tasks. Other students have had a blast and learned a lot through networking and virtuoso use of various forms of communication. Both groups of participants have been preconditioned with strong internal motivation and good professional as well as learning methodological prerequisites (Ferguson et.al. 2014).

The required prior knowledge and the habitus that are needed for highly individualized and more or less self-organized courses, however, is a challenge for many. 'O' for open is a relative concept in MOOCs and the skills required to participate in many MOOCs make them de facto closed for the majority. This de facto closure makes MOOCs less suited as a distribution model of education and training for the many. MOOCs as the well known x- and c-MOOCs are, therefore, not playing any important role in democratizing education.

If one thinks of education besides narrow job related professional development and some university courses, the lack of real openness is further stressed. If MOOCs are used as a national educational strategy, the achievement with and through MOOCs are discouraging if we only look at the experiences with the two types of MOOCs: xMOOCs and cMOOCs.

5. Social and Scaffolded Support – MOOSL

If MOOCs are to be part of an education policy strategy which includes Higher and Further education, and other formal education and as part of lifelong learning strategy, the question of pedagogical thinking in MOOC design is crucial as formal education has an obligation to attract a larger and broader group than those who already are well educated and capable of engaging in self-directed education. And as Karsten Gynther points out in "Design Framework for an Adaptive MOOC Enhanced by Blended Learning" the dropout rate really matters when it comes to formal education whereas it doesn't necessarily matter when it comes to individual professional development (Gynther 2016).

According to Stephen Downes, MOOCs should only be judged by the outcomes of individuals: "Different people have different objectives for MOOCs, and what we find in informal learning generally is that people are successful through informal learning, insofar as it enables them to do what it is that they wanted to do." (Quoted in Buck 2013). But this is not enough when it comes to utilizing the benefits of MOOCs in formal education. In formal education it actually does matter what people are learning from participating. Formal education has other requirements than informal learning in respect to content as well as completion rates.

There is a somewhat intrinsic relationship between the skills learned and the pedagogical design. George Siemens (2005) for example argues that the network society or the digital age requires a special way of learning, and he is thus in line with many other researchers who study the relationship between skills or competencies and the 'digital age'. Much research points to the need of 21st century competencies and new conditions for learning associated with the development of an information and knowledge society or 'the digital age' (ex. Sharpe et al. 2010; Beetham et al. 2007; Nussbaum-Beach et al. 2011; Laurillard 2012). Competencies like collaboration, co-creation, communication and cross-cultural understanding are essential and must be included as part of professional standard in most professions.

The focus on MOOCs in formal education changes the perspective from merely a perspective of the participant - the individual - to also include a societal perspective. Education is about ensuring the right competency profile of the current and future workforce. From the perspective of education this means a shift in focus from a technical viewpoint (how many can you reach?) to a qualitative viewpoint (what will provide the best form of learning/teaching in relation to the given conditions and requirements?). The question changes from 'flexibility for participation' to 'educational quality in supply' (Conole 2013).

Being a part of a national educational supply MOOC design must take into account that the learner should be able to engage in a social learning contexts. MOOCs providing courses for individuals have to take on responsibility in terms of offering a learning environment with supportive structures to diminish the need of a strong inner motivation. In a study on different models for educational supply to a wider population, Petersen and her colleagues also point to the need of more supportive structures in MOOCs if MOOCs are to be part of formal education: "Some of the negative attributes of MOOCs, however, may be explained by the lack of the supporting structures and the social environment that we associate with traditional education formats such as academic guidance, study group activities, social activities and technical support." (Petersen et al. 2016 p. 3). The guidance and peer activities are scaffolds for students' learning process and support the student in achieving the relevant competencies not only for the student but for society as well.

To reflect this need for social or other supportive structures in MOOCs, Ove Christensen talks about Massive Open Online Social Learning or alternatively Massive Open Scaffolded Learning (MOOSL). (Christensen 2015, see also Ferguson 2014). The basic idea of MOOSL is the same as in network learning, but with the difference that the social aspect of learning becomes a principle for the design of the web-based training provision, and that it is not necessarily the participants' own learning objectives that determine the participant's progress. In the 2014 report *Innovating Pedagogy* Mike Scharples and colleagues discuss "which successful pedagogies can improve with scale" and they come to the conclusion that MOOCs only can scale if they take advantages of elements of social learning. Their chapter on MOOCs has the telling title: "Massive Open Social Learning." (Scharples et.al. 2014).

A real open MOOC must be designed to better take into account the differences of participants. It must therefore also be a participation opportunity to be 'supported' and 'guided' through a MOOC - MOOCs must facilitate participation, and teaching 'how to mooc' should be part of the design. Moocing is what students do when they engage with the online learning environment and the connected activities as co-authoring assignments.

From the challenges we have seen for MOOC participation and the need for scaffolded participation, we find three prototypes of participation that are equally legitimate in MOOCs in that they are filling the variety of different needs for different types of participation:

1. Individual self-paced acquisition of knowledge and skills based on individual needs (xMOOCs)
2. Participation in collaborative self-organized groups with different levels of participation in co-creation of knowledge (cMOOCs)
3. Scaffolded programs that integrate elements of collaborative communities, social learning and supportive structures of participation (MOOSLs)

The third form of participation requires that educators and MOOC providers must 'rethink pedagogy in the digital age' (Beetham et.al 2007; Sharpe et.al. 2010). Research on the relationship between technology and education points to a number of quality criteria for good educational design. One can summarize the quality criteria in many ways, but there is no doubt that they as a minimum must contain these seven elements

listed by Conole in 'MOOCs as disruptive technologies: strategies for enhancing the learner experience and quality of MOOCs' (Conole 2013):

- Encourage learner reflection
- Enable dialogue
- Foster collaboration
- Apply theory learnt to practice
- Create a community of peers
- Enable creativity
- Motivate the learners.

And when it comes to online learning, it will also be important that participants have a sense of belonging, feel safe in their learning process and feel that the learning resources are relevant and appropriate to the learner's needs. This is what Randy Garrison calls presence and he operates with different kinds of presence: social presence, cognitive presence and teaching presence (Garrison 2006 and 2007). He defines presence as a necessary prerequisite for the participants' co-creation, negotiation of meaning and participants processing of understanding of teaching material. Social presence is about the participants and their sense of community. Cognitive presence is felt when the actual content and other learning resources are deemed relevant for participants' negotiation of meaning. Teaching presence deals with the learning design that structures the teaching and its parts.

In a study of the presence forms that were at stake in an online education, Armellini and Stafani showed that social presence was actually felt by participants that recognized cognitive presence and teaching presence (Armellini & de Stefani 2015). This finding emphasizes the importance of the social element to support many participants in online learning.

6. Social Media and Networked Learning

The idea of MOOSLs is that learners are gathering around common learning interests to obtain specified competencies and that they work collaboratively to achieve them as well as their personal learning goals. They form a community - and it is the community that scaffolds their learning. Learners in this model work like a network. The co-learners become part of each other's Professional Learning Network (PLN). For this process to happen the learners - the participants - have to have platforms for their communication, collaboration, co-creation and co-learning. That platform can be the MOOC - or it can integrate other already existing platforms such as social media. Especially Twitter offers a promising and dynamic learning network and might be a cornerstone of a Professional Learning Network says Nussbaum-Beech and Ritter in their very interesting study on *The Connected Educator* (Nussbaum-Beech et.al. 2011) and, in addition, Twitter has been chosen as the number one educational tool by educators seven years in a row in Jane Harts list [Top 100 Tools for Learning](#).

Fei Gao and co-authors have studied the effect of twitter integration in education up till 2011. In a meta-study they conclude that "microblogging has a potential to encourage participation, engagement, reflective thinking as well as collaborative learning under different learning settings." (Gao et.al 2012 p.783). They find that Twitter is a particularly promising tool for creating strong learning communities for a number of reasons. Not alone the collaboration but also the possible participation of people from the outside in the discussions is a benefit making learning much more authentic. Using social media and especially Twitter in education "promotes a collaborative virtual learning environment." (Gau et.al 2012 p.783). But they also conclude that there is "a need for rigorous research on" microblogging in education.

Gao's conclusions are to some extent supported by an empirical study by Gilly Salmon. Salmon and her team were running a MOOC that tried to take advantage of social media as a supportive structure for the students.

And during and afterwards they surveyed and interviewed participants on how they had used and benefitted from collaboration on Facebook and Twitter. Their study confirms a number of potentials for learning when MOOC participation is supported by social media (Salmon et.al. 2015).

In the study they found that social media made students more engaged in collaboration, co-creation, knowledge sharing and reflexive learning practices. Social media interaction also supported a sense of belonging to a community of learners. But they also found that there was no evidence that social networks provided an arena for independent professional development for all students. On the contrary, they found that for a sample of students, social networks had the opposite effect. Alas, less creative thinking, less knowledge sharing and reduced desire to collaborate. The researchers found that the adverse effects were associated with the conception of social media held by the students. "The main objections to using social media can be divided into three categories: a belief that social media might be a waste of time; the perception of social media platforms as confusing or intimidating; and concerns about blurring social and professional identities." If students held these beliefs they did not benefit in their learning from social media (Salmon et.al. 2015).

Unlike Gao's study, Salmon's study indicates that especially Facebook is more promising when used for reflexive learning, while Twitter rather supported sharing of learning resources (Salmon et al. 2015).

That great learning effects that go beyond a given MOOCs platform are achieved through social networking is also confirmed by a study by Veletsiano and colleagues presented in 'Digging deeper into learners' experiences in MOOCs: Participation in social networks outside of MOOCs, note taking and contexts surrounding content consumption.' They conclude that the reflexive work through social networking with fellow students can enhance learning. Their study supports the conclusion from Salmon that the students' conception of social media is important when it comes to the benefits. If students embrace social media they are more likely to reap the benefits through this type of learning.

The social media is in itself not sufficient to offset the challenges in MOOCs and other online learning courses compared to sufficiently providing all or most participants with a sense of belonging to a learning community, or to support competency development of interpersonal skills, co-creation, communication and participation in reflexive and collaborative learning processes.

To really teach students to mooc, more supportive structures have to be in place than just a coupling to social media. But social media can for a large sample of students be one of the most important scaffolding structures, and it is a structure that most of them know from their everyday life - and something that most of them have experiences with before participating in online learning.

7. Social Learning in MOOCs

In 'Guidelines for Facilitating the development of learning communities in online courses' Yuan and Kim point to the importance that MOOCs establish themselves as learning communities. Learning Communities, where participants have a sense of belonging, where there is academic exchange, collaboration and knowledge sharing, and how you can work together on common issues is essential for the many benefits of web-based education. To succeed the learning communities have to be part of the design, and it must continuously be supported in the course(Yuan & Kim 2014). There must therefore be allocated 'space' to 'group activities'.

It is also important that MOOC instructors contribute to the learning communities and their maintenance to give the students a security for the professionalism (the feeling for teaching presence (Garrison 2009), which

Salmon (2015) pointed out to be a challenge. Yuan and Kim also stresses the need to work with both synchronous and asynchronous contribution to the learning communities. The principles of teachers' active participation and use of both synchronous and asynchronous contributions to learning communities can be both costly and reduce the flexibility of a web-based training. But to make sure that MOOCs become an educational opportunity for the many, MOOC providers still have much to work on. (Ferguson 2014).

It is essential that study activities in a MOOC are designed so that they require or at least strongly support that students are working in groups. (Yuan & Kim 2014). And the activities need to be varied so students are accustomed to different ways of working with peers. It is crucial that there are different activities, so the learning community is activated in different learning processes: reflective, collaborative, discursive and so on.

8. Conclusion

The little research available on online social learning and use of social media suggests that much is to be gained from focussing on developing a student-centric and community-based pedagogy for MOOCs and online learning in general. But much more research is needed, for instance in relation to:

- Online learning and different learner groups (age, education, background etc.)
- Social Media use and effect in different educational levels (K12, college, vocational, HE etc.)
- Effect of learning models (learning theory) in online education
- Online learning communities

But for this research to be effective much more pedagogical experimentation is needed as well.

One of the issues with MOOCs is that they suggest a disruptive innovation for an educational delivery and business model but at the same time they suggest an outdated pedagogical model that might not serve society well when it comes to students and the competencies acquired. Or if MOOCs are based on connectivity and networked learning they leave most students without the competencies to partake the MOOC.

Students have to learn to mooc for MOOCs to be a part of formal education and a serious part of a national educational policy. One requirement for a broader recruitment is more focus on the social aspect of learning.

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MOOCs - Mitigating Objection to Online Curricula

Anat lechner, PhD

Professor of business management

Stern School of Business, New York University, USA

alechner@stern.nyu.edu

Abstract

What is the change strategy required for an academic institution to engage in, in order to leverage new opportunities associated with MOOCs? Over the past five years I was deeply involved in leading and participating in numerous committees, forums, task-forces and discussions at both the university and school level, all aimed at assessing the strategic viability of an online education strategy for our top tier business school.

We were challenged with numerous change management dilemmas from identifying a unique and new educational value that we could offer, to assessing growth potential against product cannibalization risks, learning the actual production process of an effective online experience, identifying faculty that could help lead the school in such new educational direction, securing the right resources and talent required for a top notch MOOC production, and relaxing a traditionalist culture of conservatism, among a few key issues.

We learned that the transition to MOOC based online open education platform is not just about new product development, new value offered, new communication drafted, or different commercialization efforts. Instead, a careful orchestration of numerous moving parts is needed. Overcoming a culture of education exclusion, and faculty resistance to change, developing a school wide infrastructure of talent, technologies, tools and metrics, securing university wide support, engaging in lean development, and staging a strategic market penetration, are among the change levers identified.

This short paper uses a case based approach to propose a strategic change framework for effective transitioning of the education platform to an open online democratized one.

Keywords: Democratized education, Change management, Online education strategy

1. Introduction

If you looked at MOOCs in 2011 you'd not be particularly impressed. Stanford university had a handful of such courses and it was far from clear what would their value-add be in the then-stable-conservative-traditionalist land of frontal in-class instruction. But as with any other exponential growth story, in 2014 there were already fifteen new courses added every day to the Coursera platform that has opened by then, in 2015 the MOOC space essentially doubled with 1,800 new courses announced and more people signing up than they did in the first three years combined, and today there are over 4,500 courses available with over 35 million course sign ups to at least one course (Shah, 2015).

Among the fundamentals challenged by MOOCs is abandoning of the traditional college course structure of due dates and deadlines, and the adoption of a self-paced model. This 'Always On' availability that allows students to complete the courses at their own pace, is also coupled with users ability to parse content at the level of individual lecture videos.

Examining the structure of growth, oppose to simply size its volume, MOOCs are growing exponentially, and as such, are inherently disruptive¹⁷⁶. More specifically, MOOCs bring a transformational change on two levels: First, by nature, MOOCs enjoy a scalable reach to a theoretically-infinite number of people that can partake in and benefit from this form of education and learning. The digitization of content allows for little to no reproduction cost and drives this great scalability. Second, and perhaps even more impactful, the democratization of education that comes with such scalable reach both empower learners while also commoditize the educational content, forcing the migration of value associated with its acquisition. As such MOOCs fuel other deeper level changes.

The division between high-tech and high-touch learning becomes ever more important to articulate. “Flipping” the classroom, using technology to move lectures/content outside the classroom, naturally promotes rethinking the in-person experience of discussion and interaction. Three new value-add areas emerge:

- High-order skills: Using technology to flip the classroom frees faculty’s time to working with students on insights development and higher order capabilities. Instructing students could now focus on knowledge acquisition instead of knowledge dissemination/ sharing.
- Personalized learning: While it is difficult to assess the quality of in-class learning outcomes, MOOCs present new analytics on student progress through materials, pace, areas of interest and challenge, and a real time comparison across large student population for benchmark and data patterns. New insights can then be mined to personalize the learning experience for each and every student, focusing the content, delivery and scope, to better student engagement and teaching relevance/efficacy.
- Institutional efficiencies: MOOCs allow for new levels of efficiencies not only at the student level but they also drive higher levels of institutional cost saving and content efficacy. Assuming that every institution offers four sections of Business Fundamentals every semester, there would be about 32,000 such sections taught in the U.S. in any given year. Using MOOCs we can capitalize on flipped classrooms to better deploy faculty resources.

As the MOOC paradigm grows underneath the traditional structure of the higher education industry, surveys¹⁷⁷ and reports¹⁷⁸ allow a deeper understanding of the opportunities and challenges associated with this disruptive historical moment. The visible collapse of the ‘old order’ and the emergence of new and revolutionary educational technologies generate tremendous uncertainty, strategic dilemmas, and change objections. Premier institutions find it difficult to estimate the efficacy of the new pedagogy and delivery methods, quantify the value of monetized scale against the backdrop of traditional brand value, and engage in a conversation that rally the faculty and all other constituents, to embrace opportunities associated with the new educational technology.

¹⁷⁶ The term ‘Disruptive’ is used along the lines of Perter Diamandis view on the subject. An elaborated discussion of the topic can be found in Diamandis, P. & Kotler, S. (2015). Bold. Simon & Schuster, NY, USA

¹⁷⁷ For example the HOME project <http://bit.ly/2dcsTHK>

¹⁷⁸ For example “Quality in MOOCs: Surveying the Terrain” <http://bit.ly/2cUT9VQ>

2. Paving the road to MOOCs - The Princeton case

The road to MOOC-enabled education is full of good intentions, hoops, presuppositions and challenges. A shortlist of change challenges will typically include faculty concerns, lack of awareness and/or objection, lack of necessary skills and relevant resources, and lack of strategic vision as to where the education space is going and what position should the institution assume vis-a-vis this disruption. As is with every other change of such magnitude, impact and speed, the stakes are high and a typical academic environment, conservative by nature and slow to adapt, is not likely to respond with a sense of urgency, vision and unity.

In September 2015 a Faculty Council on Teaching and Learning at Princeton University published a comprehensive report detailing a Strategic Review of Online Education¹⁷⁹. The review outlined the approach taken by the university to examine, adopt and execute a change strategy aimed at transitioning to a technology enabled education offering. The process followed is one that could serve as a model-path to a successful online education offering development.

In late 2014, about two years after Princeton offered its first MOOC (being one of four institutions to participate in the launch of Coursera, and having 16 Princeton faculty, members from across 10 disciplines, that developed MOOCs between 2012-2014), the Provost appointed a Faculty Council to assess the rapidly emerging online education space and recommend strategic priorities for the university. This effort resulted in four high-level recommendations:

1. Assume uncertainty: The online education space is typified by extreme uncertainty regarding its effectiveness.
2. Build on and enhance existing capabilities: Development of online materials and tools should build on existing strengths and enhance and complement -- not replace -- existing modes of teaching and interaction.
3. Share to benefit: Disseminate online course materials to the public as long that such efforts can yield clear benefits to the Princeton students.
4. Partner with faculty: Consult with the faculty regarding Princeton's strategy for online education, especially given faculty members' strong and widely diverging views on this subject.

More specifically, the faculty survey identified several pros and cons associated with transitioning to an online teaching/learning mode, showing in Table 1 below:

Table 1: Princeton Faculty Survey Results¹⁸⁰

Two strategic initiatives were identified for future concentration:

- (1) Development of supplemental materials designed to improve student retention in the STEM disciplines.

¹⁷⁹ <http://bit.ly/2cEaLWi>

¹⁸⁰ <http://www.princeton.edu/strategicplan/files/Task-Force-Report-on-Online-Education.pdf>

- (2) Development of small private online courses (SPOCs) for summer study. The “small private online courses” (SPOCs) are offered over the summer session with limited enrollments (~20-25 students) and consist of live, faculty-mediated discussions combined with online self-paced course activities.

The two initiatives are not only strategically important, but they are also driving capability building in areas of importance, capabilities that could later be leveraged within a broader context, while at the same time, both

+ Pros	- Cons
Flipped lecture: Students first work through recorded “lectures” at their own pace, and answer in-video questions as they go, free professors’ time to face-to-face discussion of problem and interactive forms of teaching.	Effort and resources: Flipping the lecture can be very demanding of faculty time (record, edit and update lectures, create in-video quizzes and other features, then develop a plan for using face-to-face class time more effectively).
Forming a global perspective: Using Video-conferencing like Google Hangout, Princeton students were able to connect with Coursera students from around the world to form a broad global perspective on issues discussed	In-class attendance: Online learning often weakens class attendance and reduces the quality and frequency of student-faculty interaction
Crowdsourced feedback: Digitization of course materials and the experience of thousands of students working through the course often generate candid feedback that leads to improvements in both course content and instructional methodology	Online course experience: MOOC forums with high volume discussion are difficult to manage, compromising faculty attention to students.
Performance assessments: Online courses use quizzes and peer-graded exercises that give students meaningful and immediate feedback and free up faculty time to consult with students having difficulty.	The risk for a dull learning experience: Some students found the classroom experience boring and unfocused, and faculty pointed to the difficult and labor-intensive work needed requiring a lot of preparation and experimentation.
Innovative pedagogy: Going through the process of developing and delivering a MOOC from designing and recording lectures, to designing assessments, and discussion/reflection opportunities, faculty are likely to rethink their general approach to pedagogy enhancing the efficacy of teaching and learning.	

recommendations have a relatively low risk profile and do not force all the faculty into a position that will generate resistance.

Lastly the report was pointing to four major areas where the university needs to focus attention and further its support in order to successfully embark on an online education strategy as showing in Table 2 below:

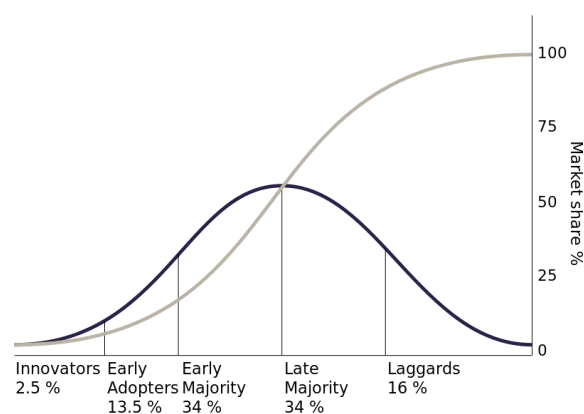
‘Table 2: Four focus areas supporting strategic transformation into an online curricula.

	STRATEGIC FOCUS	DESCRIPTION
#1	FACULTY INCENTIVES	• Making resources available for faculty who want to study various types of online learning. • Address faculty interests: A. financial incentives including course development stipends and revenue-sharing B. reduced teaching loads C. compelling evidence of the effectiveness of online learning D. enhanced visibility on a global stage
#2	PRODUCTION TALENT	Online course production and delivery costs vary by course length and complexity and often include: • Faculty members’ stipend (ranges \$25,000 and \$35,000) • Graduate assistant(s) needed to support the course • Video production charges • Copyright clearance fees • Material visualization production charges • Instructional designer fees • Administrative support fees
#3	STRATEGIC COLLABORATIONS	Interviews with peer institutions revealed a high degree of interest in forming partnerships for purposes of advancing large-scale projects in online education
#4	COMMUNICATION STRATEGY	Considerable room for improvement was identified in the communications with faculty “...regarding the benefits and limitations of online education, the resources available to support online projects, and the processes for developing and reviewing proposals”.

3. Mapping the strategic change needs for transitioning into MOOC-enabled education: Learnings from the Princeton case.

The Princeton case provides some excellent benchmark practices as well as issues to consider:

1. A sense of urgency and support from the top (visionary leadership): As Kotter (2007) noted, transformation efforts often fail when they lack leadership that acts with a clear sense purpose and urgency. The Provost at Princeton mandated the initiative of learning about and strategizing for an institution-wide online education, and by so doing, he made it into a credible institutional priority. Support from the top is essential to inspire the entire organization, ignite a sense of interest and commitment, and help to confront objections with both clout and credibility. To further enhance the credibility of this effort, the guiding coalition formed (The council) was elected from across various departments within Princeton, signaling that this effort is 'for the people, by the people' and that there's a fair representation of the diverse faculty body around the recommendation/decision table.
2. Mine the right data: An aspiration becomes convincing when there's data to support and substantiate the direction proposed. The two studies that Princeton launched, one that mined best practices from external peers and another that looked internally to map the ideas and concerns of faculty, were instrumental in building both insights and good will for an institution-wide online education strategy. The peers selected to participate in the benchmark study (Columbia, Duke, Michigan, MIT, Yale, Stanford and Brown) were all going through the experience of building MOOCs and could provide credible and deep understanding into the issues involved. The simultaneous effort to also mine the ideas and concerns of the Princeton faculty ensured internal constituents that the institution culture's point of view is also being considered. Mining the right data signals to all stakeholders that the strategic decision process would be well-informed and rationalized and that no hasty choices worth-objecting to, would be made.
3. Secure faculty support: As Rogers argued in his book Diffusion of Innovations (1962, 2003) new ideas become adopted over a five-stage process (awareness, interest, evaluation, trial, and adoption) where the innovation is first brought to life by the innovators, then get tested and iterated on by early adopters, and as it becomes more robust, it gradually picks the interests and commitment of the early majority, the late majority, and finally, the laggards (See Figure 1 below). The Council identified and brought into the fold the few Princeton faculty that have already developed MOOCs, as those early adaptors could continue to



champion the transition into an online education strategy should such strategy be recommended.

Figure 1: Rogers Diffusion of Innovation Graph

4. Show early wins (AKA 'Go slow to go fast'): The Council recommendations suggested to centers the change program on building essential online capabilities (concentrating on developing online materials for STEM courses and building SPOCs for some of the summer courses) with low risk profile. Such strategy allows to gradually build up the capacity to produce and deliver online education, test the offerings on small audience, iterate as needed, demonstrate efficacy with a few successes, and use this learning to drive evidence-based strategy for scaling the online platform/offering.

4. Additional strategic change management considerations.

Tremendous consideration was given over the years to the pedagogical aspects of creating effective MOOCs. While the challenges associated with making the online experience meaningful, engaging, and overall educational are paramount and essential to attained to, the overarching strategic envelop that wraps around this new offering is equally important to address.

'Onlining' education, as shown in the Princeton study, risks the quality of the in-class experience, adds significant development costs, and challenges the value attached to the branded leaning experience for which universities traditionally charged high dollars (at least in the USA). The concerns around diluting the brand value, cannibalizing the main revenue stream, and alienating faculty for whom this type teaching pedagogy is foreign, must be tackled within a new strategic approach that would not only put such fears to rest, but would also ensure that the new online offering is superb both in its educational efficacy as well as its overall strategic viability.

In addition to the issues discussed thus far, an overall change strategy that aims to guide the transition into an online MOOC-driven democratized education must present satisfactory answers to the following issues:

1. New value creation. As shown in the Princeton study, online learning often weakens class attendance and reduces the quality and frequency of student-faculty interaction. Theoretically though, there are numerous advantages associated with freeing faculty time, that could then result in high-touch personalized education experience, but the burden is on the faculty and the institution to create such high-touch opportunities.
2. A new collaboration/alliance model: As noted earlier n any given year in the US, there are about four Psychology 101 courses taught in each of the higher ed institutions, resulting in roughly 16,000 such courses running across the various universities. It is hard to assume that each institution provides a high-enough unique value that could warrant such unnecessary duplication of resources and efforts. Similarly, it would be completely pointless for all these universities to go ahead and produce their individual version of a Psychology 101 MOOC. Onlining education presents us, for the first time. with a unique cross-institution collaboration opportunity for course offerings and beyond. Similar to transformations that took place in other industries and resulted in cross player collaborations, for example the creation of alliances in the airline industry, we can now envision the creation of such alliances across institutions where MOOCs are shared within the alliance, reducing the need for each alliance partner to develop a full suite of such courses, and freeing every member of this collaboration to concentrate and contribute in areas where they are uniquely positioned to add value. Here too the burden in on the institution to formulate or join such alliance structure.

3. A new compensation model: The Princeton study identified the need to rethink faculty compensation in the context of MOOC creation and delivery. Faculty are interested in financial incentives including course development stipends and revenue-sharing, reduced teaching loads, and enhanced personal visibility. The traditional compensation model, which is salary based, must be adjusted to acknowledge both the effort and the possible upside associated with MOOCs, monetized or free. Among the challenges that such shift might create is the large and visible disparity that could emerge between faculty who succeed in this new mode of education that encapsulates opportunities for exponential growth (financial and reputational), and those who lag behind. Such inequalities might be threatening to an academic culture of collaboration and thus need to be carefully thought through.
4. A new capability model (beyond course instructional pedagogy): Traditionally educational institutions excelled in educating and research. Skills and capabilities within the domains of digital, social marketing, content visualization, and data mining are not abundantly present within these institutions. Onlining the education offering and personalizing educational experiences, require deep mastery of these above capabilities, and the introduction of new support staff to aid both production and delivery, working jointly with faculty.
5. Step-wise progression and transition timing: One of the key challenge underpinning any change program is the question of pace and load. How much change is too much, or too little, and how fast should change happen to effectively balance between the need to build new capabilities and the need to combat competitive pressures. As the Princeton case showed, innovators and early adopters can go slow to go fast, building capabilities in low-risk-low-scale opportunity areas, to then leverage their learning on a grander scale. Yet those who are part of the early majority would need to dive in faster in order to maintain some viability. Rapid change for those who have low change appetite to begin with, can send the institution into a spin of fighting internal objections and competitive irrelevance at the same time. Careful consideration needs to be given to engaging and ramping up the pace of transformation, relying on external knowledge and capability already developed to speed up institutional learning, and guide and support faculty success in producing and delivering a successful online experience.
6. Communication strategy: Every change effort is largely reliant on an effective communication strategy to succeed. The multiple stakeholders of any institution, educational or other, might not be preview to and aligned with the vision to online the education experience. It is essential to communicate the expected value, the effort, the goals, and the progress of this change to effectively address, and avert, objections and fears. As the Princeton council noted there is "...considerable room for improvement in the communications with faculty...regarding the benefits and limitations of online education, the resources available to support online projects, and the processes for developing and reviewing proposals".

5. Conclusion

Given the recent introduction of MOOCs, much attention was given to examining the efficacy of this new pedagogical format, and enhancing its learning or educational powers. The Princeton case however, demonstrates one institution's strategic foyer into the online MOOC-driven education space, broadening the perspective on what issues need to be addressed beyond the quality of the MOOC pedagogy .

Following the process by which Princeton studied the space and mapped effective ways to engage in onlining their education offering, gives insight into issues pertaining to internal and external collaborations, both with

faculty and peer institutions, as well as developing new educational value that encompass and leverage both online and high-touch experiences to personalize the learning.

As the online space emerges to effectively compete against the traditional education paradigm, innovators and early adopters are building capabilities that would allow them to engage in exponential growth, commoditizing, democratizing and overall revolutionizing higher education. This newly escalated pace of change presents a rude wake-up call to those institutions that are still sitting on the fence. As capabilities are slow to build, and the MOOC-driven democratized education space is fast to transform, the competitiveness and viability of traditional higher-ed institutions is increasingly at risk. The Princeton case as well as the change management considerations outlined above are meant to trigger and guide strategic discussions on how to best join this revolution!

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What have they done with the MOOCs?! The impact of MOOCs on Campus Education

Pedro Cabral

Delft University of Technology, The Netherlands
P.M.Cabral@tudelft.nl

Willem van Valkenburg

Delft University of Technology, The Netherlands
W.F.vanValkenburg@tudelft.nl

Sofia Dopper

Delft University of Technology, The Netherlands
S.M.Dopper@tudelft.nl

Abstract

In 2013 Delft University of Technology (TU Delft) started to offer Massive Open Online Courses (MOOCs) on the EdX platform. One of the main principles in the MOOC development process was to publish all educational resources under an open license (Creative Commons License) (Ouwehand, 2015). This aligned with TU Delft's Open Access Policy. Another important starting point in the MOOC development process was the aim to improve campus education by integrating MOOC content in those courses.

The impact of MOOCs concerns not only the world outside the university, but more importantly also within the university. Especially for a traditional brick-and-mortar research-based university, like TU Delft, this is a big gain: education has become more important. In the past three years it has become clear that developing a MOOC has led lecturers to re-think their approach towards teaching and to integrate MOOC materials in campus education, which has impact on the way they teach on campus. MOOCs are used on campus in different ways, from a small addition to an existing course to a full integration into a completely redesigned campus course. Moreover, some teachers became conscious of the importance of educational resources under CC License and started to use material from other universities. One of the faculties created a course which uses MOOC materials to help the students to prepare for a master program. This paper describes the way in which MOOCs have been used in campus education and the impact this has had on teaching and learning.

Keywords: Open Educational Resources, Improving, Campus Courses, MOOC, blended learning

1. Introduction

Society is changing continuously and that applies as well to Higher Education. When we think about such changes, this used to happen on a conceptual level first and only then the technology would be changed; nowadays the process of conceptual and technology changes occurs at the same time (Siemens & Tittenberger, 2009). The creation of the first Massive Open Online Course (MOOC) in 2008 was the first step for one of this conceptual and technology big changes in Higher Education. However, MOOCs only got international exposure when traditional brick-and-mortar higher education institutions decided to embrace this movement in Coursera, Udacity and edX. In a way, that big change led higher institutions to feel obliged to offer online courses (Teixeira, Volungevičienė & Mazar, 2014), with more and more universities offering MOOCs, for instance. Although the MOOC word is used indistinctly, traditional universities are experiencing

with new forms of conceptualizing the way they share knowledge and, at the same time, dealing with new type of learners. This also raises the question on how MOOCs impact campus education. Since there isn't too much research about the impact of MOOCs on campus education, the purpose of this paper is to bring this subject into discussion within the scientific community.

2. Extension School innovation program

With the objectives of “Educating the World” and “Improving Campus Courses”, the Extension School program, a TU Delft innovation program which started in 2014, focuses on the production and delivery of high quality open and online courses, such as MOOCs (Van Valkenburg, 2016). The open and online products and the corresponding expertise that are being developed within this program are used to improve online as well as campus education. This means that online teaching methods as well as online course materials that have been developed for an external audience will be used in campus education as much as possible, in such a way that the teaching and learning processes on campus will improve. This re-use in campus education has been stimulated and has happened in different ways.

2.1 Tender procedure

Four times a year, the extension school program offers Faculties the opportunity to submit a proposal to either create a MOOC or other type of online course, or even, with the idea of improving their campus education, to integrate OERs in their campus course. If a proposal is approved, the proposers receive an amount of money as well as educational and technical support to carry out their project. An eLearning developer is assigned to every new project, and guides the new teachers and their course teams throughout the complete course development process, from course design to evaluation. This development process follows a quality cycle, in order to create courses with the highest possible quality.

2.2 TU Delft Extension School's Quality Cycle

The ‘TU Delft Online Learning Education Quality Cycle’ (see figure 1), consists of three main stages: development, running and evaluation of the course. The first stage, course development¹⁸¹, consists of 3 stages as well, namely course planning, which implies designing the course; course building, which means development of all the course activities and resources as well as implementing these elements into the digital learning platform, and finally the testing stage, which entails an extensive beta-test of the newly developed course. During the process the eLearning developer can involve extra expertise if necessary, like an instructional designer, a marketer, a copyright specialist or a multimedia expert. In this way we try to correspond as closely as possible to the specific needs of the course team and the course that is being developed.

¹⁸¹ To a deeper understand please read Meijerink, Kiers & Marquis (2016)

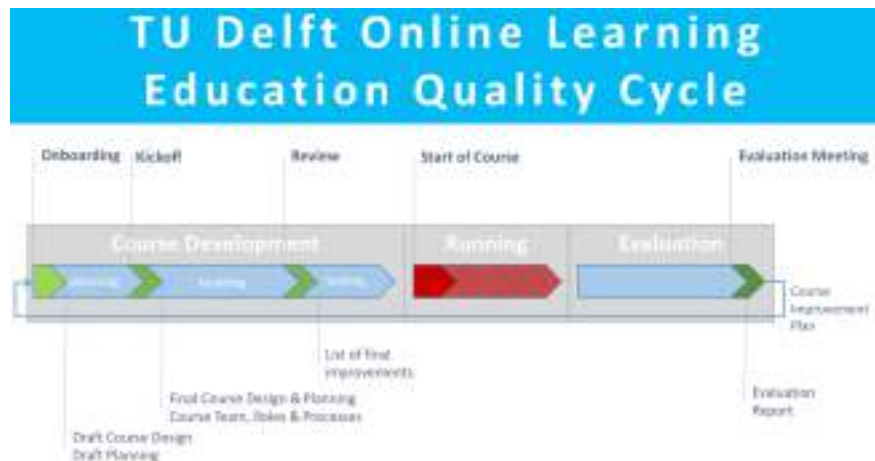


Figure 1: 'TU Delft Online Learning Education Quality Cycle'(Jorge cs., 2016)

In addition to the tailored guidance by the eLearning developer, the course teams have the option to participate in several workshops depending on their own needs (e.g. Acting in front of a camera, moderating a big online community in a MOOC, etc.). In this way they are enabled to develop the necessary skills to develop and manage an online or blended course. Finally, at the end of the quality cycle, the course is evaluated in order to understand the lessons learned and what should be improved for the next run. Although it is well recognized, inside the institution, that the development of online education, including MOOCs, has improved campus education and that it is a good strategy to promote blended teaching, when compared to other innovative movements done before (Kiers, 2016), there was no data structured in a way we could confirm this general feeling. In order to have this problem solved, this research was developed.

3. Research

In interest of gaining insight in the impact of MOOCs on campus education and the way MOOCs are used on campus this study was carried out. Until April 15th 2016 TU Delft has run and finished a total amount of 23 MOOCs¹⁸². To retrieve the information about the use of the MOOCs in Campus Education, different sources were used:

- E-Learning developer responsible for the development of the course
- Product manager of MOOCs and Faculties' Account Managers
- Evaluation Reports and Papers
- Course teams

3.1 Description

First, a list of all MOOCs was created and based on that list, all courses which were still running or in development on the 15th of April 2016 were removed (final list in Table 1). Next, the e-Learning developers were asked to complete a document in which they identified their awareness about the use of the MOOCs they worked on, in campus education. Secondly, we talked to the Product Manager of MOOCs and the Faculties' Account Managers to know any more detail about what they knew about what the lecturers were doing with the MOOCs in their campus education. In a third moment, the evaluation reports from MOOCs were analyzed to retrieve extra information and the papers written by TU Delft's Extension School Members

¹⁸² One of the first MOOCs was split in 2, so we only considered the actual 2

were viewed as well. Finally, an e-mail was sent to the course teams of the MOOCs which we had no information about to understand if and how their MOOC was used on campus.

Table 1: MOOC ran and finished before April the 15th 2016 (final date for the third quarter in the academic calendar year of 2015/2016).

MOOC Name	Course ID	Faculty
Introduction to Aeronautical engineering	AE101x	Aerospace Engineering
IMAGE ABILITY: visualizing the unimaginable	VisualX	Architecture
Sustainable urban development (AMS)	AMS.URB.1x	Architecture
The basics of Transport phenomena	TP101x	Applied Sciences
Industrial biotechnology	IB01x	Applied Sciences
Topology for condensed matter: untying quantum knots	TOPOCMx	Applied Sciences
Urban sewage treatment	CTB3365STx	Civil Engineering and Geoscience
Water and climate	CTB3300WCx	Civil Engineering and Geoscience
Drinking water treatment	CTB3365DWx	Civil Engineering and Geoscience
Building with Nature	BwN101x	Civil Engineering and Geoscience
Functional programming	FP101x	Electrical Engineering, Mathematics and Computer Science
Credit Risk Management	TW3421x	Electrical Engineering, Mathematics and Computer Science
Solar Energy	ET3034x	Electrical Engineering, Mathematics and Computer Science
Data Analysis: Take it to the MAX()	EX101x	Electrical Engineering, Mathematics and Computer Science
Pre-university calculus	Calc001x	Electrical Engineering, Mathematics and Computer Science
Circular economy: an introduction	CircularX	Industrial Design
Product design: the Delft Design approach	DDA691x	Industrial Design
Open Government	OG101x	Technology, Policy and Management
Responsible Innovation: Ethics, Safety and Technology	RI101x	Technology, Policy and Management
Framing: learn how to debate and create powerful messages	Frame101x	Technology, Policy and Management
Next generation infrastructures	NGIx	Technology, Policy and Management
Creative problem solving and decision making	TPM1x	Technology, Policy and Management
Leadership for engineers	LfE101x	Technology, Policy and Management

All the data was aggregated in the document that the e-Learning Developers had started to complete and after that a content analysis was done to 1) identify the purpose of using the MOOC materials, 2) identify what kind of materials were used and in which LMS it was offered.

4. Results and discussion

The 23 MOOCs have been used in different ways in a campus course and the extent to which a MOOC is reused on campus differs as well. From the data collected it wasn't possible to retrieve information about one of the MOOCs (AMS.URB.1x). Another MOOC(DDA691x has not been used on campus yet. There are two reasons for this. Firstly, it is not based on a campus course, but on a book, and secondly, it is on such an introductory level that it is too easy for TU Delft campus students. A third MOOC teacher (Frame101x)

indicated that the MOOC has not been used on campus yet, but probably will be used on campus later on this academic year. The first results show that, at least, 87% of the MOOCs are used somehow in campus education.

In the matrix below (Table 2) we have placed the 20 MOOCs according to the amount of MOOC materials which have been used on campus (vertical), and the pedagogical purpose for using the materials (horizontal).

In our research we identified 4 types of usage of a MOOC materials (vertical):

- **Use of the full MOOC:** this means that everything of the MOOC is reused in the campus course. The delivery platform is the campus LMS.
- **Reuse of MOOC content:** in these courses large parts of the MOOC have been reused, such as the videos, activities and assessment. The delivery platform is the campus LMS.
- **Reuse of videos:** only the videos of the MOOCs are reused in the campus course. The delivery platform is the campus LMS, videos are directly embedded from YouTube.
- **Students follow the MOOC:** The students have to create an account on edX and enroll in the MOOC directly. The delivery platform is edX.

In the didactical usage of the MOOCs we identified 3 very popular purposes and some others we have listed under other purposes:

- **Pre-requisites for a course:** Teacher recommends the students to do it before the course starts.
- **Flipped classroom:** this is the most popular purpose in which the traditional lectures are replaced by the content of the MOOC. Classroom time can be spent on more active forms of education.
- **Additional reading:** the MOOC content is offered as extra resources for the students.

Table 2: Use of MOOCs in campus education

	Pre-requisites for course(s)	Flipped classroom	Additional resources	Other purposes
Use full MOOC in TU Delft's LMS		TP101x CTB3365STx CTB3365DWx ET3034x	TPM1x	VisualX TOPOCMx
Reuse (part of) MOOC content (videos, activities, ...) in Delft's LMS		CTB3300WCx TW3421x IB01x	BwN101x TW3421x	NGIx LfE101x
Reuse of videos only in Delft's LMS	AE101x		CTB3365STx CTB3365DWx	
Students follow the complete MOOC in EdX	CTB3365STx CTB3365DWx FP101x Calc001x IB01x	EX101x CircularX RI101x	CTB3300WCx	AE101x
Additional info: One course – VisualX, TP101x, TOPOCMx, BwN101x, FP101x, ET3034x, EX101x, CircularX, RI101x, TPM1x, LfE101x More than one course – AE101x, IB01x, CTB3365STx, CTB3365DWx, CTB3300WCx, TW3421x, Calc001x, NGIx				

Most of the courses are used for flipped classroom (for example Hermans (2016)) and different lecturers use different strategies. They either use the MOOC materials (all or part) in the TU Delft's LMS or the students need to go to the edX platform and study the MOOC materials there. Some MOOCs are used in different courses for different purposes; usually this is related to the fact that the MOOC is used in a bachelor course or a master course. For instance, CTB3365STx and CTB3365DWx are used as flipped classroom in the same bachelor course, and in the master as additional material in different courses. Finally, only a few courses use the videos, which shows the importance of having activities connected to them in order to provide a deeper learning experience.

When we analyze the other purposes the following was found:

- AE101x – Students can do the MOOC and go to the exam without going to classes
- VisualX – The first run was in campus education, so the campus students were the beta testers of the MOOC
- TOPOCMx – The MOOC was used to create a complete new campus course
- NGIx – Part of the MOOC was used in a bridging course to prepare for the master program SEPAM. They also used some of the videos from this MOOC in one of the minor programs.
- LfE101x – used in honor program course

4.1 Evaluation reports and papers

Although the general information obtained in the results allow us to have an overview of the use of MOOCs in campus education, in the reports it is possible to have a deeper notion about its use.

Most MOOCs are used in a flipped classroom approach based on integrating the MOOC into the campus course it was originally based on. Students have to study parts of the MOOC, for instance, one full week or just a couple of relevant videos, to prepare for class. Contact hours are used for answering questions, discussions and working on group or individual assignments. There is a cyclical relationship between the campus course and the MOOC. First materials of the campus course are improved to use in the MOOC. Then, when the MOOC runs, participants share their own cases and provide feedback to the MOOC materials, and those cases and improved materials can be reused in the next run of the campus course again. By using the MOOCs in campus education teachers gain new ideas to improve their MOOC, and so the quality of both courses will be strengthened. A nice example of this is the draft book on Solar Energy, that was improved by MOOC participants of the Solar MOOC (ET3034x) and now is used in campus education as well.

The MOOC components can either be transferred to Blackboard, or campus students can participate in a live run of the MOOC on edX, self-paced or instructor-led. The advantage of using Blackboard is that all materials are in the same environment, and especially when not all MOOC components are relevant, only the useful elements can be put in Blackboard. The advantage of using the edX platform is that students have the complete MOOC learning experience, including interaction with the international community.

Other impact of MOOCs on campus from the teachers' perspective:

- Students:
 - All teachers interviewed feel that students are more engaged in the learning process compared to previous years. For the teachers a flipped classroom approach is less boring because they don't have to repeat the same lecture every year. One lecturer made a remark about not everyone having the profile for "flipping the classroom".
 - Some students study the MOOC material together, which allows them to prepare in an easier way for the course.
 - In most of the cases there was an increase in the final grade and a decrease in the number of retention (e.g. Smets, 2014). However, it is not clear which variables have influenced this results.
- Use of OER:
 - Some teachers, in the process of building their MOOC, found other MOOCs related to their topic and reuse the material from those MOOCs. Others got acquainted with OER and started to use in their campus courses.
- Teaching methods:
 - To flip the classroom allows either to have deep discussions about the material or side discussions about topics which weren't in the MOOC.
 - Some teachers decided to remove the option of having the grade based on the exam, giving the opportunity for students to have a continuous assessment.
 - The teacher has to rethink his contact hours compared to the number of EC-points, in order to adjust to new teaching and learning approaches.
- Selection and credits:
 - In some faculties MOOCs are used in the selection process of new first year students. For instance at Aerospace Engineering, parts of the Introduction to aeronautical engineering MOOC are used is a so-called mini MOOC which is part of the decentralised selection process (TU Delft LR, 2016).
 - Credits for MOOCs is another example of a way in which campus students can benefit from MOOCs. This is a virtual exchange of online courses that is being set up with the main objective that campus students can enhance their portfolio. Students can select MOOCs from a list of trusted universities around the world to get credit as part of their honours programme, graduate programme or electives.
- Professionalization of teachers:
 - Teachers that developed and delivered an open or online course have learned a lot about designing and teaching an online course in a way that is more effective than the best training in the world. They have a better notion of the possibilities you have to enhance student's learning process with the use of ICT. They know how to create good interactive assignments, quizzes, exercises and good video's. How to spark students, how to communicate with students online, how to use a discussion forum to share and help each other, to organise peer feedback, and alternative ways to give feedback and to assess. They are educated in online learning. This has impact on the way they teach on campus. Some MOOC teachers indicate that they are asked to help colleagues with their courses, so hopefully this knowledge is also transferred to other teachers at TU Delft.

5. Conclusion

The study shows that the majority of MOOCs are used in campus courses. The way they are integrated differs per course, but range from pre-requisite to a full integration into the campus course. Teachers as well as students benefit from this.

One of the important lessons is that just listing the videos as additional content doesn't positively affect the students. It is necessary to redesign the campus course and really integrate to MOOC materials as integral part of the learning process. Further research should be made to try to understand which kind of variables could be influencing the increase in the grades and the decrease of retention rate.

It seems to be quite natural for teachers to reuse their own MOOC in their own campus course. Therefore, most MOOCs have been used in the campus course it was originally based on. Furthermore, some MOOCs have also been used in full whereas others have only been partially used in other courses and by other teachers, for instance in electives or minor programmes. The start of reusing our own MOOCs in campus education opens the door for reusing content of others. We will further stimulate this to improve the adoption of OER in our campus education.

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‘Teaching for Transitions’: Reflecting on three nationally funded projects that developed digital tools to facilitate transitions into Higher Education

James Brunton

National Institute for Digital Learning, Dublin City University, Ireland

James.brunton@dcu.ie

Mark Brown

National Institute for Digital Learning, Dublin City University, Ireland

Mark.brown@dcu.ie

Gavin Clinch

Centre for Online Learning, Institute of Technology Sligo, Ireland

clinch.gavin@itsligo.ie

Eamon Costello

National Institute for Digital Learning, Dublin City University, Ireland

Eamon.costello@dcu.ie

Tom Farrelly

Institute of Technology Tralee, Ireland

tom.farrelly@staff.ittralee.ie

Jennifer Gilligan

Centre for Online Learning, Institute of Technology Sligo, Ireland

gilligan.jennifer@itsligo.ie

Antony Murphy

Institute of Technology Tralee, Ireland

antony.murphy@staff.ittralee.ie

Abstract

In 2014 Ireland’s National Forum for the Enhancement of Teaching and Learning in Higher Education issued a call for projects under their Teaching and Learning Enhancement Fund to support a theme of ‘Teaching for Transitions’. This theme aimed to inform the focus of activities in Irish Higher Education by changing the pedagogical landscape when it comes to supporting transitions through effective teaching and learning. The call acknowledged different types of transition: transition from secondary level into Higher Education; transition from one culture to another; or transition of adults into Higher Education. The enhancement theme also sought to improve teaching and learning culture and digital capacity.

This paper reports on reflections from three lead partners of projects funded under this call. Dublin City University led the ‘Student Success Toolbox’ project, which developed a suite of digital readiness tools for supporting flexible learner transition into Higher Education during the early stages of the study life-cycle. Institute of Technology Sligo led the ‘Get Ready Education - A Learning Journey’ project, which developed a dual pathway MOOC that supports students transitioning from second level to Higher Education in Ireland.

Institute of Technology Tralee led the 'Live and Learn in Ireland' project, which developed a number of interactive multimedia learning units that aid international students in becoming familiar with studying and living in Ireland and thus helps them make a smoother transition into Irish Higher Education. This paper identifies both the common lessons learned of these three initiatives but also the how our experiences diverged.

Keywords: transitions, teaching and learning enhancement, national projects, project leadership.

1. Introduction

This paper reports on reflections from three lead partners of nationally funded projects: the 'Student Success Toolbox' project, which developed a suite of digital readiness tools for supporting flexible learner transition into Higher Education during the early stages of the study life-cycle; the 'Get Ready Education - A Learning Journey' project, which developed a dual pathway MOOC that supports students transitioning from second level to Higher Education in Ireland; and the 'Live and Learn in Ireland' project, which developed a number of interactive multimedia learning units that aid international students in becoming familiar with studying and living in Ireland and thus helps them make a smoother transition into Irish Higher Education.

This paper will initially present information relating to the funding body, the National Forum for the Enhancement of Teaching and Learning in Higher Education, without which none of these projects would have proceeded. The paper will then proceed to present information relating to each of the projects individually, before going on to identify both the common lessons learned from these three initiatives but also the how the projects diverged.

2. The National Forum for the Enhancement of Teaching and Learning in Higher Education

The Irish Minister for Education and Skills announced the creation of a new body, the [National Forum for the Enhancement of Teaching and Learning in Higher Education](#), in November 2012. The role of the Forum is to enhance the teaching and learning experience for all students in Irish higher education. Since that time the Forum has been involved in many different activities in the pursuit of that goal, for example organising [national seminars](#), celebrating innovative and inspiring teachers through a [teaching hero campaign](#), launching a [national professional development framework](#), directly coordinating [a number of projects](#) focused on specific sectoral priorities, and funding a number of projects and initiatives through themed teaching and learning enhancement fund calls.

In 2014 the National Forum for the Enhancement of Teaching and Learning in Higher Education issued a call for projects under their Teaching and Learning Enhancement Fund to support a theme of 'Teaching for Transitions'. This theme aimed to inform the focus of activities in Irish Higher Education by changing the pedagogical landscape when it comes to supporting transitions through effective teaching and learning. The call acknowledged different types of transition: transition from secondary level into Higher Education; transition from one culture to another; or transition of adults into Higher Education. The enhancement theme also sought to improve teaching and learning culture and digital capacity.

3. The Projects

This section of the paper will present some brief summary information about each project.

3.1 The Student Success Toolbox Project

The Student Success Toolbox project is funded by the National Forum for the Enhancement of Teaching and Learning in Higher education Building Digital Capacity fund. It involves four project partners: Dublin City University (lead partner); Sligo Institute of Technology; Maynooth University; and Dundalk Institute of Technology. This project has produced both a [guide](#) for the sector on how to improve flexible learner readiness, and a [suite of digital readiness tools](#). The tools were designed around five overarching principles of supporting (i) self-regulation, (ii) personalisation, (iii) customisation, (iv) information at the point of need, and (iv) language and framing of the tools in the world of the prospective learner. Each tool was developed following an agile project methodology, which involved a cycle of development based on piloting, peer review and feedback from students. The accessibility of the tools, for the education sector, is also a key strength of the project. The tools can be viewed on the [project website](#), and can be obtained from the project's [Github webpage](#). Any institution/program team can take, augment, customise and use the tools.

The project addresses the problem of effective transitions and the foundations for student success with a specific focus on flexible learners. In the context of this project a broad definition is adopted of flexible learners, which includes adult learners engaged in part-time and online/distance learning. Enhancing

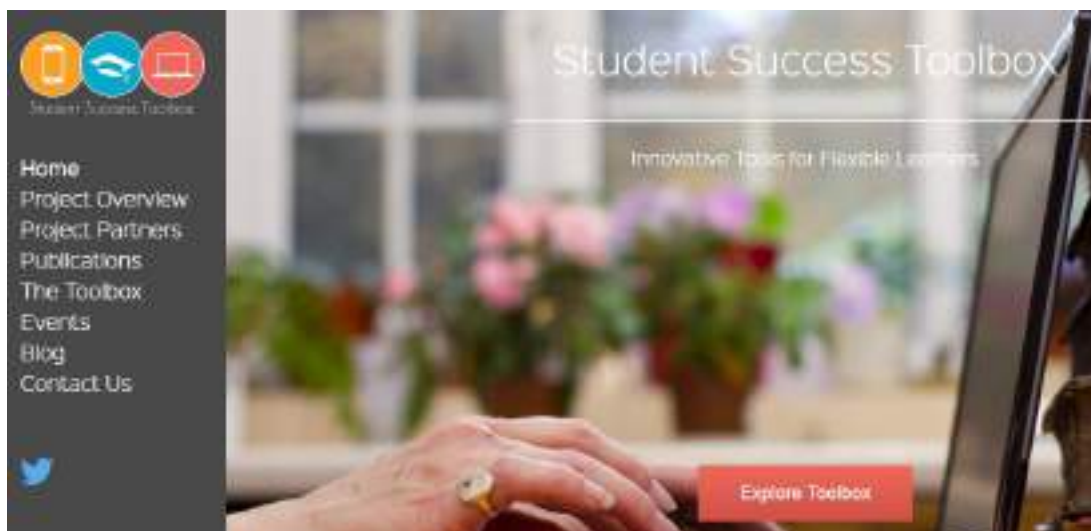


Figure 3: The student success toolbox project website



retention and completion rates of this group of flexible learners is a significant problem both globally and within the Irish context (HEA 2012; Simpson 2003).

The project's focus is on producing resources that support flexible learners through key transitions in the early stages of the study lifecycle: from thinking about study, making choices, the registration process and through to the first few weeks (Brown, 2014). A premise of the project is that foundations for success are laid early in the lifecycle, and that insufficient attention has been given in the literature and within institutions to the importance of this period. A related assumption is that this transition period may be enhanced by the availability of appropriate digital readiness/preparation tools, which scaffold both prospective students and those about to embark on flexible study for the first time.

The methodological approach utilised by the project is a design-based research approach. It is an iterative process that does not just evaluate an innovative product or intervention, but systematically attempts to refine the innovation while also producing design principles that can guide similar research and development endeavours (Wang & Hannafin, 2005).

The project conducted an [analysis of the existing literature](#), in order to address the overall question “what tools work?” in relation to supporting flexible learner success during the transition period.

This analysis identified a number of tools and interventions. Nichols (2011) evaluated positively the use of support measures, including a compulsory support survey, orientation course, general messages of support, and personal contact with students requesting help. Gallie (2005) found discussion forums, active emails, and time-limited lecture postings useful to foster student satisfaction and improve success. Murphy, Politis and Slowey (2015) suggested mature learners benefit from generic advice on the range of options at higher level to help course choice, early access to timetables, and activity based learning to improve academic ability and confidence. They highlight the importance of providing a space for entrants to socialise with the wider community of adult learners. Though useful, the number of tools identified here was limited.

To support the literature analysis, a database of existing readiness tools was created through an examination of the websites of twenty-two universities in four different regions around the world. This examination involved the identification of website-based readiness tools that institutions make available to prospective learners and/or learners who were preparing for study in that institution.

Rather than analyse tools geographically or based on format (video, webpage, etc.) the tools were coded thematically and clustered into groups based on their main function as follows: 1) Course match; 2) Preparation for higher education; 3) Orientation; 4) Addressing personal circumstances; 5) Community; and 6) Satisfactory student experience. The six groups correspond closely with the key factors identified by Jones (2008) as the main factors that, when in deficit, contribute to learner dropout. The clusters were matched with related literature in order to identify points of convergence between the literature and the tools in use internationally.

Based on the literature analysis, and on the analysis of tools in use, eight digital readiness/preparation tools were developed to facilitate successful transition into higher education for flexible learners.

Am I Ready for Study?

In the [Am I Ready for Study? tool](#) prospective learners are provided with the opportunity to self-assess if they are ready to commit to flexible study. This quiz is comprised of six sections addressing: Previous Study; Work and Family; Study Intentions; Study Skills; Computer Skills; and Work Habits. After answering each question personalised feedback is provided, and upon completion of the quiz an overall summary of their results and further personalised feedback is provided. Each person is either informed they are ready for study or encouraged to access the provided resource links to discover how they could enhance their readiness.

Do I Have Enough Time?

The [Do I Have Enough Time? tool](#) provides a self-reflective ‘Calculator’ where prospective learners are supported in thinking about the amount of time spent on different activities and how much time they have to allocate to study. The calculator enables people to self-assess whether balancing study with their existing commitments is realistic. Each person is provided with tips on how to most accurately estimate how they

spend their time under the sections Work, Family, Household, Hobbies, Leisure and Sleep. On completion of the exercise people are given feedback on whether their personal circumstances are conducive to studying.

Who can I ask?

The [Who Can I Ask? tool](#) offers prospective learners the opportunity to think about their support network and how they might garner support to help them succeed. Users explore how to seek support from friends, family, employers, institutions, and other students. Support scenarios about how students were supported through their studies can be accessed throughout the tool. Advice is offered on how to deal with a lack of support.

My Computer Skills

In the [My Computer Skills tool](#), through the guidance of a student narrator, prospective learners are informed of the necessary computer skills needed in higher education. They are informed of the technology they need, and related services offered by institutions. Student stories can also be accessed, exploring learners' interactions with email services, online reading materials, Word and Powerpoint. A computer skills quiz is offered within this tool, allowing self-assessment of computer skills. Three navigation pathways are available through this tool depending on previous experience with computer technology. Online services to assist students in improving their computer skills are flagged.

My First Assignment

In the [My First Assignment tool](#), through the guidance of a student narrator, prospective learners follow a narrative on what it is like to plan/develop an assignment. Advice on how to start, develop a plan, and break down a research question is provided, with key elements within a plan being presented. A series of student quotes are accessible throughout the tool to give users a sense of what it is like to tackle an assignment. Different navigation pathways are available through this tool depending on previous experience with higher education.

Head Start Online: First Steps to Flexible Study

This [Head Start Online tool](#) is a five week MOOC that provides prospective learners with advice on how to prepare for studying at higher education level as a flexible learner. This tool incorporates a number of the other tools within its structure. This allows the MOOC to aid prospective learners in: assessing their readiness for higher education; calculating how much time they have available in their lives to study; examining what supports they have to help them overcome common problems; learning about computer; and about the study skills required to study successfully. Additional content (text, audio and video), activities and facilitated online discussion forums, unique to this tool are also used to help prepare prospective flexible learners.

Study Tips for Me

The [Study Tips for Me tool](#) provides crowdsourced support for flexible learners from other flexible learners. The site uses the Tumblr platform, and addresses topics such as developing a healthy study/life balance. Learners are free to post on the site and it is intended that materials posted would be generic and beneficial for any flexible. Through encouraging interaction between students at an early stage of the study lifecycle in this manner it is believed the tool will benefit all students in overcoming challenges and developing suitable plans for study.

Online Orientation

As an 'on-entry' orientation is unique to a programme or institution the [Online Orientation tool](#) takes a different form. This tool is created as a guide for those creating an online orientation, describing the elements that should be present in an effective orientation and giving examples of different approaches to including that element in an online orientation. The tool facilitates the user in developing a plan for creating an online orientation for their programme/institution.

Evaluation of the tools

An iterative development-review-(re)development approach was utilised throughout the project. For all tools, feedback was received from higher education staff and existing flexible learners at two stages during development: tool design storyboard first draft; and first tool prototype. This feedback was a salient influence in developing tools that can 'speak' to learners. A small scale pilot evaluation commenced in the four partner institutions when more advanced design prototypes were developed. This phase consisted of further exploration of the tools and completion of an online survey by flexible learners, followed by participation in focus groups by a subset of these learners. This evaluation was used to inform the final iteration of the tools.

3.2 The Get Ready Education - A Learning Journey Project

"Get Ready Education – A Learning Journey" is a dual-pathway MOOC incorporating a number of free, online courses that have been designed to help secondary level students in Ireland prepare for the challenges of college and university. The project is led by the Institute of Technology, Sligo and the partnering institutes are: NUI Galway, Galway Mayo Institute of Technology, University of Limerick, Limerick Institute of Technology, Mary Immaculate College and Letterkenny Institute of Technology.

While MOOCs have in the main been designed as stand-alone, self-directed on-line courses some institutions have been experimenting with MOOC wrapping where a formal course incorporates existing MOOC(s) in a blended model that combines elements of face-to-face and online learning (1).

This paper reports on a pedagogical intervention and the collaboration of seven Irish universities and Institutes of Technology in the design and development of a dual-pathway MOOC to support students in the transition from secondary to Higher Education in Ireland. The importance of aiding students transition into higher education has been highlighted by Cook & Leckey (2) who found that undergraduates are likely to arrive at university with learning strategies suitable to secondary school but far less effective in third level learning environments. They conclude transition to be the 'greatest hurdle' in higher education.

Given the demographic profile of the target audience, 16 to 20 years old, 50% male 50% female, and their relative lack of experience with MOOCs and self-directed learning the university partners concluded on the need for two discrete pathways within the MOOC. A self-directed pathway where the participant navigates the content, assessments and fora alone (intended primarily for first year undergraduate students and those with MOOC experience) and a teacher-facilitated pathway where participants are supported and directed through elements of the MOOC by a teacher in the classroom using a blended approach to learning. MOOC participants will also be supported by e-moderators whose role is to stimulate and support discussion.

In order to test the hypothesis of this design approach and the efficacy of the dual-pathways a two week pilot MOOC was delivered to a number of school and college student cohorts in November/December 2015.

The MOOC can be delivered as a 6 week long course for self-directed learners and a 12 week course for teacher-facilitated learners with start dates in January and September each year to suit the academic calendar. However, it is envisaged that participating schools may wish to adopt different delivery times and durations. For example, one school has indicated it will facilitate student participation with the MOOC over 3 days.

The short, online courses aim to provide an understanding of the type of learning required at third level and to assist students in developing appropriate and effective skills and learning strategies for higher education.

The MOOC will consist of the following courses/topics:

1. Orientation
2. Learning to learn (at third level)
3. Critical and Creative thinking
4. Digital Literacies and communication skills
5. Responsible Citizenship
6. Synthesis & Reflection

Pedagogical Approach:

There are two alternative pathways participants can take:

Pathway 1: Self-Directed - Participants complete the courses on their own.

Pathway 2: Teacher-Facilitated - Participants complete the courses with their class, facilitated by their teacher.

Each course will take approximately 2 to 3 hours to complete and includes a reflection piece. The courses are open and flexible so they can be taken over a number of weeks or in a short block of a few days – whatever suits the school timetable.

The predominant learning theory on which the online courses are predicated is Connectivism. A key feature of connectivism, as defined by George Siemens and Stephen Downes, is that learning can happen across online, peer networks. In connectivist learning, a teacher will guide students to information and answer key questions as needed, in order to support students learning and sharing on their own (Siemens, G & Downes, S). The use of e-tivities is another important element in the structure of each course and an adaptation of Gilly Salmons 5 stage model brings the learner through a series of collaborative online activities which have been designed to encourage the learner to participate in online discussions, information exchange and knowledge construction. A reflection module brings the learner to the final stage in developing their own ideas and reflecting through a private blog.

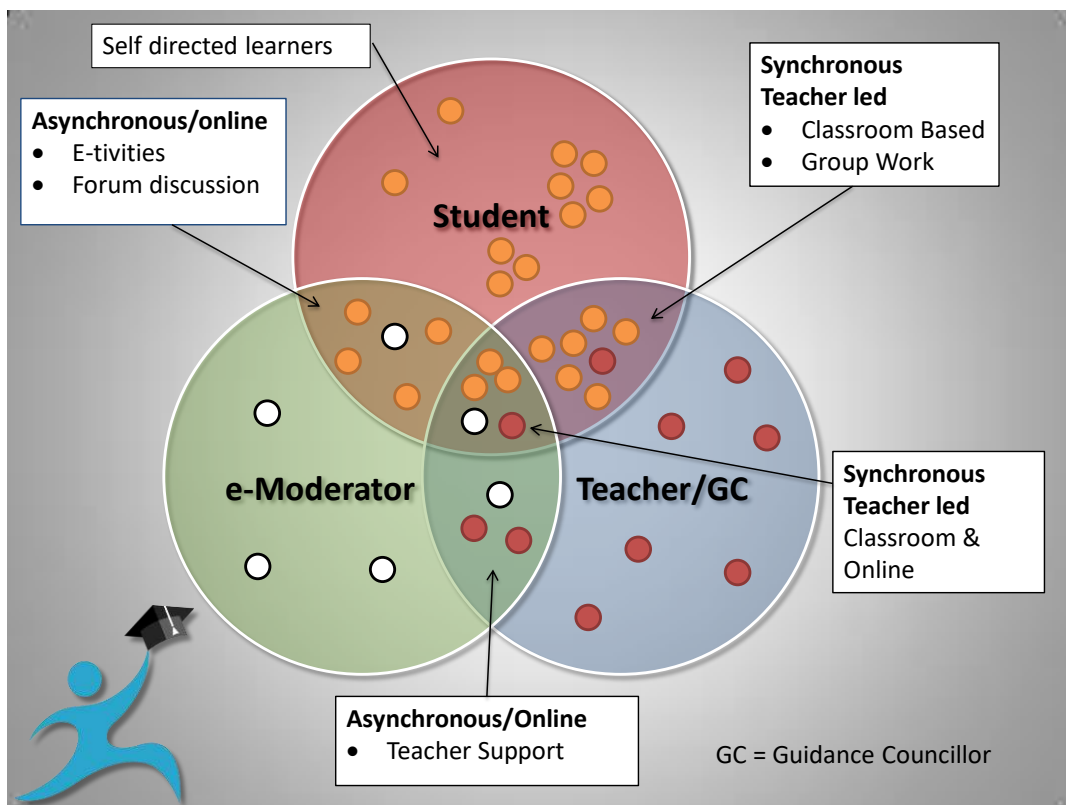


Figure 3: Dual Pathway Model: modes of engagement

The final two years of secondary school education in Ireland are known as the senior cycle where programmes lead to State examinations when students are, typically, 18 years of age. Student achievement in these examinations is directly linked to processes of selection for courses of study in further and higher education through a points system (3). Universities set minimum points requirements for each programme of study. As a means of incentivizing MOOC completion by secondary school students the partner universities are proposing to issue micro-credentials in the form of digital badges. These badges could translate as additional 'points' for the student and potentially make the difference between being offered a place on a chosen university course or not. The presentation will report further on this potentially innovative practice within Irish Higher Education.

Engagement and completion of the MOOC promises many benefits to students:

- A smoother transition from 2nd to 3rd level education
- Enhancement of student success and progression in 3rd level
- Greater confidence in student's ability to transition
- The development of essential study skills
- Independent learning
- Digital literacies
- Aid development of a sense of belonging

The expected Key Benefits to the Higher Education Sector:

- Higher retention rates of students in HE
- Enhancement of student success and progression in HE
- Greater collaboration between Universities
- The development of common learning materials and content
- Faculty professional development
- Greater understanding of the barriers to successful transition from Secondary to Tertiary education
- An Understanding of secondary school students and first year undergraduate students' participation in and engagement with MOOCs

Collaboration

The proposal to develop a MOOC to support the transition from second to third level education in Ireland was first mooted by the Centre for Online Learning at IT Sligo in 2012 but considered to be beyond the capabilities of one institution and consequently shelved. It was subsequently revisited in 2014 in response to the National Forum call for funding for collaborative proposals around the theme of transition. IT Sligo has a reputation as a major provider of online learning in Ireland with over 50 programmes delivered in 2014. However, if it was to deliver a quality MOOC to support transition to third level then it would need to collaborate with other Irish higher education institutions with expertise in the delivery of modules such as learning to learn, critical and creative thinking and digital literacies and communication skills.

Invitations to collaborate were issued to and accepted by 6 regional and cluster intuitions (NUIG, GMIT, LyIT, UL, LIT and MIC) and the resultant proposal was approved for funding by the National Forum in November 2014. A Steering Committee was then formed of 7 members (one from each institute) and an Instructional Designer identified and employed for 12 months by IT Sligo. The Steering committee agreed to divide the provision of module content between all but IT Sligo and LyIT. It was accepted that IT Sligo had expertise in online delivery and the experience of delivering previous MOOCs and that the other partners could deliver quality content.

This relationship has served the project well, committee meetings were productive and decisions reached quickly and unanimously. The division of funds was also agreed upon at an early stage in the project and no issues have arisen in this regard since. One consequence of any collaboration, particularly with multiple partners, is that projects tend to be developed at a slower pace than if one institution was to deliver it alone. However, the original proposal outlined a two year development plan for the transition MOOC and this has been achieved. Certain target dates were missed but these were the result of the academic calendar for both schools and universities.

The collaboration has led to greater connections being formed between the partnering institutions and this bodes well for future collaboration around common themes and goals.

The “Get Ready Education – A Learning Journey” MOOC can be explored by visiting the [project website](#) where guest access is enabled.

3.3 Live and Learn in Ireland Project

The Live and Learn in Ireland project is developing digital objects to support international students' transition into the Higher Education sector in Ireland. The plan involved the creation of four interactive digital learning objects that could be accessed by international students prior to their arrival in Ireland. In addition to the four student units the plan also incorporated the creation of two interactive digital learning objects for Higher Education staff in Ireland. These two staff units provide information, insight and strategies aimed at informing HE staff to provide better support to international students and thus ease their transition into the Irish HE sector. Having conducted an extensive needs analysis phase, and developed and tested a pilot digital object, the project is currently in the development phase constructing and testing the remaining digital objects. The units can be viewed on the [project website](#).



Figure 4: The live and learn in Ireland website

Phase 1

Needs Analysis, which ran from January to July 2015, involved researching the challenges facing international students and the staff that support that transition. Research conducted included:

- Literature Review
 - Online survey of current international students at each of the five partner sites. The final total student response was 573.
 - Ten interviews with staff in each of the partner sites
- Options for hosting the digital supports and potential design features were considered during this phase.

The main issue for phase one has been achieving ethical approval at five separate sites to conduct the research, which while time-consuming ultimately was rewarding in that it allows for the potential to publish the research, offering added value to the project outcomes. Another challenge was maintaining momentum for the project after it got off to a great start with a student-led webinar on International Transitions. In order to address this challenge the level of communication was increased with additional face-to-face meetings and fortnightly team conference calls.

Phase 2

Pilot Development and Testing, which ran from July to September 2015, saw the development of a web site, liveandlearninireland.ie, and the creation of Unit 1.1 Academic. The unit, which gives a general overview of the HE sector in Ireland, was tested with incoming international students through an online survey (n=352). The unit and web site have subsequently been redeveloped and the project has moved into Phase 3 Development.

Phase 3

The four student units have been built and are available on the project's website liveandlearninireland.com. The team tested Unit 1.1 Academic a second time with a survey of international students (n=232) who had experienced at least one semester of studying in Ireland. Initial feedback from international officers around Ireland has been hugely positive. However, at this point in time the feedback is largely anecdotal without any formal evaluation at this stage. The two staff units are currently being built with the intention of their launch in October.

4. Project Commonalities and Divergences

The principle commonality between the three projects was the focus on the importance of actively facilitating transitions into higher education, and a recognition of how vital it is to target potential new students during the pre-entry period. The principle divergence is the student type being targeted by each project. The three student types (post-primary students/school-leaver entrants to higher education, flexible learners/online or part-time entrants to higher education, and international students entering Irish higher

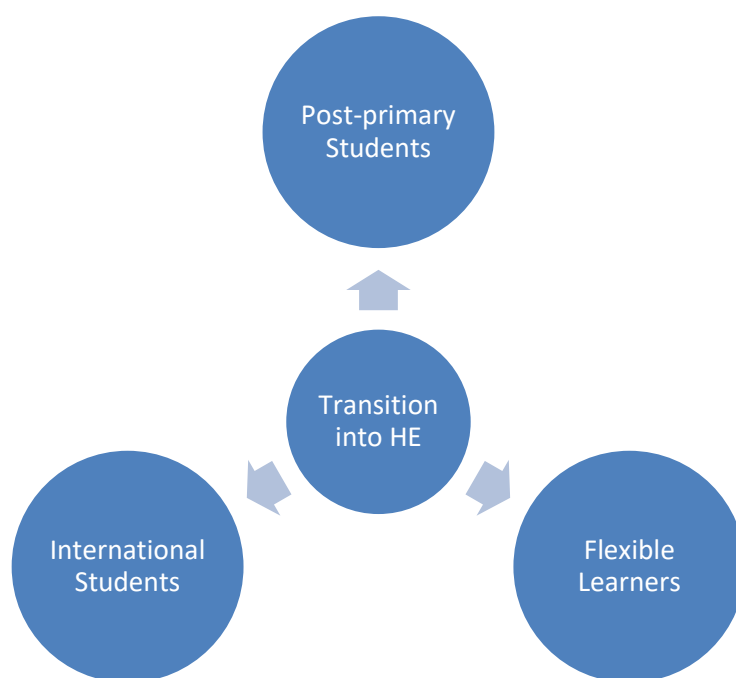


Figure 5: Principle project commonality-divergence

education) are distinct groups with particular profiles that demand tailored approaches to facilitating their transition into higher education. That said all students falling into these three categories have to deal with the common aspects of the transition process in that they all must form a more or less accurate set of expectations about what the experience of being a student is going to be like, and then must deal with the degree of 'entry-shock' associated with how well their expectations match up to the reality of what they find. The second point of commonality-divergence was the use of technology in the three projects. All three projects developed technology-mediated methods of facilitating transitions into higher education. There was divergence between the projects then as to the type of technology utilised. The 'Student Success Toolbox' project developed a suite of digital readiness tools using a web-development company to produce html5-based tools, but also using Tumblr to build the Study Tips for Me tool and a Moodle-based MOOC platform for the Head Start Online MOOC tool. The 'Get Ready Education - A Learning Journey' project also used a Moodle-based MOOC platform for their project, although of a different design to the Head Start Online MOOC. The 'Live and Learn in Ireland' project developed their three units (Academic, practical, and social) using Articulate Storyline, such that these can then be embedded into webpages and VLE/LMS. All three of the projects used literature reviews to give a grounding to the development of technology solutions for the problem of transitions into higher education. A further point of commonality-divergence was that the 'Get Ready Education - A Learning Journey' and 'Live and Learn in Ireland' developed technology for use of students/prospective students, whereas the majority of the tools developed by the 'Student Success Toolbox' project were created as OERs to be shared with the sector rather than directly for students. All three of the projects highlight the importance of: aiding in the creation of a realistic set of expectations about higher education; providing socialisation opportunities as part of socialisation processed. Each of the project teams delivered on these goals in slightly different ways as they tailored their content to the specific student-type on which that project was focused, using different message and using different language in order to try to authentically 'speak' the language of that student type.

5. Conclusion

The foundations for student success, regardless of student type, are established in the earliest stages of the study lifecycle, in the pre-entry period. New and prospective students may be supported through this vital transition period by the ready availability of specially designed digital readiness and preparation tools. These three projects both facilitate transition into higher education directly, and can serve as bases on which others can build both new tools for different student types, or build bigger and better tools for post-primary students, flexible learners, and international students.

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Educating undergraduate students *for* openness

Sandra Hofhues

Assistant Professor for Media Pedagogy and Instructional Design at University of Cologne, Germany
Email: sandra.hofhues@uni-koeln.de

Sabrina Pensel

Student Assistant at the Professorship for Media Pedagogy and Instructional Design at University of Cologne, Germany
Email: sabrina.pensel@uni-koeln.de

Abstract

Current challenges in the formal education system are related to the openness of (higher) education institutions for the public, for the opportunity of gaining open insight into research and teaching, and to the involvement of students in research more than ever. We will focus on the education for openness: Therefore, we will firstly present our lecture design at the University of Cologne, Germany, along with our online letters about research as an instructional design tool for raising students' awareness for open science and education by encouraging them to exchange and share research experiences. Both involve undergraduate-students in a research-led learning process and encourage them to draft research designs and projects. The objectives are achieved, within the whole group of students, by tracing different questions, unfurling individual talents and increasing previous knowledge. After our short sketch of the setting, we will illustrate areas of conflict between studying, self-organization and openness on the basis of empirical data. Our findings externalize noticeable discrepancies between the strong focus on research on the one hand and measuring learning outcomes on the other hand, which led to student complaints. We will sum up how the disclosed conflicts are related to education for openness, and ask the research question: How could the developed research competencies be seen, while undergraduate-students should also be educated for openness?

Keywords: Education for Openness, Research-Led Learning, Formative Assessment, Instructional Design

1. Introduction: Open learning scenarios and student's own research

Several disciplines (e.g. organization sociology, pedagogy in Higher Education) are concerned with the question of how university of the future will look like. They may ask as well, if there is room for improvement, e.g. concerning open learning scenarios and student's own research. Especially with regard to the open learning discourse at universities you might identify some limits, and open boundaries, too. Current challenges in the formal education system are related to the openness of (higher) education institutions for the public to create the opportunity of gaining open insight into research and teaching, and to the increasing involvement of students in research (Rugelj, 2013). A lot of them could be explained with elder discussions about involving undergraduate-students in a research (learning) process (see below). They touch the academic ideal of education *through* science and research (cf. Huber, 2009). Even if education *for* openness (e.g. critical thinking) is a core ingredient, the focus on science and research often bars the way for individual reflection beside the contents of research.

The present article will focus (mostly) on this last point, the education for openness (Peters, n.d.) within formal, putative closed learning scenarios. Therefore, we will present our lecture design at the University of

Cologne, Germany, below. For this purpose, a special Open Educational Resources (OER) tool has been developed (cf. Hofhues & Pensel, 2016). The core lecture design and this tool involve undergraduate-students in a research-led/-tutored learning process (Healey, 2005) and encourage them to draft research designs and projects (Sandover, Partridge, Dunne & Burkill, 2012). After our short sketch of the setting, we will illustrate areas of conflict between studying, self-organization and openness on the basis of empirical data. We will sum up how the disclosed conflicts are related to education for openness, answering the research question:

How could the developed research competencies be seen, while undergraduate-students should also be educated for openness?

2. The elder discussion: Involving undergraduate-students into research

Nevertheless it is necessary to zoom in the discussion of research and learning, because it is a matter of academic teaching and strategic development. Some call it a superordinated approach, in particular when talking about the “Koenigsweg” of research-based learning, as Huber (2009) names all those designs which address the student’s own research. Huber (2009) and Wildt (2009) both establish the idea that every student should ask her/his own research questions minimum once a study program. As one result, research (learning) processes are often understood as an open teaching and learning method. Jenkins, Healey, and Zetter (2007) differentiate all learning processes with regard to research in four groups on an earlier level (see figure 1): They distinguish to what extent students were enabled to deal 1) with research content/topics or 2) research processes and problems. The students’ roles in these processes are crucial as well: Are they 3) an audience or 4) participants?

Reinmann (2015) christens the matrix “Spielarten”, which addresses the variety of concepts or designs with regard to learning through research in a German term. She is interested in the student’s practices in particular, which are evoked through research, for example the more active or productive practices or the less like listening, reading, asking questions etc. The latter are really important at the beginning of a research-led learning process, but usually not recognized as a part of designs with regard to research. In plain terms, education *through* science and research means to involve students as academics into research and research practices like critical thinking, openness etc. So we should widen the perspective this way: It is possible to do research in all stadia of the (academic) research and learning process. This means, that students grow up with research in different teaching and learning scenarios.

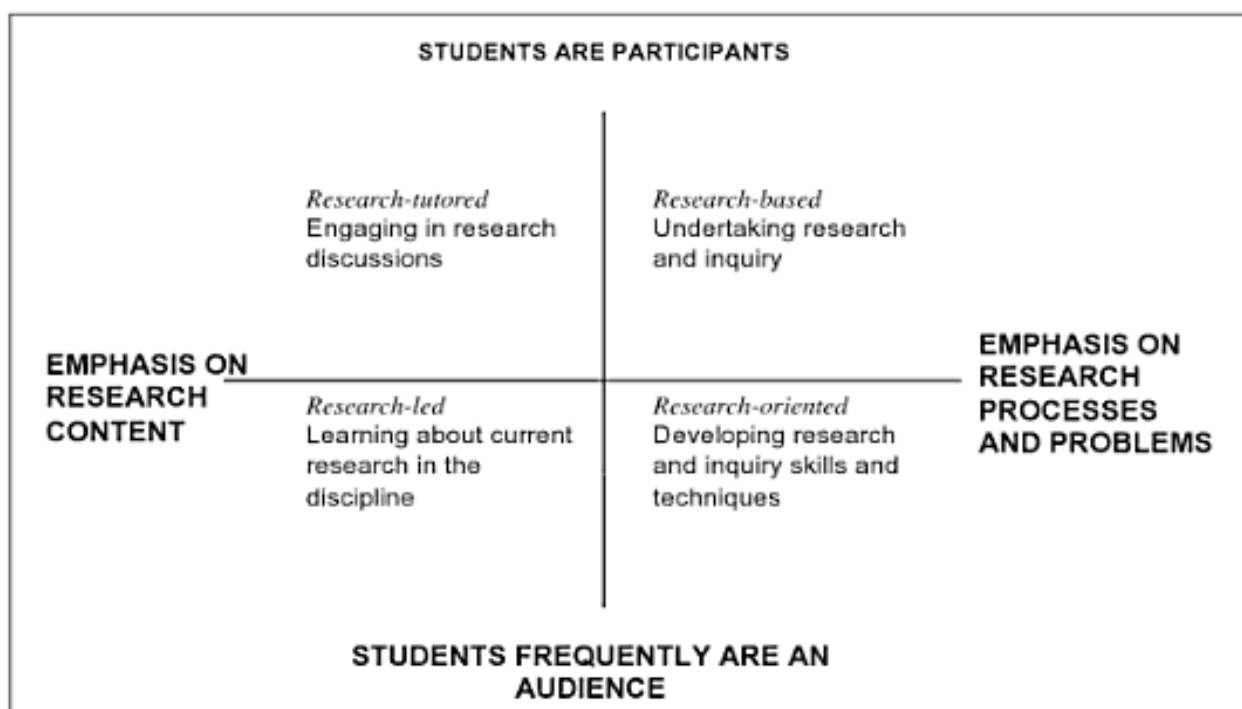


figure 1: learning processes with regard to research (according to Jenkins & Healey, 2011, p. 38)

Students are able to do their own research, even if they are young, inexperienced or naïve (whatever your colleagues might argue). During a lecture they would not only receive theories, they also would scrutinize them. Sometimes they would ask own research questions referring to the contents or contexts, too. Why should students not deal with own research projects running the entire study program? Teaching and learning in this broader perspective would give students more than just one insight into research. It would generate several ideas for the students of how to be a critical thinker and researcher (instead of a student).

Opportunities for the education for openness are obvious above all. When you primarily address practices like listening, reading or asking questions in a lecture design, you deal with research contents in fact, but you are responsible for several communication processes as well. Why don't you open them? The annotation processes, for example via the annotation option in digital tools, or simple questioning could initiate active and collaborative learning processes even in a closed lecture design. Consequently, these discourses are sometimes forerunner of own research questions that could be stored in open Wikis etc., to mention only *one* opportunity. This gives us the idea, that there is a link between the critical thinking and the openness of research-led/-tutored learning processes on the one hand and the open-minded perspective of Open Science and Education on the other hand. The following example will reinforce our assumption.

3. Example of a research-led/-tutored lecture design: the “Introduction into Media Didactics (Instructional Design)”

Whenever expected, universities should support education *through* research, and *for* openness (see Peters, n.d.). Subsequently, we will illustrate with an example how to design an inquiry-based lecture with around 300 students on the basis of the lecture „Introduction into Media Didactics/Instructional Design“. Through this, we will firstly describe the general framework of the lecture concept. Secondly, we will introduce our

instructional design tool “Forschungspost” as an Open Educational Resource (OER). In closing of this chapter, we will discuss first findings and students’ lecture evaluation.

3.1 Learning objectives and educational contents of the lecture

As the name suggests, an introduction lecture is designed to provide basic knowledge. In this regard, the target audience of the lecture „Introduction into Media Didactics (Instructional Design)”¹⁸³ are Bachelor students from all fields of educational sciences at the faculty of Human Sciences at University of Cologne - most of the students among them are student teachers. We recommend the lecture attendance at an early point of the Bachelor programmes, although several lecture attendees in fall term 2015/16 were already at an advanced state of their study programme.

The lecture programme starts with a first overview of the research field to receive a general idea of media didactics/pedagogy (cf. table 1 in the appendix). Afterwards the lecture design guarantees an enriching interplay of introduction, specification and discussion in each session to provide guidance on the one hand and self-dependent learning on the other. In addition, each session starts with a brief retrospect on the previous session to consolidate the acquired knowledge. Thereby, content links between sessions and learning targets can be expatiated. Besides, students should be able to individually deepen their research interests concerning media pedagogy. Therefore, the lecture design bases on a research-led/tutored learning approach to enable students in transferring gained knowledge into new study and working contexts and to develop open, critical views (not only, but also with regard to technology).

3.2 Research-led/-tutored approach within the lecture design

The core ideas of research-led/-tutored lecture designs are to involve students into the main issues and queries of the disciplines, not only by receiving contents, but also by enabling them to draft and conceptualise their own research projects together with fellow students. Thus, the instructional design refers to current findings and perceptions of Higher Education Research which suggest introducing students into research practises already at an early point of their studies to qualify them for transferring theoretical knowledge to practical applications (see chapter 1). For this purpose it is important that students verbalize their own research questions in exchange and through dialogues with others.

In order to raise students’ awareness for the procedural approach of research, in our case students autonomously fulfil specific research tasks given by lecturers during the semester. These tasks are intended to successively prepare the final research draft which should be submitted at the end of the term. Essential part of this self-study phase is to collaborate with fellow students by building research tandems/teams. Thus, even in the rather anonymous learning context of an introduction lecture with hundreds of attendees it gets possible to encourage students to discuss, compare and exchange first research experiences. Because of that, peer feedback is an integral part of the assignments to introduce students to the on-going process of giving and getting feedback from fellow researchers. On top of that, it will foster their awareness for the importance and role of Open Science and Education in modern societies. Therefore, it is a necessary prerequisite that students are familiar to the relevance of acknowledged feedback rules.

¹⁸³ according to the German term “Mediendidaktik”, which is not well known in English-speaking countries. It refers to discussions on Instructional Design or Technology-enhanced Learning, but goes back to another history within the field of general education and school research.

The six tasks are irregularly provided on the Learning-Management-System (LMS) ILIAS of University of Cologne. During the term the tasks are getting more challenging and costly in terms of time because they increasingly require intensive engagement and discussion. All tasks have to be fulfilled and presented until a certain deadline to motivate students for continuous participation, although the submission is not finally controlled. Merely, the lecturer supervises the completion of the research draft in teamwork at the end of the term. This research draft should present students' research interests, queries and findings of a first literature research. To create this outline, students previously fulfil the subsequent tasks:

1. What topics from daily news do you know that have a link to the currently discussed research field?
2. Which of these collected topics would be a good starting point to ask further research questions together with your student team?
3. How could a research question which is linked to your research interest and your chosen topic look like?
4. Now it is your turn to evaluate your fellow student's research questions in a "peer review". All of those reviews will be available at our lecture Wiki.
5. Please search for former research and literature regarding your research interest.
6. How does this literature and former research help you to answer your own research question?

figure 2: tasks

At the end of those assignments students submit their research draft, developed and written together with fellow students. In addition to the tasks, they take a short exam regarding the educational contents which had been discussed during the term. Thus, students can give prove of their acquired knowledge.

4. A special OER tool: the "Forschungspost"¹⁸⁴

Due to the huge amount of 300 students who attended our lecture in fall term 2015/16 we faced the challenge to coach and accompany each one of them properly while gaining their first research experiences although we were manned with only one teacher and one student assistant (tutor). Therefore, we developed an instructional design tool called "Forschungspost" (engl. 'Letters of Research'). As an Open Educational Resource (OER), it enabled us to support our students in their curricular intended inquiry-based-learning process and to sensitise them for the importance of openness as an educational objective.

The "Forschungspost" project started with single digital letters which were written by the docent and the tutor. They are available as a download on the lecture weblog. In each edition narrative material and journey metaphors were used to give students an authentic understanding of comprehensive opportunities which are provided by an own research project e.g. the emphasis of individual research interests as well as autonomy in choosing methods and research approaches. Research projects in general were compared to a situation when travelling to a foreign country, listening to an unknown language and meeting new people – metaphors as telescopes, backpacks and magnifying glasses were used to describe strategies to handle those situations and to get to know new facts about the surrounding world.

The first "Forschungspost" editions "Gute Reise" (engl. "Have a good trip") and "Reisevorbereitungen" (engl. "Travel Arrangements") broached the issue of decisions which should be made before beginning a research project e.g. asking a proper research question.

¹⁸⁴

first and foremost in German, see <http://blog.hf.uni-koeln.de/mediendidaktik/forschungspost/> (17.10.2016)



figure 3: How the “Forschungspost” looks like¹⁸⁵ - Edition 1 and 2

In the second half of the fall term it turned out that the “Forschungspost” is not only a helpful tool for communication between academic instructors and students but also a great opportunity for students to discuss with each other and to exchange individual research experiences. It began with several digital letters, short stories and reports equal to the first editions of the “Forschungspost” which were handed in by students to be published on our weblog.¹⁸⁶

Thus, the “Forschungspost” was not longer only a communication medium for exchanging experiences and facts about the manner and possibilities of research but also an instructional-design tool for encouraging students to realize their own research projects by tracing different questions, unfurling individual talents and increasing previous knowledge. In terms of this, the heterogeneity and diversity of students is understood as a benefit and main resource for successful, various and inspiring research throughout universities, projects and classes (cf. Reinmann, 2015). By reporting about their own projects in a narrative and creative way, students depict each other manifold research ideas and approaches and are getting emotionally involved in this topic. This on-going discussion and communication about research enabled us to give students the understanding that research does not only base on certain results and findings but likewise on the variety of perspectives, the heterogeneity of researchers and the permanent discourse and discussion between scientists. Of course, openness of dialogues and open science in general can then be understood as promoters of successful and modern research.

In this regard, the “Forschungspost” is even a benefit for the socialization of undergraduate students in the context of academic work, because they recognize their peers as fellow researchers and have the

¹⁸⁵ cf. http://blog.hf.uni-koeln.de/mediendidaktik/files/2015/10/Forschungspost_Pensel-Hofhues_01_final.pdf; http://blog.hf.uni-koeln.de/mediendidaktik/files/2015/10/Forschungspost_Pensel-Hofhues_02_final.pdf (17.10.2016).

¹⁸⁶ They followed a call for ‘research letters’ which were posted on the lecture weblog, see <http://blog.hf.uni-koeln.de/mediendidaktik/ausschreibung-wohin-reisen-sie/> (17.10.2016). Students should be motivated to share individual experiences of their own ‘research expedition’ with peers and docents.

opportunity to give each other feedback (cf. Hofhues & Mallwitz, 2016).¹⁸⁷ But *why* is the narrative approach of the “Forschungspost” such a great benefit when educating *for* openness?

In comparison to standard introductory literature for scientific work and research our project provides an unconventional, demonstrative and vivid insight into science and research. Metaphors and analogies help to involve students emotionally by using an intuitive and true-to-life speech (Totzke, 2005, p. 30). Furthermore, the direct addressing of students through the medium of a digital letter benefits the fact, that students begin to establish a relationship between the reading and their own research experience thinking one step further (Fahrenwald, 2005, S. 46). Thus, the “Forschungspost” facilitates self-reliance and self-dependence of students and their peers in the context of research. Even more they have to decide if they would like to (prod)use the instrument. In addition, it is not only a tool, which depends on a specific lecture or a certain project, but it can also be read and used by students during their studies in general. However, the project is characterized by voluntariness – students *can* download letters and write their own ones but they do not have to. From our point of view, the “Forschungspost” is a core contribution to an education for openness.

5. The student’s point of view – evaluation data and findings

At two points of the lecture we gathered direct feedback from the students through a one-time fish bowl setting. Students had the chance to tell us about their feelings and impressions concerning the research-led/-tutored lecture design. 13 students signed a data protection declaration and joined the discussion. In addition, students could answer the standardized questionnaire at the end of the term. Here we asked for student’s experiences and knowledge growth as well as for their assessment concerning the instructional design of the lecture. Furthermore, within five items we broached the issue of self-reliance and self-dependence in open teaching and learning scenarios and the issue of experiences with research-led/-tutored lectures. Subsequently, we will introduce the major findings. They are shortened from Hofhues et al. (in print).

5.1 Views at the research-led/-tutored lecture design

Until the middle of the winter term, the research-led/-tutored lecture design runs pretended very well: The students understand what they should learn within the lecture (see learning objectives). They have already gotten an idea, how their individual and common success proceed in a research-led/-tutored design. In addition, they argue that the contents of the lecture are well structured and presented, and that they are traceable from the perspective of a less experienced target group. The educational contents are described not a quarter as complicated “as the ones e.g. in statistics”, like a female student says in the fish bowl setting. A benefit from the student’s perspective is that all materials are online in the LMS, too. They emphasise the transparency which is a focal point in the open discussion. “In essence, openness ... refers to a kind of transparency which is the opposite of secrecy and most often this transparency is seen in terms of access to information especially within organization, institutions or societies.” (Peters, n.d., p. 2) The students feel really supported having all this. But the well-intentioned blog and the “Forschungspost” were more or less neglected; the Wikis seemed to be useful for comparison with other research tandems.

The research-led/-tutored lecture design was not overly criticized at this early stadium. Later on the same students were a bit more critical in the standardized questionnaire: They highlight especially problems in

¹⁸⁷ Due to these effects on teaching and learning at universities, the Forschungspost got nominated for the Open Educational Resource Award 2016, commissioned by the Media Authority Berlin-Brandenburg, see www.open-educational-resources.de (08.10.2016).

interaction with their tandem partners until they handle in their research sketch by one page (DIN A 4) total length. Mentioning this as stressful, they mainly focus on their own time management. In retrospect a few students find faulty, that they have to learn for a single exam at the end of the lecture, too.

Both leads us to the conclusion, that there are some discrepancies between learning through research on the one hand and on the structure of a lecture or rather a study program on the other hand, within which the (formal) assessment part plays a fundamental role (see chapter 5.3). These findings are really relevant in our present context. They show that time is a crucial factor in open learning scenarios. Besides they illustrate the importance of openness in mind even in formal educational contexts like ours. From our point of view it is definitely a benefit of research-led/-tutored learning that students' attitude concerning studying and learning influences their perception of success or failure.

5.2 Tasks and technologies

During the lecture the students like the way they learn very much. They often remark their own joy about thinking critically at a mass university like the University of Cologne with its 50.000 students all in all. Even if their experiences with research-led/-tutored lecture designs are low, they cope with their research tasks without any further problems. Only the 'big picture', their research draft by one page, sometimes arouses questions, because the tasks were uploaded step by step.

The practical problems in the use of the Wikis were solved in the first weeks. Thus, the students could concentrate on research. Anyway, an important finding is, that most students were not able to use all media and technologies within the lecture design in a way, how professionals would use them. A participant, again in the fish bowl setting, speculates, that the whole lecture design with its media and technologies could be "to modern" for the students. Indeed, he appreciates the variety of media and technologies in a lecture with regard to media didactics (instructional design) very much, because every student can use the tools which she or he likes. But in a self-critical way he realized, that nearly nobody would use all offerings for her or his own learning processes. The "Forschungspost" is counted among these under-utilized tools (see chapter 6).

5.3 Summative and formative assessment

So far, our findings externalize noticeable discrepancies between the strong focus on research and measuring learning outcomes which led to several student complaints (cf. Hofhues et al., in print). The students most frequently indicate the absurdity of the final in a setting which bases on research processes and open dialogues. They would like to research or learn within just one classroom setting, not within both. The combination of both – exam and research draft - seems to be "too much" from the student's perspective.

They criticize the concrete questions of the final term exam, too. Definitions or complex questions seem to be unfair, as long as the students work on their research draft. They do not see the aspect, that an exam could also be a feedback insofar as knowledge is concerned. One can conclude that the students focus only on their own research. Another interpretation is a limited interest in learning like Reeves (2006, p. 299) pointed out: "If something is not assessed (in higher education), then it is not learned."

With regard to the general arrangement of a lecture, this finding is very helpful and at the same moment sad: Due to the conceptions of a study program in Germany, an academic is more or less bounded by the examination regulations. If an exam is formally planned, you could not totally forget about it. In consequence, open learning scenarios like this must externalize the shown discrepancies.

The aspect, that the lecture design might be extensive, is on the contrary a weak criticism, because the students show in the standardized survey, that they worked not more than 30 hours for the lecture.

In both surveys we identify the interaction and communication processes between the tandem partners as irritating and challenging. More than just a few students mention, that the agreements with their fellow students costs time. In these planning horizons they would prefer to do something else. As a result we make a note of the favoured efficiency in time management. Students would love to do their work on their own (instead of open and together). By planning a research-led/-tutored lecture you cannot *and* would not like to take the burden of communication off. Quite the contrary, the students should mediate contents as well as their teamwork practices in this case. The consequence is, that this finding will come up again and again. And this is a core finding in the context of education for openness within a formal education institution.

6. Conclusion

Particularly with regard to our empirical findings, we can see that a research-led/-tutored lecture design is realizable even at the current conditions at a mass university. From our point of view, this conclusion is important, because we deal with a formal educational context, where openness in education is not the norm nor is it common.

Beyond that an essential finding regards the learning scenario itself: *Doing* research for less experienced students is feasible, if research is understood as a task within the learning design. But the design could be fragile because of the student's age or their (missing) experience, their absent knowledge in the professional media use, and the general interest in collective (team) work. In other words: All findings underline that educating undergraduate students *for* openness in open learning scenarios like research-led/-tutored lectures is needed more than ever. From our point of view, students need for example those irritations to scrutinize their own way of thinking and learning at universities, and they need space within the formal educational settings to do research.

To transfer our lecture design to other contexts of teaching and learning, it might be an improvement to completely avoid summative assessments, exams and marks to increasingly foster the benefit of flexibility and openness (cf. thought experiment by Reinmann, 2012). This would come very close to the original education idea of freedom of research-led learning, and the idea of education for openness as well.

However, the research- led/-tutored design and its openness are different to the requirements of usual lectures and the following exams. Thus, research-led learning is characterised by flexibility and a constant risk of failure, without even mentioning the specific challenges which come along with using digital media. Hence, it is an essential part of research-led/-tutored learning to get support by teachers and peers to experience research as an adventure of learning (Anastasiadias, 2015). Particularly with regard to the role of technology-based learning mutual confidence and commitment between teachers and students are important prerequisites for openness.¹⁸⁸

To sum it up, we can say that a research-led/-tutored lecture cannot be understood as an individual educational opportunity, but as an individual focusing within open learning contexts. This entails that it is

¹⁸⁸ Preliminary you have to “understand how these new technologies, and especially Web 2.0 platforms and protocols, promote a ubiquitous learning that collapses spaces between school and home, work and school, work and personal interest, teacher and student and so on, transforming formal education and the market and creating new forms of social production that are essential to the knowledge economy.” (Peters, n.d., p. 4)

necessary to adapt the organisation of study programmes to the requirements of research-led learning, meaning that research orientation has to be conceptualised along the “Student Life Cycle” (Würmseer & Hofhues, 2015). Hereby, voluntariness or openness are crucial points. Supporting tools like the “Forschungspost” should be provided but not obligatory. Instead, students should learn to decide whether they want to use certain tools or not.

We agree with Peters (n.d., p. 5) that the education for openness and the idea of Open Education are strongly related, and that they might be “one of the most significant educational movements” (ibid.) in this day and age. In addition, the flexibility of research-led/-tutored lecture design permanently offers opportunities for further development and improvement, for example in the direction of education *for* openness.

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Appendix (table 1): Operating schedule of the lecture

Date				References
Introduction: What is Media Didactics (Instructional Design)?				
21/10/15	1. Session	Media Didactics (Instructional Design)	Basic knowledge about Media Didactics (Instructional Design); Differences between Media Pedagogy, typical problems and solutions	Petko, 2014 (obligatory); Keres, 2012; Ulodziecki, 2010
First insights: On which understanding of Media, Instructional Design, Media Didactics (Instructional Design) base?				
28/10/15	2. Session	Media/Technologies	First insight: Media and technology-based concepts of media from different perspectives	Horz, 2011; Meyer, 2008
04/11/15	3. Session	Instructional Design	First insight: Instructional Design, differences between the terms and concepts of "Bildung" (engl. Education)	Gruschka, 2011; Terhart, 2009
11/11/15	Blended Learning: What is good research question?			
18/11/15	4. Session	Learning theories	First insight: Learning theories (Behaviourism, Cognitivism, Constructivism)	Reinmann-Mandl, 2006; Reinmann, 2015
Specialization: Which concepts and ways of teaching can be seen in the field of Media Didactics (Instructional Design)?				
25/11/15	5. Session	Approaches	In detail: Approaches to Media Didactics (Instructional Design)	Barsch, 2006; Kronenbros, 2003
01/12/15	Instead of regular session: Invitation to the lecture series "Digital Revolution" at the University of Cologne			
09/12/15	6. Session	Concepts	In detail: Learning with (digital) media and technologies; Fostering media competencies in universities	Damberger, 2013; Notari & Döbel-Honegger, 2013; Rummel, 2014
16/12/15	7. Session	Formats	In detail: E-Learning and blended learning, Mobile Learning	Bachmann, 2011; Dittler, 2007
23/12/15	Blended Learning: Peer review			
Final discussion and outlook: Which controversies exist in the field of Media Didactics (Instructional Design)?				
13/01/16	8. Session	Technology & Pedagogy	Controversy: Technology-enhanced learning, e.g. SchoolTV, Laptop/iPad classes, BYOD, MOOCs	Nolda, 2011; Häuptle, 2007; Schiefner-Rohs, 2013; Schulmeister, 2013
20/01/16	9. Session	National & international Discourses	Controversy: Educational Technology vs. Instructional Design etc.	Hillen & Andis, 2014; Mayrberger & Kumar, 2014; Scharf, 1998
27/01/16	10. Session	Instructional Design & Media Pedagogy	Controversy: General Didactics vs. Technical Methodologies	Arnold & Roßa, 2011; De Witt & Czerwionka, 2007; Terhart, 2005
03/02/16	Blended Learning: Working with research drafts in the virtual classroom setting			
10/02/16	Exam (obligatory)			

The impact of Emerging Web 3.0 on Open Online-Learning

Ilaria Venturini

Università Telematica Pegaso

Email: ilaria.venturini@unipegaso.it

Rosario Oliviero

Università Telematica Pegaso

Email: rosario.oliviero@unipegaso.it

Abstract

The paper focuses on the impact of emerging Web 3.0 technologies on online open learning. In the Web 3.0 technologies perspective, learners will be much comfortable switching among a wide range of open resources making a simultaneous use of locally installed applications, tools and content. Learner's preferences based on learner's online activity with more than one provider are mined to proactively offer mechanisms and services tailored to the learner's interests. Such a distributed learning environment provides also facilities for self-organized groups of learners and communities of practice. Online lifelong learning contexts are supported with increasingly enhanced usability features. Software for social purposes could also be incorporated with educational facilities.

Moreover, in the Web 3.0 perspective it will be also much easier to extract and identify personally identifiable patterns. Issues that are more complex and challenging than previously experienced ones arise in the online learning context. In particular, the basic notion of personal data is revisited in the paper and *multipersonal data*, as defined in the paper, are singled out. Their relevance in the online open learning context is discussed. Some challenges stemming from them are emphasized and some solutions are mentioned.

Keywords: Personal Information Management, Personalized Online-Learning, Web 3.0 Technologies.

1. Introduction

Nowadays, following three main ways are currently in use to deliver online learning content.

- i) Corporate LMSs (Learning Management Systems), hosted by education institutions, are used primarily to deliver, over web-based interfaces, content designed for particular. Moreover, LMSs keep track of certifications, maintain a learning catalog and handle financial transactions, combining databases with digital frameworks for managing curricula and evaluation tools. LMSs restrict access to content and services and allow interactions for people who somehow deal with the same course.
- ii) OER (Open Educational Resources) are educational resources that are available online and can be freely used or re-used. Nowadays, MOOC (Massive Open Online Courses) are the most popular education content source that is available on the web to anyone. In Table 1 (from <https://www.class-central.com/report/moocs-2015-stats>) MOOC is compared with e-learning courses delivered via a LMS.

Table 1: MOOC compared with generic e-learning courses

MOOC	e-learning courses
A technological design that facilitates the dissemination of the activity of participants through one or more platforms	Use an e-learning platform (LMS) with a set number of functions and structure designed for interaction with lecturers
Open environment	Closed environment
Free access	Access on payment of registration fee
Massive participation	Limited group
Support of the community	Support of the teaching staff
Range of communication tools, use of social networks	Communication through debate forums
Emphasis on learning process rather than evaluation and accreditation	Evaluation and accreditation oriented

The increasing growth of MOOC utilization, since 2012, is displayed in following Figure (from <https://www.class-central.com/report/moocs-2015-stats/>).

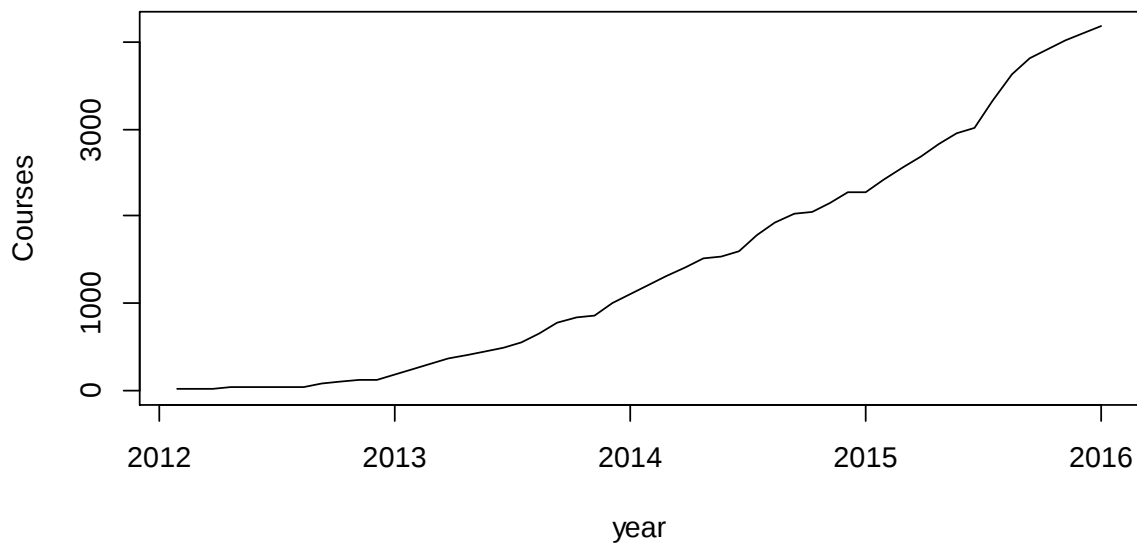


Figure 1: Number of courses delivered via MOOC in the years since 2012

Starting from the first MOOC at Utah State University in 2007, MOOC has been provided under different educational subject matters and by several platforms, as shown in Table 2 and Table 3, respectively (from <https://www.class-central.com/report/moocs-2015-stats/>).

Table 2: Course distribution by subject matters

Course Subject Matters	Percent
Business & Management	16.8
Science	11.3
Social Sciences	10.8
Computer Science	9.74
Humanities	9.41
Education & Teaching	9.36
Health & Medicine	8.27
Programming	7.44
Art & Design	6.73
Engineering	6.11
Mathematics	4.09

Table 3: Course distribution by platforms

Course Provider	Percent
Coursera	35.6
edX	18.1
Others	16.4
Canvas.net	6.92
FutureLearn	5.68
Miríada X	3.66
France Université Numerique	3.33
Udacity	2.95
Open Education byBlackboard	2.12
Rwaq	1.83

Nowadays, there is a plethora of MOOC available on the web (Yousef et al., 2014).

xMOOC (whose name derives from edX platform) tend to use learning materials with proprietary licenses.

cMOOC (connectivism MOOC) are based on a connectivist pedagogy that conceives learning as the creative and social process of connecting nodes of knowledge. However, MOOC have high rates of drop-out and also steeply unequal patterns of participation.

Inadequate communication and cooperation mechanisms are considered as one of the main criticisms for MOOC (Clow, 2013; Hone & Said, 2016). Some challenges in personalized MOOC are pointed out for instance in (Younef & Sunar, 2015).

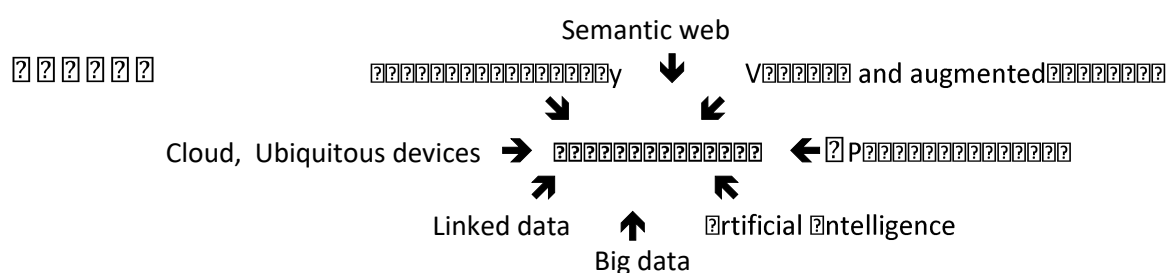
- iii) Besides institutional learning, educational content can be freely accessed to, via web browsers, from the growing repository of free content. Open source tools such as MediaWiki (the wiki system behind Wikipedia) and WordPress (a popular blogging system) are tools freely in use by many Faculties (Waßmann et al., 2014). Dictionaries, thesauri and other necessities of a learning environment can be found online. Social software is increasingly being used in education through web logs, wikis, tools and applications for creating and sharing multimedia and personal knowledge bases. However, different learning resources are isolated from each other and follow different implementation standards. PLEs (Personal Learning Environments) collect learning materials under the learner's viewpoint. A PLE includes learning applications and Web 2.0 interactive tools and applications (e.g., blog, mashup, P2P, virtual classroom, wiki, podcasting, videocasting, and so on) (Alotaibi et al., 2015). Learning resources in a PLE are somehow tailored to the individual's interests, educational, cultural and social level. Moreover, the current trend moves from isolated learners to clustered groups of learners. It is often summarized as:

autonomous learning → assisted learning → collaborative learning.

Online facilities (such as the open source social networking platform ELGG) provide tools for self-organized groups of students who can share information and work collectively, avoiding the problems of tools distributed across multiple sites. Actually, university students are already

often engaged in web environments to create and share content and to interact with others. For a personalized management of the learning material, efficient and widespread mechanisms are needed that are based on the student's characteristics, the educational objectives and the available technology (Uskov et al., 2016).

The emerging Web 3.0 technologies move toward a web of semantically linked data and promise to support easy customization for aggregating or filtering data as well as deployment for making the service composition more responsive to learner's requirements, as pointed out for instance in (Lal & Lal, 2011). The emerging [Semantic Web](#) exploits various features of still developing Web 3.0 technologies (Rubens et al., 2011; Hussein, 2013; Dominic et al., 2014) as displayed in following diagram (from Venturini & Oliviero, 2015):



Semantic web technologies allow us to exploit the semantic relationships that correlate terms. This is a dramatic potential for learning. Personalization and collaboration in open online-Learning are made configurable especially via semantic web and linked data (d'Aquin, 2012).

1.1 Contribution and structure of the paper

In the perspective of personalized and collaborative open online e-Learning 3.0, the paper focuses on revisiting the basic notion "personal information" or "personal data". Specifically, any personal information concerning one learner but which actually concerns also other involved identifiable individuals, termed as *multipersonal information*, is singled out in the open online-Learning.

The privacy preservation challenges that stem from multipersonal information are highlighted.

The remainder of the paper is structured as follows. The first section clarifies the multipersonal notion in the open e-Learning 3.0 perspective. The second section outlines some challenges which arise from the multipersonal information. The third section refers about related work. The fourth section concludes the paper.

2. Personal information in personalized and collaborative open online-Learning 3.0.

It is nowadays widely accepted that personalized online e-learning is needed because of:

- diverse cognitive abilities,
- diverse prerequisites,
- diverse learning styles,
- diverse learning subject matters.

There are technologies that facilitate the personalization management. In Web 2.0, *mashups* can be considered as the lightweight technologies (*versus* SOA Web1.0 technologies) that allow users to customize content aggregation (Kalou et al., 2013). A mashup is a web application or a web page which combines data

from several sources (analogously to the mashup in the musical framework referring to a composition created by blending two or more pre-recorded songs). In (Dong et al., 2009), mashups are used to build an open e-Learning 2.0 prototype user-centric *ecosystem* (defined as a learning community and an enterprise united by a LMS). Mashups have the potential to be quite useful for educational issues, taking into account that content creation usually evolves over a long time period and often quite naturally involves re-using previous content.

So far, personalized e-learning services for higher education have received an increasing attention (Henning et al., 2014). If the learner interacts with content providers which facilitates customization by providing a personalized content in the sense of a content that is tailored to the learners' interests, the learners' profiles need to be exploited. Personal data are quite naturally required in order to build up learners' profiles.

Since unforeseen uses of personal data can be facilitated in personalized and collaborative settings over Web 3.0, the basic "personal" notion has to be better understood, as we are going to motivate.

Let us start from the MOOC proliferation. Recommender systems are exploited in order to support learners in finding a specific MOOC (Sunar et al., 2015). In general, a recommender system for learning is any system that provides personalized recommendations for guiding the learner in choosing learning resources, by analyzing the users' preferences or by taking into account previous experiences.

In order to provide personalized learning experience in MOOC, tracking and collecting participants' data are required as following items try to clarify.

1. Registering on websites asks to submit personal data, as name, email address, age, gender, level of education, birth date, postal address and so on.
For the setup of heterogeneous teams, the personal data must usually be provided during the MOOC registration process.
Then, during the course, optional additional personal data will be stored and exchanged worldwide between users. Personal data sent to other users of MOOC might be forwarded by them to third parties. Such a collaborative trend leads to a much greater ease of data collection.
2. Within forum postings, personal information will be delivered. At a greater extent, within learning collaborations, personal information will be delivered because of a self-disclosure that is likely to occur among learners who belong to a same infrastructure relationship.
3. Learners cross commenting adds metadata which provide meaning and context to collected data. Annotation metadata, may define prerequisites and learning objectives. Such metadata can be stored either *internally* i.e. where the data (they refer to) are stored (*embedded metadata*, always available with the data, as typically in media or multimedia assets) or *externally* (as typically in databases).
4. Some of the emerging next-generation data integration tools in Web 3.0 shall have the ability to read written documentation of data structures and produce semantic metadata.
In Semantic Web, all of users' profiles and digitally traced information shall be annotated via ontology-based markup language (such as RDF or OWL), modeled and marked up by a well-defined semantic web ontology. The ontology is the link between user needs and characteristics of the learning material. RDF, the XML application for coding, exchanging and reusing structured metadata, enables interoperability among applications which share on the web *machine-understandable* information. RDF makes disposable for use, in a format understandable both by a human and a

machine, the vocabularies that have been designed for the use of the semantics of metadata among different parties.

Metadata can be added to data as *semantic markup*, i.e. semantic annotation metadata that use the terminology that one or more ontologies (they point to) define. Semantic markup might state that a particular entity has a particular property, that diverse entities have some relationship among them and that a personal data actually refers to several identifiable individuals.

Models of semantic metadata models are addressed in (Stan et al., 2011) for a semantic interoperability in social networks.

5. It is nowadays widely accepted that e-portfolios have the capability to maintain a complete inventory of skills and knowledge acquired by the individual through formal, non-formal, informal, accidental and incidental learning (Donnelly & O'Keeffe, 2009; O'Keeffe et al., 2013). In the formal education context, it has been also widely agreed that portfolios give teachers and students the chance of evaluating procedures based on performance and final products got by the students, under the subject area and the educative level in which the e-portfolios are being used. A same e-portfolio can be viewed simultaneously from remote locations and can be updated easily. The learning e-portfolio can be considered as a work in progress since its content is constantly evolving. Emerging e-portfolio software is set to provide a bridge between the content on the user's hard disk and central storage. Since openness includes reuse, revise, remix and redistribute (Peter & Deimann, 2013), to let authors monitor the usage of their content as well as scholars ensure that they receive proper attribution, DRM (Digital Rights Management) are a concern (Downes et al., 2003).

Specifically, the DRM issues related to e-learning documents include:

- papers available for some time period only;
- papers available to a specific group of users only;
- educational content with multiple authors with different DRM preferences;
- authors' institutions with different DRM policies.

Besides automatically enforcing limits on user behavior, DRM technologies are designed to report back to the information providers on the user activities. Different DRM systems take different ways to collect information. Usually, DRM initially identify the IP addresses and then tracks the user information via download, browsing activities, subscription service, etc. so that the users' preferences can be assessed and predicted.

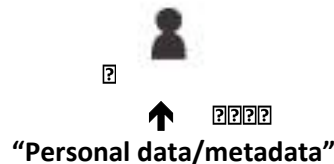
Since collaborative learning facilitate collecting personal information which link different authors together from their e-portfolios, DRM facilitates involving other individuals who may be identified.

6. Linked Data technologies enables us to exploit a homogeneous, connected representation of resources originating from different sources (Bizer et al., 2009). Thus also to collect information about the various learner's e-portfolios. More specifically, user profiles generated by monitoring across the web through client-side cookies, server-side logs, or a variety of other means, may reveal preferences that are shared among identifiable learners. Learner's personal information details created and updated by the learner may involve (either intentionally or unintentionally) other learners or instructors or people external to the University.

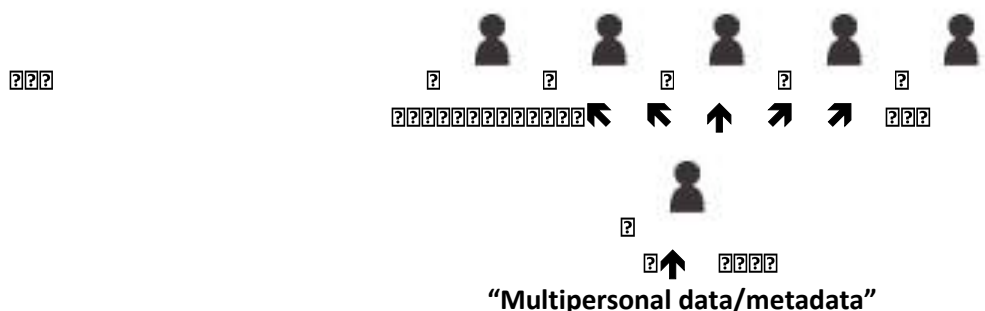
We can conclude from previous items that in the framework of personalized and collaborative e-Learning 3.0, the capability of some personal data to actually concern more than one identifiable individual may often occur.

Now some personal data are sensitive: think, for instance, of a genetic disease (e.g., *hoemophilia*) or an ethnic group (e.g., *Hispanic*) or a resource that is shared only by a specific collaboration team. Also sensitive personal data of people who belong to a same team may be revealed (either intentionally or unintentionally) by a specific element of the team.

Personal data/metadata are conceived as related to one individual only who can be identified (either directly or indirectly) by means of them, as following draw suggests:



However, there are also personal data/metadata which have the capability of identifying more than one individual. They are categorized as multipersonal, i.e. as data which, while referring to one individual, involve also other individuals, as suggested by following draw:



It is worthnoting that for what concerns the multipersonal information management, semantic Web 3.0 technologies should facilitate to manage the multipersonal categorization.

In the Semantic Web perspective, the categorization of a term as multipersonal can be specified by a vocabulary. In computer science, a vocabulary is referred to as a set of terms (words, codes, etc.) that are used in a specific context when a strict formalism is not necessarily used. Vocabularies are the core building blocks for [inference](#) techniques on the Semantic Web.

Notice that an ontology is a more complex and possibly formal collection of terms that might be described as a hierarchical system of categorization (Henze et al., 2004).

W3C offers various techniques for defining different vocabularies in a standard format (W3.org, 2016). [RDF](#) and [RDF Schemas](#), [Simple Knowledge Organization System \(SKOS\)](#) and [Web Ontology Language \(OWL\)](#) are [known examples](#). The choice among such technologies depend on the specific application domain.

3. Some challenges stemming from the multipersonal information

Since personalized and collaborative online-Learning requires learner modelling, it is necessary to collect learners' data related with the physical, physiological, genetic, mental, economic, cultural or social identity.

As it has been pointed out in the previous section, also sensitive personal data are required to provide

personalized online materials to learners, to guide learners and to allow them to collaborate.

Sensitive multipersonal data are often long-term stored in data repositories in a way that undermine the concerned people's privacy. As more and more databases are made accessible via web applications with increasing usability, their exposure to security and privacy threats obviously increases (Najwa & Ip-Shing, 2010; Hye-jin, 2013; Chen & He, 2014).

Moreover, emerging Web 3.0 technologies do facilitate data storage in the cloud and therefore data transmission. Secured data transmission and strong authentication do not guarantee that privacy will be preserved. In online communication there may be increasing threat of privacy violation.

Moreover, Semantic Web technologies enable the explicit representation of knowledge and its processing in order to deduce new knowledge from implicit one.

Thus, although storing personal information is authorized for a specific use only, its potential uses are so diverse that it is hard even to identify them.

It has been focused in this paper that monitoring functionality might reveal identified users' personal data through the personal (may be sensitive) data released by one learner only. So information that a collaborating learner does not desire be revealed may be (more or less easily) inferred.

Collaborators that are traceable from learners' e-portfolios, tagged pictures, etc. may be unaware of their privacy violation. Thus learners can procure threats to other unaware learners by making their own profiles as visible.

Therefore, sensitive multipersonal information requires technological innovative solutions under at least following a), b) and c) concern.

- a) **Privacy preserving Principles.** Here we limit to mention the Informed Consent Principle. It is likely that sensitive multipersonal data are supposed to have been gathered and plaintext stored only once an informed consent has been granted from some of its carriers. Thus, any personal information will not be disclosed to any other person or organization without a written consent, unless authorized or required by law.

However, if one individual's informed consent actually affects more than just the information donor's privacy, a privacy option by one carrier inevitably undermines the privacy of the other involved individuals. It is likely that a privacy breach for one of the carriers occurs essentially at the same extent for the other carriers. In most cases, the consents of all of the involved individuals may be impossible or impractical to obtain. Hence, the Informed Consent Principle has to be revisited, as for instance in (Venturini, 2013a), once a personal sensitive information turns out to not concern a unique owner.

We stress that revisiting the Informed Consent Principle is necessary also because otherwise it is not compliant with the Purpose Specification Principle, that foresees that personal data may only be collected for specified, explicit and legitimate purposes and not further processed in a way incompatible with those purposes.

Actually, collecting and storing sensitive multipersonal data has as a major purpose the privacy preservation for all of the identifiable individuals who are involved. Therefore, honouring any informed consent that has been released by some only of the involved carriers of a multipersonal information would not be compliant with the Purpose Specification Principle.

- b) **Privacy preserving algorithms.** It is nowadays widely accepted that exploiting on data the strongest privacy preservation technology which is at disposal for use may determine useless data because of information loss (e.g., (Foresti, 2011) for data release). An acceptable tradeoff among privacy

preservation, information loss and low-cost encoding remains a major issue of the algorithmic solutions (Fung, 2010) and in particular for multipersonal data that are long-term stored in databases (Venturini, 2013b).

To the aim of providing comprehensive platforms for supporting semantics-aware privacy preserving database management systems combined with tools for low-cost data hiding and for privacy preserving data mining, adequate algorithmic proposals for multipersonal data management are necessary.

- c) **Privacy policies.** Every privacy preserving system has its own privacy policy.

In the “notice and choice” privacy approach on the web, users are given notice of the privacy practice. Namely, if they do not like it, their choice is to leave the website.

However, privacy policies on Web 3.0 environments need additional solutions to give users better control over the collection and use of personal and multipersonal information. Actually, interaction with multiple systems and interrelationships between systems make the issues of ownership, control and privacy preservation more challenging than previously experienced.

Specifically, also realizing the potential of using personal data in MOOCs requires a new privacy policy paradigm for tackling the privacy issues (Marshall, 2014).

4. Related work

The impact of Web 3.0 technologies on e-Learning has received attention from several authors. Also e-Learning 3.0 has been outlined by some authors. For instance, since 2011 e-Learning 3.0 promises personalization, intelligent agents, semantic annotations, computer-understandable data and knowledge management. Also, it enhances the opportunities and tools for collaboration and interaction (Oakes, 2011). Here we limit to mentioning the related work on the novel notion this paper deals with, namely the *multipersonal* notion.

The *multi-owner privacy* addressed in (Li et al., 2010) and (Ren et al., 2011) as well as the *multiparty privacy* that received attention in the last years, e.g., in (Chen & Liu, 2009), have a different meaning. They intend to cover privacy problems which arise when some parties jointly are active in a computation task, usually on the web.

In (Venturini, 2013a) multipersonal data are (there termed as *multicarrier*) are discussed under the data release problem with emphasis on privacy protection under the (there revisited) Informed Consent Principle. In (Venturini, 2013b), multipersonal data are addressed for the release problem by exploiting Arithmetic Coding (Zhou et al., 2008), to preserve privacy for compressed multipersonal data that are long-term stored in relational tables.

The multipersonal notion is independent from but is similar to the *multi-carrier* one in (Chen et al., 2007), where it is considered as a kind of external knowledge that can be exploited to discover information, and to the notion of *community attribute* in (Gundecha et al., 2011). *Community attributes* characterize information about friends of a user, including friends that are traceable from a user’s profile, tagged pictures, etc. in the family of all attributes that are available for every user on a social networking site. They are defined in (Gundecha et al., 2011) as the opposite of *individual attributes*, that characterize individual user information.

5. Conclusions

The purpose of the paper is to attract attention to the semantics of term “personal”. More specifically, “multipersonal” information has been addressed in the paper in the framework of open online-Learning 3.0.

In Web 3.0 environments, multipersonal information could be annotated as metadata that may easily enrich the vocabulary of ontologies for the specific learning domain and could be accessed by software agents. The privacy challenges of multipersonal information in open online-Learning 3.0 are emphasized by the Web 3.0 technologies.

The benefits of an enhanced understanding and management of personal information can be aligned with the existing best practices in online education. Toward a best practice, also collaborative relationships in open online [\[1\]\[2\]\[3\]\[4\]\[5\]\[6\]\[7\]\[8\]\[9\]\[10\]](#) enable more correct inferences once the semantics of personal information is properly taken into account.

5.1 Further work directions

The multipersonal categorization is worth-carrying out in interesting application domains as the e-Learning area, where it can enrich related vocabularies and ontologies.

The multipersonal notion is likely to be of interest in the Privacy Preserving Data Mining (PPDM) which introduces semantics relationships among values.

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What can Europeana bring to Open Education?

Fred Truyen

KU Leuven, Belgium
fred.truyen@kuleuven.be

Clarissa Colangelo

KU Leuven, Belgium
clarissa.colangelo@kuleuven.be

Sofie Taes

KU Leuven, Belgium
sofie.taes@kuleuven.be

Abstract

Europeana is Europe's main culture portal, with now about 50 million objects of Cultural Heritage, including documents, images, videos and audio recordings. It is well known by Libraries, Museums and Archives as well as scholars for its trusted content. However, it is still underused in Education. Several factors make it an ideal tool for higher education. First of all, there is the quality: the cultural heritage objects described in Europeana come directly from the source, from the current holder, and have been digitized to high standards. Second, an ever growing part of it is available for public reuse, and openly licensed, as the European Commission pushes Cultural Heritage institutions to open up their collections. Thirdly, and this might be of growing interest, it shows Europe to its full diversity, in contrast to many current educational resources such as schoolbooks. It holds records from Central and Eastern Europe as well as those of Western Europe. Last, Europeana is transforming from a portal into a platform for reuse, educational as well as commercial. It wants to offer higher quality primary source material in a way that it can be integrated in educational apps, but also in an interactive way in online learning such as MOOCs. In this talk, we will discuss two examples from Europeana Space: creative reuse of Europeana content and the Europeana Space MOOC.

Keywords: Europeana, MOOC, Open Education, OER

1. Introduction

In this paper we want to show how large open resources of cultural heritage such as Europeana can contribute to open learning. We will shortly introduce Europeana, Europe's Cultural Heritage portal, and the focus on the activities in the EC-funded project Europeana Space, which aimed at exploring possible use cases of reuse of Europeana contents. We will then give examples of educational use, by highlighting the Europeana Space MOOC, a self-paced open online course which is open for registration now.

2. Europeana

Europeana¹⁸⁹ is the portal to Europe's cultural heritage. Europeana holds now >50m records from >2,300 European galleries, museums, archives and libraries, including books, newspapers, journals, letters, diaries, archival papers, paintings, maps, drawings, photographs, music, spoken word, radio broadcasts, film, newsreels, television, curated exhibitions, in 31 languages, all provided with extensive descriptions and metadata. All the contents of Europeana have been provided by the museums and collection owners themselves, and often have been digitized to high standards. This allows for a different kind of reuse of this content. Today, Europeana wants to become a platform of this reuse, so that this cultural heritage can be remixed. This can be for new creative businesses that can exploit Europe's cultural riches as a source matter for new products, but of course also for recreation, tourism, education and research.

Europeana offers a search box to search for content, and supports multilingual searches. Besides this main interface, Europeana currently boasts thematic collections and exhibitions, which are curated and narrated collections of images that bring a coherent view. These are of course very suitable for an educational use. There are currently two collections, one on Music and one on Art History, offering a true portal to these domains. A collection has a specific search box, as well as pre-defined searches, which make it much easier to access the content for those who are less acquainted with the subject. Furthermore, the collections have curated exhibitions, where a story is told about the objects described. This material is very well suited for a lesson in a school context.

For example, the Art History collection has pre-defined queries such as "Art Nouveau Posters" or "Edvard Munch", as well as specific exhibitions, such as "Faces of Europe" or "Baroque and Enlightenment". A collection on Maps in the works, as well as one on photography, which will be provided by Photoconsortium¹⁹⁰. On top of this, Europeana has a wide range of exhibitions outside of these collections, such as "Faces of Europe", "The Men on the Memorial", "Photography on a Silver Plate" etc.

Specific projects have contributed large collections to Europeana, e.g. Europeana 1914-1918¹⁹¹ on the First World War, Europeana Fashion¹⁹² and Europeana Photography¹⁹³, which contributed over 450.000 images on early photography. This last collection, with contents of Europe's major photo archives selected from the first 100 years of photography 1839-1939, has contributions from 13 countries with metadata translated in 16 languages (including Chinese, Hebrew and Russian). With contributions from countries such as Bulgaria, Slovakia, Poland, Lithuania besides Western European countries a wealth of historic material becomes available that can complement history schoolbooks and allow for a richer narrative of Europe's history, based on source documents.

The Music collection on Europeana has about 180.000 images, 50.000 sound recordings, plus texts, videos and other objects. It features prepared searches to e.g. Chopin, Brahms together with exhibitions.

¹⁸⁹ <http://www.europeana.eu>

¹⁹⁰ <http://www.photoconsortium.net>

¹⁹¹ <http://www.europeana1914-1918.eu/>

¹⁹² <http://www.europeanafashion.eu/portal/home.html>

¹⁹³ <http://www.europeanaphotography.eu>

Europeana Sounds¹⁹⁴ adds to this an enormous collection of a rich diversity of sound recordings, all open for reuse.

The exhibitions are narrated, which makes them a good starting point for an educational task. Students could read the Introduction, and then try to find specific materials by using precise keywords in queries, to go in a kind of curatorial dialogue on the content. At the moment the exhibitions are in English Language only.

Europeana is a freely accessible resource. Everything is free for personal use. Many of its contents also allow professional reuse. This is indicated in the search box under the heading “Can I use it?”, where one can choose for “Yes with Attribution” or “Yes with Restrictions” (The restrictions often being only non-commercial reuse). Some materials are to be used “only with permission”, these are works in copyright. Part of Europeana’s offerings are dedicated for reuse through Creative Commons licenses¹⁹⁵, while a growing part is in the Public Domain¹⁹⁶. This all makes Europeana an ideal instrument for educational use by teachers and students, as well as for course authors and MOOC builders who are looking for reuseable content.

3. Europeana Space

Europeana Space¹⁹⁷ is an EC (European Commission) funded best practice network aiming to foster reuse of the cultural heritage content in Europeana. Having contributed largely to the collections of Europeana, the partners in Europeana Space are working to make demonstrators and showcases of interesting reuse of this content creative industries. We did pilots on dance, TSV, photography, museums, open and hybrid publishing and games. For each pilot, a hackathon was organized where designers, creators, GLAM (Galleries, Libraries, Archives and Museums) professionals and students could come together to build mock ups of new applications, using the API’s (Application Programming Interface) and toolkits that were developed by Europeana Space. There are also 5 demonstrators: Archaeology in Cyprus, Irish Poetry and Folk Tales, Cavafy literature library, Photographic investigation of works of art and the Rode Altarpiece¹⁹⁸.

This way it covers a wide variety of cultural content, with all their specific problems regarding to media formats, required interaction, copyrights etc. The whole idea behind the pilots is that examples are given as to how the cultural heritage content in Europeana can be reused in new applications. This with the aim of feeding the hackathons, where developers and content providers were invited to come up with novel concepts that could generate new business models, all starting from the idea that Europeana could function as a kind of repository of “raw” cultural “material” that can be recombined and repurposed as to create new exchanges.

Europeana Space also developed an infrastructure, the “Technical Space”, where users can login and access the specific contents used in the pilots. This infrastructure allows the definition of collections and exhibitions, and it provides in API’s to access both the Europeana and Europeana Space contents¹⁹⁹.

¹⁹⁴ <http://www.europeanasonsounds.eu/>

¹⁹⁵ <http://creativecommons.org>

¹⁹⁶ <https://creativecommons.org/publicdomain/mark/1.0/>

¹⁹⁷ <http://www.europeana-space.eu>

¹⁹⁸ <http://www.europeana-space.eu/education/>

¹⁹⁹ <http://www.europeana-space.eu/with/>

Pilots

The **TV pilot** exploits the opportunities of re-using Europeana content in SmartTV applications to create new TV experiences. A technical framework provides an environment to analyse, personalize and present Europeana content. The pilot supports and evaluates two scenarios in which video material is brought out of the archive and onto the viewer's screen.

For the broadcast scenario, RBB developed an HbbTV application based on the Berlin Wall. The SmartTV application, targeting a social community, is based on archive videos about the building of the Berlin Wall in 1961 up to German re-unification in 1990. The local community scenario led by Sound and Vision focused on applications for an immersive user experience in the living or class room. It investigates use cases such as the elderly re-living personal memories through TV content or pupils learning about historic events.

The aim of the **Dance Pilot** is to create a general framework for working with dance content and the metadata accessible through Europeana and in so doing enable the production of two innovative models of content reuse, one for research purposes and one for leisure. As such two applications will be developed based on this framework: DanceSpaces and DancePro.

- DanceSpaces focuses on the needs of the general public, dance enthusiasts and pre-professionals, dance audiences/viewers and tourists, etc. who want to share and explore content about a particular dance aspect.
- DancePro focuses on the needs of researchers and dance experts (e.g. dance artists, choreographers) who need a set of much more powerful tools for accessing dance content and creating extensive metadata.

The **Games pilot** is examining how the highly engaging principles of gaming can be applied to digital archives and their content in order to create new prototypes for future games applications. Drawing on the wealth of cultural material in Europeana, these games will target different sectors of the emerging games market and ask how this medium can bring new audiences to existing collections and content using various digital delivery platforms. Three demonstrators are created as part of this pilot:

The casual game focuses on restoration. It presents the player with a painting (from Europeana), covered in dust. The aim is to restore the painting as quickly and effectively as possible, challenging the speed and accuracy of the player. The casual game is based on the arcade game QIX from 1981. The objective of QIX is to claim rectangular shaped areas of territory on the games screen, in order to acquire over 50% of the space available. This casual and compelling model of gameplay has been adapted to reveal image content from Europeana as the player claims territory. A video mashup game aimed at the social gaming market, that deploys archive materials in new and unexpected ways.

The creative game allows the player to create collages from filmed footage (from Europeana), encouraging people to draw connections between content and generate their own remixes. The social game is themed around dance and the playful experience of mixing and matching archived videos of contemporary dance in order to create new 'mashups'. Players are presented with a library of dance clips video content that has been curated by the members of the Games and Dance Pilots which they are then able to sequence together on a timeline.

The educational game is themed around the format of the self-portrait, using a series of images already drawn from Europeana. Using the styles and themes of these images as a starting point, players can map photographs of themselves or their friends into the image and blend these together using a range of touch

screen based tools. The original images link back to their archive sources and also to open content on the artist, arts techniques and historical context for the image. The aim is to match the images as closely as possible, encouraging creativity and learning through emphasizing the form and composition of the painting.

An educational game designed for Art teachers and their students, that allows them to create and share new work based on inspirations from the archives.

The **Open and Hybrid Publishing pilot** explores this question by producing a creative multi-platform resource, called an 'open book', about the dynamic relationship between photography and other media. Titled *Photomediations: An Open Book*²⁰⁰, the resource uses open content, drawn from Europeana and other online repositories, and run on open software. The 'open book' includes several chapters – such as Photography and Time, Becoming Media or The Ecology of Images – containing visual and textual material on different aspects of photomedia. They are followed by two 'open' chapters: an online exhibition and a discussion forum.

The Pilot has two main goals:

- to popularize the availability of online image-based resources by making extensive use of material that uses CC-BY License or similar open licenses
- to devise an alternative business model for using 'open and hybrid publishing' with regard to digital image-based heritage and sharing it with others: educators, students, publishers, museums and galleries and digital heritage organizations.

The **Museums pilot** addresses challenges posed by a shifting paradigm: users engagement, edutainment, interaction, audience development, user generated contents, but also market competitiveness.... these are some key elements that recently entered the cultural heritage world. Also museums and memorials, especially the small and medium ones, had to update their strategies and structures according to this new cultural scenario, but keeping on facing the "old" challenges: such as optimization of decreasing financial resources, update of collections, design of new exhibition paths.

The pilot has been designed keeping in mind all these aspects with the aim of creating ready-to-use solutions for content and exhibition curators but also for end users, that maximize results leveraging on the archive of multimedia contents available in Europeana combined with web-based and mobile solutions. Two distinct products will be the result of this activity:

- The Toolbox, a web-based application designed for museum curators, that allows them to create always brand new educational videos and promotional worksheets melting the museums/memorials contents with the heritage of Europeana
- The Blinkster mobile app – that will enrich the exhibitions with Europeana contents by exploiting the mobile strength such as augmented reality, object recognition and geo-localization for education and entertainment experiences within hand's reach

The **photography pilot** features applications grouped around 3 ideas:

- Storytelling web applications and apps allowing for users to create new stories by mixing historical images from Europeana and other public sources with user-generated content;

²⁰⁰ <http://photomediationsopenbook.net/>

- Museum applications providing access to Europeana and similar resources can yield new types of visitor-experiences;
- Augmented reality applications enabling historical images to be layered with actual experiences and other material, such as maps and social user data.

In the photography pilot, we developed an environment “tell your photo story”²⁰¹ where teachers can build their own stories using images coming from Europeana, Flickr Commons²⁰² and other similar sources. The pilot continued work by Photoconsortium members on EuropeanaPhotography²⁰³. You can search images in these sources at the same time, select the images you want to use and make a story with them that you then can save and share with others. Not only can teachers prepare a class for their students, they could also give an assignment to those students to build their own stories. Besides using the images that you find in the catalogues, you can also upload your own. Mixing cultural heritage with user-generated content allows for a real interaction by communities with their heritage, and also for a re-appropriation of heritage. It can lead to new interpretations where meanings are given to heritage that today’s communities can relate to. For Europeana Space, we uploaded collections that we gathered in Pisa, in an event where we asked people to bring their own vintage photos that we then digitized, from the Leuven City archive collection and from a “bring your own photos” event in Leuven, where we did high-quality digitization of photos brought by members of the public. All these photos are in the EuropeanaSpace technical platform and are in the process of being uploaded to Europeana under CC-BY-NC licenses.

For the museum applications, the pilot used the Blinkster application applied to a photography exhibition, “All our Yesterdays”²⁰⁴. With this app, visitors can get extra information about the pictures displayed, and save their visit to their smartphone, so that after the visit they have the pictures of the photos they liked. This app could form the basis for more sophisticated educational scenarios for a museum visit.

The Augmented reality app targets tourism. It starts from a repository of vintage pictures of a City (in the demonstrator this is the city of Leuven in Belgium which was destroyed during the First World War). These are matched to reference images of today. For each reference image a multitude of similar images is taken from slightly different viewing angles. This allows the app to identify the place when someone points his smartphone camera in the right direction. When a match is found the vintage photos can be overlaid. This technology can form the basis for tourist quest applications, leading tourists around historical cities.

4. Europeana Space MOOC

The Europeana Space MOOC brings all this information together MOOC on the edX platform²⁰⁵, where interested students not only learn about the rich cultural heritage content available in Europeana, but also do hands-on assignments actually learning how they can become active users and contributors rather than simply consumers of heritage. The MOOC contains a learning module on five of the pilots (Photography, TV, Dance, Open & Hybrid Publishing and Museums) and an important module on managing Intellectual property rights “IP for the Cultural Entrepreneur”, and a module on Creative Marketing. The IPR module

²⁰¹ <http://www.tellyourphotostory.be>

²⁰² <https://www.flickr.com/commons>

²⁰³ <http://www.europeana-photography.eu>

²⁰⁴ <http://www.earlyphotography.eu>

²⁰⁵ <https://www.edx.org/course/europeana-space-creative-digital-kuleuvenx-eurospacex>

highlights possibilities of reuse through Creative Commons licenses and addresses issues such as Orphan Works and the balance between cultural rights to open access and intellectual property rights.

The MOOC targets three levels of users: a general audience of people interested in cultural heritage that want to learn how they can do more with the available online content – with a special focus on teachers and students, a public of GLAM professionals and lastly designers and developers. While the learning materials for the first group are the typical MOOC ingredients such as preparatory readings, video lectures, knowledge clips, quizzes, forum discussions and assignments, the materials for the professional groups are more documentation oriented and offer direct pointers to the relevant knowledge bases.

The assignments in the MOOC aim to really help learners to take the step to become active producers of remixed and repurposed content, according to the **4R principle: reuse, redistribute, revise, remix**²⁰⁶. In the assignments, learners actually use the toolkits and API's produced to build and share new narratives, stories, and applications. With the MOOC, launched on the KULeuvenX Open edX platform we want to reach out to large user communities of cultural heritage, making sure Europe's rich digitized cultural heritage is repurposed and re-appropriated by new applications, narratives and learning experiences. It is also a showcase of "MOOCs the other way around": rather than copying an existing university course into a MOOC, this MOOC is the result of practice-oriented research that leads to new academic contents and learning formats.

5. Conclusion

We hope to have brought to the attention that with Europeana users have access to a very rich wealth of online cultural heritage resources that can be used in Education. With the Europeana Space portal, we aim to show how useful reuse of these materials can be made by teachers, students, amateurs and GLAM professionals as well as developers in the creative industries. The Europeana Space MOOC helps to put interested users to get started.

²⁰⁶ Hilton, J., Wiley, D., Stein, J., & Johnson, A. (2010) "The four R's of openness and ALMS Analysis: Frameworks for Open Educational Resources." *Open Learning: The Journal of Open and Distance Learning*.

The learner's Journey – Creating more engaging MOOCs

Carl Dawson

Proversity, South Africa
Carl@proversity.org

Krishan Meetoo

Proversity, United States
krishan@proversity.org

Adam Brown

Proversity, United Kingdom
adam@proversity.org

Abstract

Massive Open Online Courses (MOOCs) are often perceived as a low-cost and efficient means for a teacher to reach a large audience of students, but if they are poorly made they will not be effective. A poorly made MOOC could have damaging effects on the teacher and the institution that they work for. Proversity teamed up with a professional screenwriter, summarising key areas of dramatic theory, to develop a robust template for the structure of MOOCs. It is hoped that in the near future, Proversity will be able to use The Learner's Journey to create more effective MOOCs that allow learning through gameplay, immersing the student in the subject.

Title: The learner's Journey – Creating more engaging MOOCs

Authors: Adam Brown, Carl Dawson and Krishan Meetoo, Proversity www.proversity.org

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1. Introduction

1.1 Proversity

Proversity has now delivered over 100,000 learning hours in the open education space for corporate clients. With youth unemployment still rampant across Europe and very specific skills shortages in key industries our findings from the first fifty cohorts of learners offer some interesting patterns, differences with academia and opportunities for strategic delivery.

1.2 The problem with MOOCs

Proversity has identified that as a growing field, Massive Open Online Courses (MOOCs) are not as efficient as they could be. The open-source ethos underlying MOOCs has led to a 'free-for-all' mentality, where teachers who are keen to spread their knowledge are sometimes doing so in an inefficient way. Proversity is developing new tools to encourage a more effective way for thought leaders to teach students at a lower cost to all parties. Our industry is growing and we're moving in the right direction, but not fast enough and there is a better way.

1.3 The paper

This paper will deliver an introduction to the way that screenplays and video games are structured and consider how the dramatic theory used could be incorporated into the creation of MOOCs to make them more interesting for the learner, more effective and easier for the teacher to create.

We will introduce *The Learner's Journey* – Proversity's structure template for writing MOOCs, explaining the theory behind it.

It is hoped that the Learner's Journey will help educators without prior knowledge of screenwriting to put together more engaging MOOCs, using the template provided.

We will explore plot structure from Aristotle to the present day and its relationship with the student's satisfaction of seeing a story reach its successful resolution, something which Aristotle termed the 'proper pleasure' (Hiltunen, 2002).

1.4 Thesis

How can dramatic theory and story structure be used to make MOOCs more effective and engaging?

2. Empathy and 'the perfect pleasure'

In 335 BCE, the philosopher Aristotle wrote *The Poetics*, the earliest surviving work on dramatic theory (Tierno, 2002), explaining that for a story to work, the audience must feel empathy with the protagonist (hero/heroine). This does not mean that the audience need to *like* the protagonist, but there must be some quality in their character that they will root for. This empathy is usually created by showing the audience that the protagonist a victim of undue suffering who is trying to overcome this by achieving a specific goal (Hiltunen, 2002). For example in *Breaking Bad*, Walter White is a high school teacher who is diagnosed with cancer and becomes desperate to provide for his family after he dies, making us empathise with him, even rooting for him as he turns into a menacing drug dealer.

Aristotle wrote that the audience must have a superior point of view to the protagonist, so that they are aware of the threats ahead before they can attain their goal. This knowledge creates *suspense* in the audience as they *fear* for the hero's safety, anticipating the danger that lies ahead. This suspense builds *tension* throughout the narrative until, when the hero ultimately triumphs, it is *released*, giving the audience a cathartic sense of relief – Aristotle called this *the proper pleasure* (Hiltunen, 2002).

An example of this can be seen in *The X-Factor* a television programme that makes use of contestant's backstories to manipulate our empathy with them – making us *care* about the talented underdog, and *fear* for them with clever use of VT inserts of the contestant desperately listing the reasons why they need to win, juxtaposed with a judge saying that they don't think they'll be very good. Timing, evidence of nerves etc, all work to build our fear, then when the act goes well, the audience are on their feet etc, the act cries and we the viewers at home feel their happiness, releasing a sense of catharsis upon us.

These shows also use empathy to make us dislike the less talented or unpleasant contestants, portraying them as unusual and different, employing carnival humour to encourage the audience to laugh at them.

In the paper *Experimental testing of the empathy-altruistic theory*, Batson, C., Duncan, B. D., Ackerman, P., Buckley, T., & Birch, K. (1981) showed that empathy is an innate trait, and that if people see someone in distress, they are more likely to be altruistic, to help one another, if they have empathy with that person

needing their help. To prove this, Batson asked female students to take the place of 'Elaine' who was receiving mild electric shocks. Those who were led to believe that a placebo drug they took led to empathetic concern, offered to take the shocks, whereas those who had been led to believe that they would feel distress were more likely to leave.

Another simple way to make the audience member root for the hero is to portray them as being similar to the target demographic, but having commonly desired qualities that the viewer probably doesn't have, as Hiltenun (2002) states in *Aristotle in Hollywood*:

"A good plot needs a hero who is morally good, consistent and like us in the sense that he displays characteristics which, in similar circumstances, we may also have." (p. 19)

This can be seen in the plethora of Sunday night dramas aimed at upper-middle class professional audiences, featuring eccentric middle class protagonists who share similar characteristics to the audience but provide a sense of escapism through where they live, such as a Cornish fishing village in *Doc Martin*, or a Scottish castle in *Monarch of the Glen*. These dramas are popular because they feature characters who are similar to the target viewer, but lead slightly more glamorous or interesting lives. The protagonist doesn't have to be realistically similar to the viewer – the proliferation of muscley action heroes and curvacious heroines is testament to that – but if they display characteristics that the viewer finds desirable, they will feel empathy with them.

As Jeremy Gwilt, Producer of *Monarch of the Glen* said in an interview in the Guardian in 2001:

"At eight o'clock on a Sunday night, audiences have a particular need. When the week is in prospect and people are getting in gear, I'm not sure they want to be intellectually extended. However, I think there is an appetite for well-structured storytelling, strong characterisation and emotional engagement with those characters. These are essential elements for any drama but particularly those on a Sunday night."

Screenwriter Robin Mukherjee mentioned this at the Southern Script Festival (Bournemouth University, 26th-27th March, 2011) about his CBBC show *Combat Kids*, that when writing for children, the characters should be a year or two older than the target demographic, which encourages the children viewing to empathise with the characters.

In *The Learner's Journey*, to encourage the student to empathise with the protagonist in our MOOC, they should be from the student's likely demographic, displaying familiar characteristics and appeal to the universal qualities that most people hold dear – family, friends, goals, etc. (Skolnick, 2014).

The student must have a superior view of the quest ahead, to encourage *fear* that the protagonist might not succeed and involve them in the lessons (Hiltenun, 2002)

It would be sensible to consider how the video game industry creates heroes who the players all root for, regardless of their demographic. When Lara Croft dies in the game, the player doesn't think 'oh no, Lara Croft died' they think 'I died' (Skolnick, 2014).

We achieve this by boiling the story down to an individual, showing the student a person, or family who could suffer on a personal level if they fail, someone like us. When we watch a film where a nuclear bomb is about to be dropped on a city, we do not see the city as a whole, we see a character going about their daily life, we see their loved ones, their interests, their hopes and dreams. When we see the nuclear bomb about

to be released, it is this single person that we empathise with, as we relate to them and see similarities between them and us (Skolnick, 2014).

3. Structure

3.1 The three-act structure

In *The Poetics*, Aristotle wrote that every story has three simple stages and that for the audience to willingly suspend their disbelief “a good plot must be both logical and credible”, with each step leading plausibly to the next (Hiltunen, 2002, p. 19):

1. Thesis: The beginning of the story, where the characters are set-up. The viewer identifies with the hero, realising that they must solve a problem and creating *suspense* in the viewer.
2. Antithesis: In the middle, the hero repeatedly tries to resolve the problem, but encounters complications and fails, building tension as the viewer *fears* that they will not succeed.
3. Synthesis: At the end the hero solves the problem, *releasing* the viewer’s suspense, causing them to experience *catharsis*, which Aristotle described as the ‘proper pleasure’ (Hiltunen, 2002).

Aristotle’s three-act structure seems to suit humans – when the brain processes information, it automatically tries to assemble it into a logical pattern (Yorke, 2013). This explains the feelings of catharsis and satisfaction when a story is resolved.

In *Documentary Storytelling* (2011), writer Susan Kim suggests that human beings can’t help but search for Aristotle’s three act structure of set-up, complications and resolution: “I think that’s just the way we as humans are neurologically and culturally structured.” (Bernard, 2011).

Whether this is something that is hard-wired, or developed from an early age through stories, is unknown, but Kim (2011) suggests that this built-in desire for logic and the three-act structure are responsible for dreams. Upon waking, the succession of random images which have flit through it during sleep are strung together automatically to create a vaguely coherent story (Bernard, 2011). The powerful yet simple three-act structure will form the foundation of *The Learner’s Journey* (see Table 1).

Table 1: The three-act structure of *The Learner’s Journey*

Step	Three-act structure	MOOC plan (with approx. % time)
1	Thesis	Introduce the student to the subject to be taught, the protagonist, their goals and why they can’t achieve them. (10% of the lesson)
2	Antithesis	The student follows the protagonist, as they proceed through their quest. The information that would usually be told to them in a lecture format is delivered through the story they are watching. At the end of each ‘lesson’ there will be some simple gameplay to test the student’s understanding before they can proceed to the next stage. In screenwriting, the end of Act II is where the protagonist meets their antagonist and battle commences (70% of the lesson).
3	Synthesis	The student is advised to revisit parts of the MOOC and put all of the information together to pass the unit, releasing the student’s suspense with cathartic relief. (20% of the lesson)

3.2 The road to *The Writer's Journey*

Whilst Aristotle was the first person to say that plots should have a beginning, middle and an end, Epes Winthrop Sargent in *The Technique of the Photoplay* (1916) was the first to develop this into three acts (Yorke, 2013).

In 1928, the Russian folklorist Vladimir Propp, published *Morphology of the Folktale*, after studying 100 Russian folk tales, which he found to all followed a similar pattern, which not only adhered to Aristotle's three-act structure, but could be broken down into 31 steps ('functions') that were (usually) present in a story (Fiske, 1995).

In 1949, Joseph Campbell, published *The Hero With a Thousand Faces* which included a seventeen step template for the structure of stories that he called *The Hero's Journey*, or the *Monomyth*. Interest in the Monomyth grew when George Lucas revealed that he had used it to develop the plot of *Star Wars*.

In 1979 Syd Field, in "*Screenplay: The Foundations of Screenwriting*" was the first person to link the three-act structure to screenplays and developed several terms that have been familiar to screenwriters ever since, such as *the midpoint*' (Yorke, 2013).

In the early 1990s, a Hollywood film executive, Christopher Vogler, having read Campbell's *Hero with a Thousand Faces*, began to notice that the scripts he was being sent to read followed a similar pattern and wrote a seven-page memo for screenwriters, which he later developed into *The Writer's Journey: Mythic Structure for Film Makers* (2007) as a blueprint for writers, setting out a simpler structure than what had gone before it.

An important plot point was missing from Vogler's structure, according to John Yorke, former Head of Channel Four Drama, Controller of BBC Drama and a founder of the BBC Writers Academy. In Yorke's *"Into the Woods"* (2013) he highlights Vogler's omission of the midpoint.

The midpoint is a moment in the middle of a screenplay when everything changes for the hero, it's not an act break and it can be a positive or negative change, but the Hero's Journey changes dramatically. If we think of the opening and closing scenes as diametric opposites that bookend the narrative (Snyder, 2005), then the midpoint is the pivot where we see this change begin to happen (Yorke, 2013). This is the moment where the hero stops accepting the problems thrown at him/her and starts fighting back. Yorke (2013) points out that Vogler's model, while more useable than Propp and Campbell, misses this crucial moment, it will be included in *The Learner's Journey*.

After Vogler, many scriptwriters like Robert McKee, Blake Snyder, etc. began to publish different structure models. While these different structures might seem confusing at first, John Yorke (2013) showed that they all merely break down Aristotle's three acts into different sub-units (see table 2) and indicate that there is a universal structure.

Table 2: Structure comparison table of the structure models mentioned: (Yorke, 2013)

Author	Steps																															
Aristotle	Thesis										Antithesis										Synthesis											
Vladmir Propp	Absentati on	Interdicti on	interdicti	Recon.	Delivery	Trickery	Complicit y	Villainy	Mediatio n	counterac	Departur e	1st donor	Reaction	magic agent	Guidance	Struggle	Branding	Victory	Liquoratio n	Return	Pursuit	Rescue	Unrecogn ized	Unfounde d claims	Difficult task	Solution	Recogniti on	Exposure	trans figuratur a	Punishme nt	Wedding	
Joseph Campbell	the Call to Adventure	Refuse the Call		Super-natural aid	Cross threshold		Belly of Whale		Road of Trials		Meet Goddess		Woman as temptress		Atone with Father		Apotheos is		Ultimate Boon		Refusal of the Return		The Magic Flight		Rescue		Cross return line		Master of two worlds		Free to live	
Syd Field	Set-up Plot point 1										Confrontation Plot point 2										Resolution											
Christophe r Vogler	Ordinary World	Call to action		Refuse the Call	Meet the Mento r		Cross the thresh old		Tests, allies and enemies		Approac h inner cave		Ordeal		Reward		Road back		Resurrection		Return with Elixir											
John Yorke	Act I										Act II			Act III			Act IV			Act V												
Blake Snyder	Openin g image	Theme stated		Set-up		Catalys t		Debat e		Bre ak into Act II		B- stor y		Fun & gam es		Mid - poi nt		Bad guy s close in		All is lost		Dar k nigh t of the soul		Break Act III into		Finale		Final image				

3.3 Non-fiction structure

The models above were designed to show how fictional stories are structured. As we are investigating MOOCs, it is worth considering how factual content is dealt with. The closest comparison is the documentary, where the author takes an idea, hypothesis or series of questions (Bernard, 2011) and explains it to the viewer while keeping it interesting so that they pay attention and enjoy it.

At first glance, we might think that a documentary is different to a work of fiction, but as Sheila Bernard says in *Documentary Storytelling* (2011) the programme is still telling a story:

“Factuality alone does not define documentary films; it’s with those factual elements, weaving them into an overall narrative, that seems to be as compelling as it is truthful and is often greater than the sum of its parts.” (p. 2)

As with MOOCs, a documentary must deliver backstory (exposition) in an interesting, engaging and thought-provoking way, without moving so fast as to ‘spoon-feed’ the information, or so slowly that it becomes dull and disengaging. The structure must move the story forward and motivate the audience to go with it (Bernard, 2011).

The narrative or plot of a documentary shouldn’t be too complicated – a well-structured plot will allow for detours to explain theories, bring in additional characters etc. This information should be seeded, drip-fed subtly throughout the documentary so that the viewer picks up more and more information without a conscious awareness that they are doing so. (Bernard, 2011).

Just as films should have emotional resonance with the audience in order to engage the viewer Bernard (2011) claims that the same is true with documentaries – and therefore MOOCs – which can create the same emotional resonance with the audience as films and TV programmes can.

To engage the viewer, the documentary should have a clear set-up that poses a question and draws the viewer in, making them care about the outcome. If the viewer can anticipate or hope, for a certain answer, then they will empathise and be interested in what they are watching. This can be achieved by showing a situation that ties into universal goals that most viewers will want (safety, wealth, love etc). In a film, the viewer roots for a character, but in a documentary they will root for the result that they anticipate. This is relevant to MOOCs because we need to engage the participant (Bernard, 2013).

3.4 Video game structure

So far we have discussed screenplays, which are designed to be passively watched. In a screenplay, while the viewer has empathy with the character, there is no active role for them to play in the hero’s quest. A better analogy for a MOOC would be a computer game, where the player (i.e. student) makes decisions for the protagonist, guiding them along their journey, sharing their hopes and fears.

Eva Skolnick advised in *Video Game Storytelling* (2014) that the first thing to consider with writing for an active medium is *conflict*, without it there’s no story – why would anyone want to watch characters achieve something without a struggle? The struggle makes it interesting for the viewer, without conflict, what’s there to watch? In the same way, why would anyone want to play a computer game unless it was a *challenge*? And, in turn, a MOOC has to be challenging to engage the learner, maintain interest and build their desire to complete the quest MOOC.

So the learner needs to encounter conflict, by being challenged throughout the MOOC, such as deliberately feeding them misinformation and seeing who picks up on this – as with any lecture, students are given information, but are expected to read around the subject, develop theories of their own and question what they are being taught (this is one area where the MOOC can be more effective than a lecture, as the learner’s journey would allow the student to progress at their own speed, emulating to some degree the 1:1 tutorial system of Oxford and Cambridge, but at a far lower cost).

A simple way to find the conflict in a story is to pitch it as a logline, e.g. *The Hangover* ‘A stag party *wants* to get back for the wedding, *but* they can’t find the groom and come up against a multitude of problems as they search for him.’

Computer games can be summed up in the same way, ‘Video Game Storytelling’ gives an example: “‘Tomb Raider : Lara Croft *wants* to help friends escape from a monstrous island, *but* a bizarre militaristic cult has other plans for them and supernatural forces prevent anyone from leaving’ (Skolnick, 2014).

As we can see from the above examples, the hero’s conflict is also their *challenge* (Skolnick, 2014). With MOOCs it is perhaps more relevant to consider the hero’s conflict as the *learner’s challenge*.

When developing a MOOC, the first step would be to summarise the learner’s challenge with a logline along the same lines of ‘the hero *wants* to do something, *but* can’t because...’ (Skolnick, 2014).

The hero’s goal will be related to the learner completing the MOOC, for example a MOOC about shipping could involve the character having to set sail somewhere. The antagonistic forces working against this will be a combination of *internal* (e.g. lack of interest, knowledge, time, commitment etc.) and *external*, by personifying a problem, such as an inspector checking the condition of the ship before it can leave dock; or a lack of time could be portrayed as an appointment that can’t be avoided, so the designers could introduce a sudden time-limit on a section (incorporating elements of video game design will be discussed in a later paper).

This brings us back to the three-act structure, as a simple way to plot the learner’s challenge and show us how they should *feel* as they undertake each lesson (see Figure 2):

Act I – *Setup* the challenge: Explain what the challenge is and why the hero has to confront it.

Act II – *Confront* the challenge: The hero faces a series of tests that become progressively harder.

Act III – *Resolve* the challenge: The hero overcomes the final test (Skolnick, 2014).

We should think of MOOC lesson units as being the same as video game levels, each a discrete, stand-alone unit that moves the story and the characters forwards. Just as with video games, these lessons link together to form the overall course, following an overarching story (Skolnick, 2014).

The graph in figure 2 can be used to plot the challenge presented to the student in each MOOC, or in the entire course.

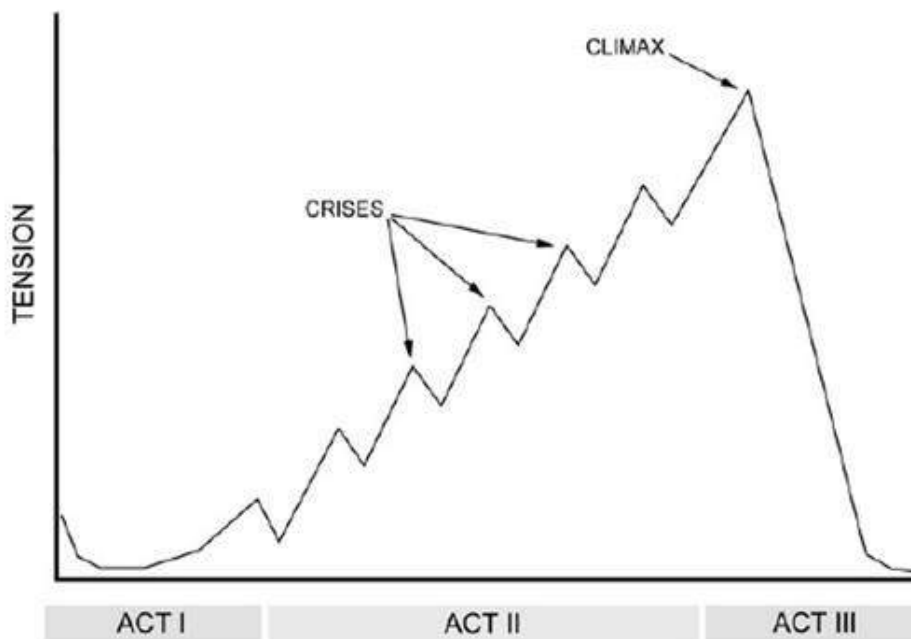


Figure 2: The Game Player's Journey

'Tension' shows the level of challenge presented to the student.

(Evan Skolnick, *Video Game Storytelling*, 2014)

To plan each lesson we should consider why the scenario exists and what the learner will get out of it. Video game designers use a Level Design Document (LDD) to show the plan for each level (Skolnik, 2014), which has been adopted to help plan MOOC lessons (see table 3).

In *Video Game Storytelling* (2014) describes a concept in the games industry for the developer to check that the character in the game and the player are aiming for the same goal, this is called 'ludonarrative harmony' and requires that the following three questions all have the same answer:

- (i) What does the learner want?
- (ii) What does the character want?
- (iii) What is the learner being asked to do?

Taking all of this into account, we can lay out the model for ***The Learner's Journey*** (see table 4).

The script-writing process will be covered in a future paper, but will build from a one-sentence *log-line* to a three sentence paragraph *premise* listing the three acts. The plot points of ***The Learner's Journey*** can then be filled in, to build the plot structure.

Once this has been completed, a *Treatment*, or prose version of the script can be written, which is then divided into an *Outline* to show where the plot points will be. A *Step-outline* flowchart of the narrative is then prepared from this and finally the script can be written from there.

Table 3: The Learner's Journey MOOC Lesson Plan:

The Learner's Journey MOOC Lesson Plan	
Where in the overall story does this take place?	
What happened in the previous lesson?	
Did anything happen between the lessons?	
What's the next lesson?	
How will this one prepare the student for the next lesson?	
What's the hero's emotional state and why?	
How should this lesson make the learner feel, beat by beat?	
<u>What does this lesson need to accomplish in the:</u>	
Overall course?	
Overall story narrative?	
Hero's character arc?	
<u>Ludonarrative harmony test:</u>	(ensure that these all have the same answer)
What does the learner want?	
What does the character want?	
What is the learner being asked to do?	

Table 4: *The Learner's Journey:*

Act	Step
Act I	Ordinary World
	Call to adventure
	Refusal of the call
	Meeting with the mentor
	Crossing the threshold
Act II	Tests, allies, enemies
	Approach to the innermost cave
	Midpoint
	Ordeal, death, rebirth
Act III	Reward
	The journey back
	Resurrection
	Return with elixir

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Responsible Innovation: Open and online education for students and professionals.

Joost Groot Kormelink

TU Delft, Faculty of Technology, Policy and Management

j.b.j.grootkormelink@tudelft.nl

Abstract

This article is about a project funded by the Dutch Government titled '*Flexible Learning Paths in Responsible Innovation*' (implemented by the TU Delft) . The project focuses on the development of open and online education in *Responsible Innovation* for both on-campus students and professionals (in order to become a Chartered Engineer).

Responsible Innovation (**RI**) comprises two key notions: Ethical acceptability *and* orientation towards societal needs and grand challenges. RI implies a different mind-set on the part of engineers: one of societal engagement and social responsibility. In other words we have to rethink innovation. Engineers need professional competences and abilities to improve societal outcomes and to develop appropriate innovative solutions which accommodate core values such as sustainability, privacy, safety and security.

For this purpose, the project will develop open and online educational resources and courses for both on-campus students (master and bachelor) and professionals .

In this paper we will focus on the key results of the above mentioned project:

- An open platform for OER (Open educational Resources) as well as student's research (minors).
- Six online courses for professionals which we develop for – and in consultation with- KIVI (the Royal Netherlands Society of Engineers). Since this year KIVI-members can become a *chartered* engineer if they meet certain conditions (competences) . Our online courses will help engineers to meet the requirements.
- A number of didactical experiments.
- International activities.

Keywords:

Online education for professionals, Responsible Innovation, Open Research and education platform, Reuse of OER, Credit for MOOCs

Introduction

This paper is about an ongoing project of the TU Delft (Delft University of Technology), funded by The Dutch Ministry of Education, Culture and Science focusing on the development of *open and online education in the field of Responsible Innovation* (further referred to as **RI**).

Two key elements of RI are: *ethics*, and *safety of (new) technologies*. The core idea of RI is that we have to discuss the ethics, societal needs and risks of new technologies before the widespread deployment. RI is a very topical subject and implies a different mind-set on the part of engineers: one of societal engagement and social responsibility.

The target groups for this project are very broad: all on-campus master students of about 200 minor bachelor-students as well as professionals. Moreover, the project aims to put RI on the agenda of engineering universities in an international context.

Obviously, these goals are very ambitious. In this paper we will sketch the broader context of the project, our approach, and our results so far. Will we manage to do attain these ambitions? What are some lessons learned? What type of institutional support did we get?

This paper will:

- First describe the broader context:
 - The importance of RI (par. 1.1).
 - The tender for online and open education of the Dutch Ministry of Education, Culture and Science (par 1.2).
 - TU Delft and its ambitions versus online education and training students in ethics and engineering (par. 1.3).
 - Information about the implementing department (par. 1.4).
 - The MOOC RI which we already developed before the start of the project.
- Summarize the project and our motives for online education (par. 2.1) and its results so far (par. 2.2).
- Last but not least: include a number of reflections (par. 3).



Figure 1: Logo EU PRISMA project, see par. 2.2)

1. Context

1.1 Urgency: Why we need RI

Technology is advancing at a very fast rate, just have a look at this document:

<https://www.weforum.org/communities/meta-council-on-emerging-technologies>. However, many decisions regarding emerging technologies are uncomfortable. When should an autonomous vehicle sacrifice itself and its owner to protect others? What happens when medical expert systems work on behalf of insurance agencies rather than patients? What happens when killer robots may decide to pull the trigger without human involvement? What about the risks of implantable computer chips? What if Artificial Intelligence becomes better than humans at all cognitive tasks?

We thus need to discuss ethics and risks of new technologies before their widespread deployment. We need responsible innovation (RI).

RI is a very topical subject and implies a different mind-set on the part of engineers: one of societal engagement and social responsibility. Engineers need professional competencies and abilities to improve societal outcomes and to develop appropriate innovative solutions which accommodate core values such as sustainability, privacy, safety and security. We have to rethink innovation. This is what the project in terms of content will address.

We want to give engineers (both students and professionals) a framework to reflect on these crucial questions and the implications for the innovation process as part of their training. Online education obviously offers some clear advantages to attain this objective. See also par. 1.3.

Intermezzo

The following drawings on the - for ethicists famous - 'trolley problem' are an example of the way we discuss RI in our courses.

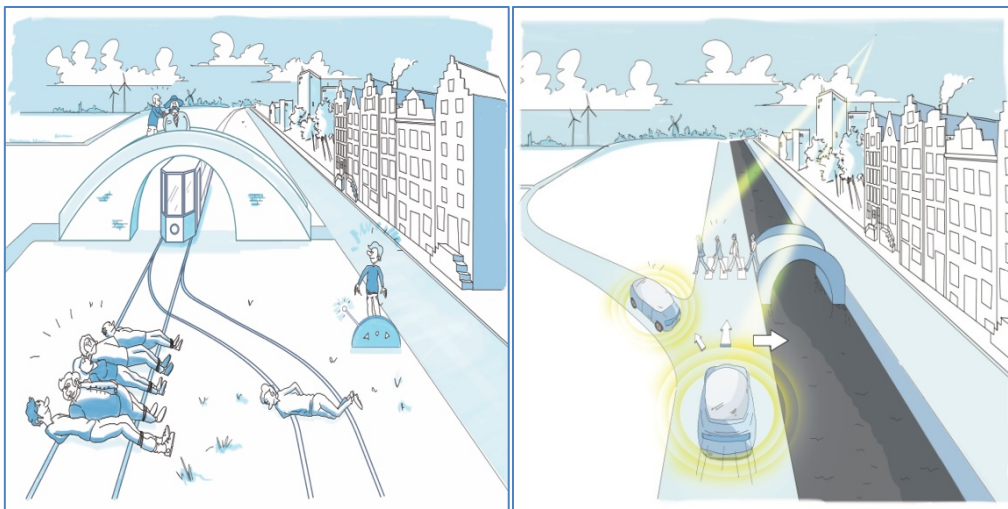


Figure 2: the trolley problem (drawings by Ayelt van Veen, student assistant MOOC RI)

The Trolley Problem is a famous thought experiment in ethics. The general form of the problem is this: There is a runaway trolley barreling down the railway tracks. Further ahead on the track, there are five

people tied up and unable to move. The trolley is headed straight for them! You are standing some distance off in the train yard, next to a lever. If you pull this lever, the trolley will switch to a different set of tracks. However, you notice that there is one person similarly tied up on the side-track.

So you have two options:

- Do nothing, and the trolley kills the five people on the main track.
- Pull the lever, diverting the trolley onto the side-track where it will kill one person.

What would you do?

You make think this is hypothetical ethical question. It is not, see the picture above. Self-driving vehicles have to make choices when an accident cannot be avoided. Engineers have to think about such issues during the design process.

1.2 Tender Dutch Ministry of Education, Culture and Science

The Dutch Ministry of Education, Culture and Science provides funding for pilots around Open and Online Education programme during the period 2015/18.

This project is part of this programme and received a subsidy of k€ 100 for the period 1.9.2015 until 31.12.2016.

Aim of the program of the Ministry is to contribute to the quality, accessibility and efficiency of higher education using online education. The project is monitored by [Surf Foundation](#) and also includes a bigger research program (4 PhD's) titled [SOONER](#) led by the Open University in the Netherlands.

1.3 About the TU Delft and its policies versus online education and ethics

1.3.1 About the TU Delft in general

The TU Delft (Delft University of Technology) is the biggest university of Technology in the Netherlands. It's mission is *'to make a significant contribution towards a sustainable society for the 21st century by conducting ground-breaking scientific and technological research – acknowledged as world class; by training scientists and engineers with a genuine commitment to society; and by helping to translate knowledge into technological innovations and activities with both economic and social value'.*

The TU Delft:

- Offers 16 Bachelor programmes and 31 Master programmes.
- Has a student population of around 20,000.
- Employs around 2,600 PhD-students.

For more information: [Facts and figures](#) and [highlights](#).

1.3.2 Ethics and engineering

It is the policy of the TU Delft that all master students will get training in the 'ethics of technology'.

However, this does not mean some sort of a standard course for all our Masters students. The way this is being taught depends on the educational program. In other words this is flexible. This goes both for the content (thematic, in line with the program) as for the way of delivery (one specific course versus embedded in different courses with co-teaching from other faculties).

Obviously, this flexibility and the high number of students mean a big challenge for the key teachers involved in terms of workload and dealing with a limited capacity. Online education and Open Educational Resources (OER) are ways to deal with this flexibility.

1.3.3 TU Delft policies: online education.

Open Education (OE; for free) and Online Distance education (ODE, tuition fee) will change the higher education landscape and accompanying business models. The TU Delft wants to be a forerunner and a global player. As a result, TU Delft already offered over 25 MOOCs on the high profile EdX platform and is developing a broad range of online courses. The university will also experiment with offering credits (EC's) for MOOCs in 2017.

See:

- <https://www.edx.org/school/delftx/allcourses>.
- <https://online-learning.tudelft.nl/>
- <https://ankamulder.weblog.tudelft.nl/category/open-education/>.

Selection of courses is being done on the basis of internal tenders. For the development of MOOCs, faculties receive a subsidy of K€ 25. For online courses, faculties will get a 'loan' of K€ 25 for the development (which has to be refunded once the course generates revenues).

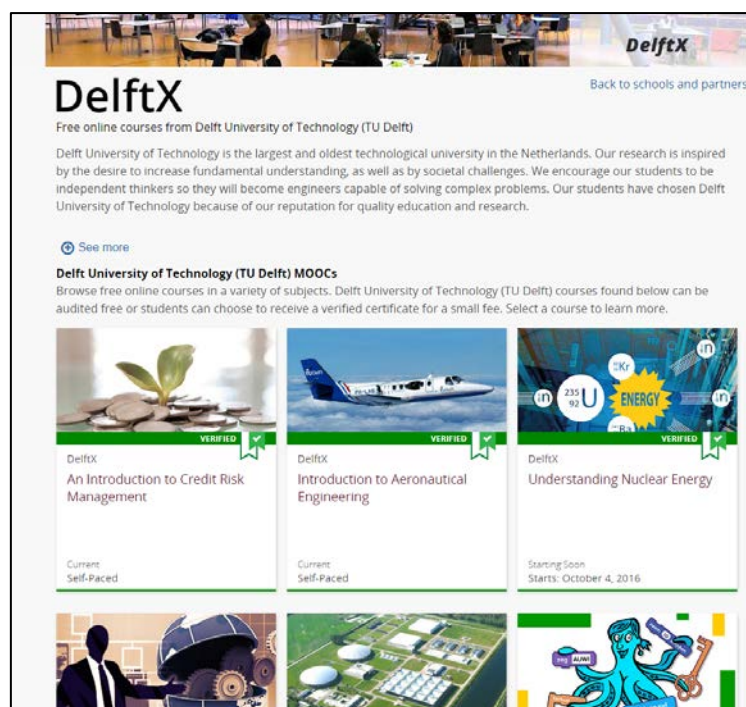


Figure 3: Screenshot <https://www.edx.org/school/delftx>

The main motives for the TU Delft ambitions and policies when it comes to OE and ODE are as follows:

- Reaching new and unprecedented numbers of global students for the academic niches where the TU Delft is a global leader.
- The chance to explore and eventually generate new revenue streams through the development of a MOOC business model.

- Idealistic. The opportunity to share valuable academic knowledge with parts of the world (especially underdeveloped regions of the world) that need it the most and do not have access to high quality higher education.
 - Strengthening world class reputation also online.
 - Quality: new course materials give the opportunity to innovate our courses and improve our on-campus curricula.
 - Attracting more international (quantity) and talented (quality) students.
- Or to simply quote our central administration: 'be there or be square'.

Recently we reached a new milestone: > 1 million enrolments for our MOOCs. Below a screenshot of the press release.



Figure 4: Screenshot:

http://www.tudelft.nl/fileadmin/Files/tudelft/actueel/Nieuws/Beeld_2016/one_million_enrolments_MOOCs.pdf

Considering the importance TU Delft attaches to online education, it has created an Extension School which provides all the key facilities and support to the faculties: a professional studio, e-learning experts, instructional designers, marketers and basic funding for faculties to initiate new MOOCs and online courses (see above). The services are being offered 'for free' meaning that faculties don't have to pay for it. In addition the Extension School has its own research program.

1.4 implementing department

The project is implemented by the department of Values, Technology and Innovation (VTI) of the Faculty of Technology, Policy and Management (TPM)

VTI studies value aspects and value conflicts associated with socio-technological systems and its innovations. It provides descriptions and analyses for value-sensitive design of systems and technological solutions that address societal challenges. It aims at establishing morally acceptable results regarding sustainability, safety, security, efficiency, privacy, and equality. In this way the department aims at making a valuable and sustained contribution to scholarship in the field of responsible innovation.

This is the link to the trailer of VTI: <https://youtu.be/jNv7q0A0Fbo>.

1.5 MOOC RI

In 2104, VTI already offered a MOOC on RI via the EdX-platform for around 10,000 students. Important to note is that many teachers were involved in this MOOC (by providing web lectures). This gave us a head start for the project in terms of 'awareness', commitment and basic materials for our project.

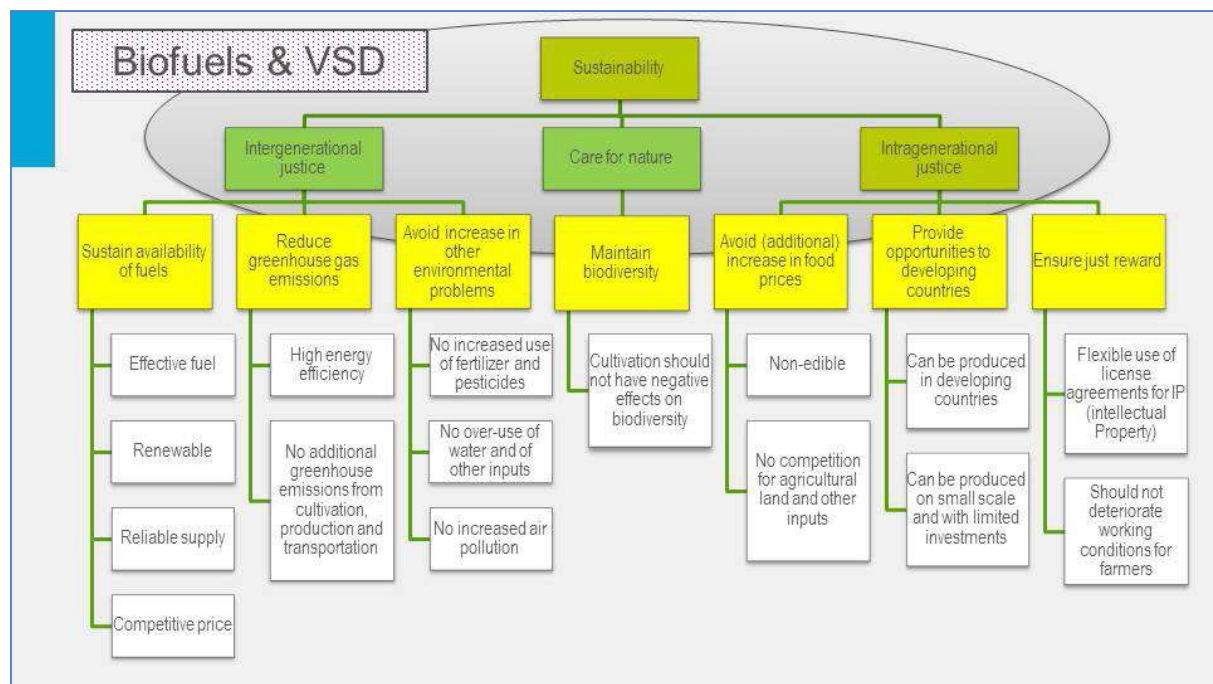


Figure 5: one of the things we teach in the MOOC RI is Value Sensitive Design (VSD) as shown below

2. The project

2.1 Project description/need for online education

As mentioned in the introduction: this project is all about developing online education and OER in the field of RI for both on-campus students and professionals.

This project brings a number of things together: the high ambitions of the TU Delft when it comes to online education, the possibility to get some additional funding (tender), the increasing importance of RI in a technological world, the ambitions of the implementing department (VTI) and the increasing demand for training in the field of ethics and technology/RI (i.e. on-campus).

The ambition for this project is to develop flexible learning paths in **Responsible Innovation (RI)** for different target groups:

- As mentioned above (see par 1.3), the first main target group is *all* our masters' students. Online education is considered as the best way to meet this challenge with a very dedicated but small number of core teachers as it allows for flexibility and easy re-use and sharing of materials geared towards the specific needs of the different faculties (and their educational programs). The courses are offered in a blended format.
- Our on-campus *minor* (bachelor) students in the field of Responsible Innovation.
- Professionals (engineers/designers/architects and decision makers/executives).

Considering these ambitions and limited teaching capacity, developing multipurpose online education was considered as the best way forward.

Box 1 below summarizes in more detail some key elements of RI.

Box 1 : RI learning objectives and key content

RI comprises two key notions: Ethical acceptability and orientation towards societal needs (societal values). Engineers need professional competences and abilities to improve societal outcomes and to develop appropriate innovative solutions which accommodate core values such as sustainability, privacy, safety and security.

Education in the field of RI implies that responsible agents must have been enabled:

- To obtain relevant knowledge on: (i) the consequences of the outcomes (ii) the range of options they have.
- To evaluate both outcomes and options in terms of relevant moral values: wellbeing, justice, equality, privacy, autonomy, safety, security, sustainability, accountability, democracy and efficiency.
- To use these considerations as requirements for design and development of new technology, products and services leading to moral improvement.

The following content is key in this respect:

- RI and ethical issues (key values, moral overload, responsibilities, values embedded in products and services).
- The innovation process from a RI-perspective.
- Safety (unintended harm), Security (intended harm) and risks analysis.
- Value Sensitive Design.
- Understanding the concept of frugal innovation (re-engineering products and services).
- Understanding of empirical, conceptual and technological research.
- Standards and implications.
- A large number of best practices addressing the need of different disciplines and target groups.

2.2 Project results

The project is not yet finished but our approach and results can be summarized as follows:

a) On-campus blended education in ethics for masters' students: creating flexibility

During discussions with the directors of education of the different faculties arrangements have been made about the set-up of the courses in the field of Ethics. As indicated above, flexibility is one of the key elements (content, way of integration into the curriculum).

To support this process we have created a repository (course in Blackboard) with a range of materials (both generic and thematic) which can be re-used on campus depending on the educational program and which also serves to train the trainers (co-teachers at faculties).

These materials have partly been published (re-used) as Open Educational Resources.

b) Online courses for professionals (chartered engineer)

For this part of the project we decided to partner with KIVI (The Royal Netherlands Society of Engineers). KIVI is the largest engineering society in the Netherlands and has around 20,000 members.

KIVI is busy developing a system which enables their members to become a **Chartered Engineer (CE)**. CE is an internationally recognized engineering qualification. It is well known in the Anglophone world but less in other parts of the world. As a CE, engineers can distinguish themselves with an independent professional qualification that represents the highest competence and commitment standards of their profession.

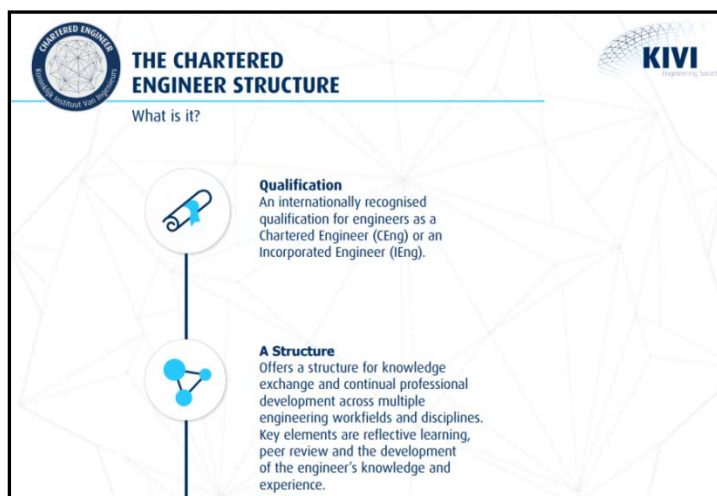


Figure 6: KIVI chartered engineering, retrieved from <https://www.kivi.nl/carriere/professional-registration>

To show that they meet the **CE-requirements/competences**, candidates have to submit a portfolio. If they are a CE, they have to invest in 'Life Long learning'.

Following consultations with KIVI, it was decided to develop a set of online courses enabling KIVI-member to obtain and maintain this qualification.

At this stage the following courses for the year 2016-2017 have just been announced:

- **Ethical Conduct for engineers.**
- **Leadership for Responsible Innovation.**
- **Safety Culture Assessment.**
- **Designing for Values.**
- **Responsibility for Risk and 'The Problem of the Many Hands'.**

All courses have a study load of around 20-30 hours. Students will get 'CEU's or 'Continuous Education Units'. One CEU counts for 10 hours of study load. More important, these courses are recognized by KIVI as part of becoming (and remaining) a CE.

c) **Open education and research platform for 3 minors**

Our initial goal was to develop and select OER-materials for the minor RI. However, these plans became more ambitious. We now have developed a joint platform for not only the minor *Responsible Education* but also for the minors *International Development and Entrepreneurship*, *Companies and Innovation* as well as the course *Sustainable Development*. These courses have in common that they focus on core values such as safety, sustainability and inclusiveness and that students work on concrete case studies (research assignments) throughout the course. Students are obliged to publish their research findings for the broader public after a peer review process.

The platform not only includes a large number of OER and other assets but also provides all the functionalities for publishing student's research (i.e. a solid peer review process and meta-data system). As an external visitor, you will find:

-
- A lot of interesting Open Educational resources (OER) which mainly comes from our MOOCs which we also use as background materials for our students. Much more is coming up!
 - Final publications (peer reviewed) and blogs from student's on their research (we already published a selection from last year).
 - Ways to contact us for possible research assignments by students.

This is the link to the website: <https://tudelft.openresearch.net/>.

d. **Didactical experiments**

In 2017, the MOOC RI will be part of a bigger experiment from the TU Delft titled 'Credit for MOOCs'. Currently TU Delft aims at setting up an alliance with several international partners, like the University of Queensland, the University of British Columbia, EPFL, Rice University and Australian National University. Their shared ambition is to recognize and integrate **MOOCs in (formal) campus education**. This would mean that in the future any student registered at one of the partner universities can take any MOOC offered by these universities and be awarded formal Credits for it. The MOOC RI will participate in this pilot which will be launched towards the end of 2016. In the meantime, a lot of practical issues – like proctored exams, re-sits and obtaining formal recognition by the examination boards- have to be resolved. Dealing with many international partners obviously adds to the challenge.

Furthermore we used a '*Learning tracker*' in the re-run of the MOOC RI (2015/16)

The Learning Tracker is a dashboard (for an example, see picture below) in which students can see metrics showing their own progress compared to current peers and previous students who took the course as shown in the picture below. The assumption is that it empowers MOOC students to assume a more active role in shaping their own learning experience.

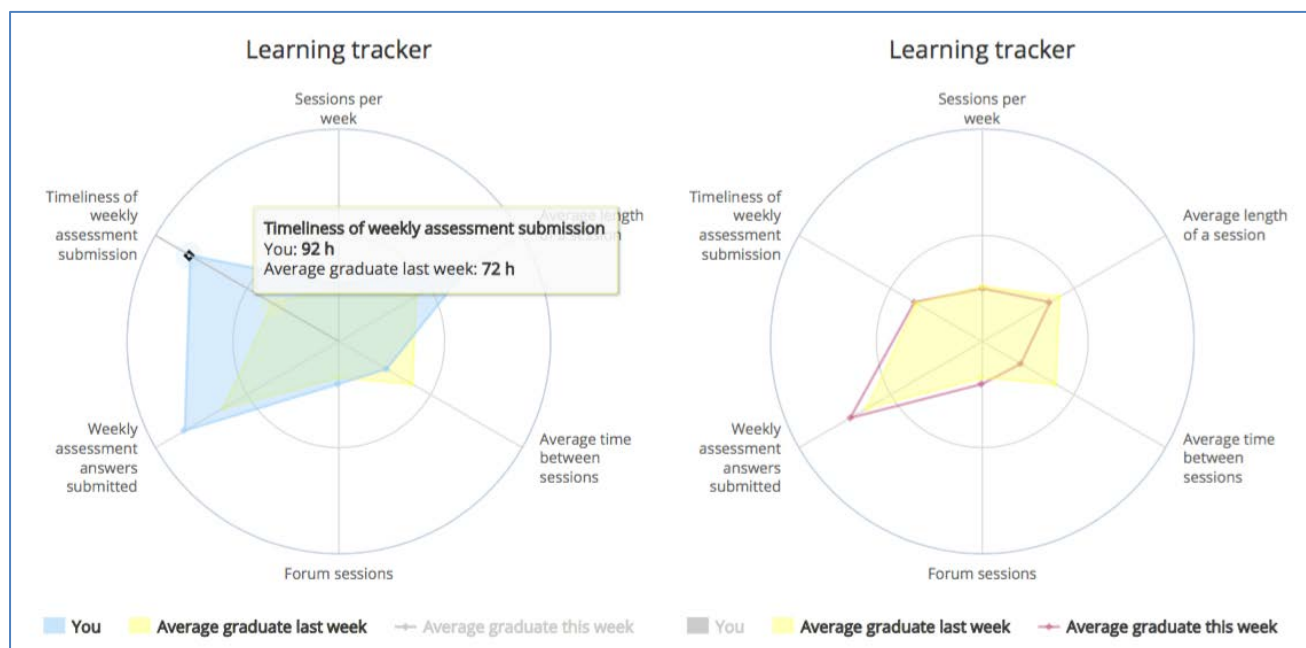


Figure 6: The learning trackers as used in the MOOC RI

The main results reveal that when exposed to the Learning Tracker learners are more likely to complete the course with a graduation mark because (i) learners attempt more quiz questions and (ii) they submit their work earlier. Although our results indicate that the Learning Tracker impact learners' engagement and reduces procrastination, there is little evidence that other aspects of learners' self-regulation were influenced.

For a full report, see: [The Learning Tracker: A Learner Dashboard that Encourages Self-regulation in MOOC Learners](#) (master thesis).

e) Spin-off and (upcoming) international activities

Furthermore, we developed an e-book on the basis of the MOOC RI. This will become part of the Open Textbook experiment of the TU Delft.

Last but not least, we will develop (planning 2018) two new MOOC as part of H-2020 projects. These projects are [CANVAS](#) (Constructing an Alliance for Value-driven Cybersecurity) and [PRISMA](#) ('Piloting Responsible Research Innovation in Industry: a roadmap for transforMative technologies').

3. Reflections

Although the project is not finished yet, a number of reflections can be made.

Yes, we can!

Developing online education and OER for both on-campus education as well as training for professionals is very demanding and requires setting clear priorities.

Fortunately, as a result of the subsidy for the project, we have been able to hire some essential additional staff (2 post-docs and one expert in safety)to develop the online materials) under the supervisions of the responsible professors.

Win-win

Developing online materials can also be a win-win situation. Online materials for professionals can be re-used for internal students and vice-versa. This is clearly reflected by the re-use of the MOOC RI in a blended format as part of the minors and the re-use of on-campus materials for professionals.

Key is to produce learning objects which can be used 'stand-alone' and re- mixed easily. In our case, learning a learning objects (videos + readings+ assessment) do require about 2- 4 hours of study.

But you need strong institutional commitment, support and facilities

As mentioned in par. 1, the TU Delft took the decision to invest heavily and steadily in online and open education. This resulted, among other thing, in the establishment of an Extension School and a close partnership with EdX.

This project would indeed not have been possible without the support of the Extension School and its facilities and expertise. They provided the project with recording facilities, experienced E-learning experts, the platform for online training of professionals and marketing- support. In addition they evaluate the courses and conduct a number of research activities (i.e. around learning analytics). The facilities are being offered 'for free', meaning that the faculties don't have to pay for these services (so no financial threshold!).

Unique online content

To our knowledge, what we are doing in terms of developing online and open education on the topic of RI is still unique. Our aim is to build a broader network. Part of this strategy and the way forward concerns our involvement in 2 EU (H-2020) projects (see par. 2.2) and leading a working group on RI within the framework of [CESAER](#), the Conference of European Schools for Advanced Engineering Education and Research. We are furthermore working on an alliance with the EU project titled RRI toolkit (<http://www.rri-tools.eu/>). Basic steps have been made but it will require a number of year before a real impact can be shown.

Flexibility is key

One of the supporting factors for this project was flexibility. This allowed us to adapt the project to new internal and external circumstances. As for the minors, the platform which we developed will be used much broader than anticipated (see par.2.2).

Furthermore, the initiative of KIVI to develop a CE-qualification has been a catalyst for the development of online education but this was not foreseen at the start of the project.

But developing paid online courses is still 'fuzzy' in terms of market and price.

TU Delft is still piloting with online education (paid courses) and the underlying business model. The aim is have at last a break-even price. However, in practice the market and the willingness to pay a certain price is still quite 'a long shot in the dark'. External students also require more flexibility, real life case studies and 'nudging'. We know from other pilots that offering on-campus education *simultaneously* (some roster, some content, same exam) online for external students (online) is very challenging as external students

have other expectations (contextual content) and need more incentives, guidance and flexibility.

This 'fuzziness' is not different for our KIVI-courses although we partner with KIVI. The CE qualification is still in its initial stage and it is very difficult to assess what the actual demand will be including the price students are prepared to pay. The actual number of students has a high impact on the question whether the courses can indeed become cost-recovering.

There is also a continuing debate about recognition, formal exams and the role of the examination board when it comes to online education for professionals.

For our online courses, the TU Delft will offer CEU's - and not EC's- to mark the distinction between on-campus courses and more informal (in terms of exams) online professional education.

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Learning analytics and learning technologies

Building an infrastructure for empowering Distance Education in the Open University of Cyprus

Christos Rodosthenous, Petros Christoforou, Michalis Epiphaniou, Georgia Matheou, Stathis Mavrotheris, Christopher Christodoulides
Open University of Cyprus

A Learning Analytics Methodology for Student Performance Assessment in a Distance and Open Education Environment

Vasileios Kagklis, Antonis Lionarakis, Elias C. Stavropoulos, Vassilios S. Verykios
Hellenic Open University, Greece

Massive on-line learning: moving from web to mobile

Marco Mezzalama, Enrico Venuto
Politecnico di Torino

Open badges – a new way of recognizing and demonstrating the skills of students and staff online

Jenni Meriläinen
Lahti University of Applied Sciences, Finland

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The Open University, UK

Mobile learning: A one-year-old Italo-Japanese collaboration.

Satoshi Yamawaki¹, Nicola Paravati², Atsushi Inutsuka³, Yann Auffray⁴

¹Castalia Co. Ltd., Japan, ²Università Telematica Interazionale UNINETTUNO, ³Castalia Co. Ltd., Japan, ⁴Castalia Co. Ltd., Japan.

Innovative Practice Relating to Examination in Distance Learning

Pierre Beust¹, Isabelle Duchatelle²

MiPNES-DGESIP, Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche/ Normandie Université, UNICAEN, CEMU¹; Normandie Université, UNICAEN, CEMU²

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Uninettuno (UTIU)

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Livio Conti

Università Telematica Interazionale UNINETTUNO

The role of the image in the online education: from the representation of reality models and concepts to the drawing of a new space without place and time

Rosario Marrocco

Università Telematica Internazionale Uninettuno; Sapienza Università di Roma, Italy

Building an infrastructure for empowering Distance Education in the Open University of Cyprus

Christos Rodosthenous

Open University of Cyprus, Cyprus
christos.rodosthenous@ouc.ac.cy

Petros Christoforou

Open University of Cyprus, Cyprus
petros.christoforou@ouc.ac.cy

Michalis Epiphaniou

Open University of Cyprus, Cyprus
michalis.epiphaniou@ouc.ac.cy

Georgia Matheou

Open University of Cyprus, Cyprus
georgia.matheou@ouc.ac.cy

Stathis Mavrotheris

Open University of Cyprus, Cyprus
stathis.mavrotheris@ouc.ac.cy

Christopher Christodoulides

Open University of Cyprus, Cyprus
christodoulides@ouc.ac.cy

Abstract

Universities worldwide offer distance education courses through a number of channels. There is a plethora of courses offered either as part of official Programs of Study that lead to a degree or even as Vocational Training Programs or as MOOCs. The Open University of Cyprus (OUC) is the only higher education organization in Cyprus dedicated to distance education using an innovative eLearning Platform named eClass.

The eClass eLearning Platform is the main educational medium of the Open University of Cyprus that hosts a number of services, courses, educational content and activities. The scope of this paper is to describe the eLearning Platform and the offered services that are integrated under its umbrella, like the Video Lecture and Streaming service, the Synchronous Learning service and the Plagiarism Detection service. Moreover, this paper presents an overview of how this platform is integrated to the University's infrastructure for user creation and management, student enrolments and library services. We conclude by presenting metrics of the eLearning Platform usage.

Keywords: distance education, eLearning Platform, Moodle, infrastructure

1. Introduction

“Distance education is teaching and planned learning in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as special institutional organization” (Moore & Kearsley, 2011). Technology is critical in the concept of distance education, as educators and students are located in different places and for teaching and learning respectively, they need some form of communication technology. First generation distance education involved the usage of print-based correspondence education. Second generation distance education involved the usage of educational television and radio. Both were lacking the bidirectional communication between the educators of the institutional organization and their students (Bates, 2005). It was the explosion of Internet in 1995 that has expanded the possibilities and potentials of the communication and educational technology, leading it to the third generation and opening new horizons in distance education. Nowadays distance education has established its name in higher education, having high numbers of people (academics, researchers, students, media) taking advantage of its abilities. Moreover, new technologies allow students who combine their studies with work and family life to attend courses and evolve their careers.

The Open University of Cyprus (OUC) is a public university and the only higher education institution in the country dedicated to distance education. The OUC uses open and distance education to provide undergraduate and postgraduate courses, continuous education and retraining and to promote life-long learning (Republic of Cyprus, 2002). The University has gradually grown its academic presence and reputation in Cyprus and Greece in just ten (10) Academic Years by incrementing its Programs of Study from two (2) in 2006 to twenty-one (21) in 2015 and its enrolled students from 162 to almost 5000. The Ministry of Education and Culture has recently appointed a coordinating role to the OUC in distance education in Cyprus, to promote and offer inter-university programs in English.

2. Learning Methodology

The main organizational unit of the OUC's Programs of Study and Training Programs is the thematic unit that covers several subject areas. Each Program of Study belongs to one of the three Schools (Faculty of Humanities and Social Sciences, Faculty of Pure and Applied Sciences, Faculty of Economics and Management). A Dean is responsible for a School and assigns the role of the Academic Coordinator to educators responsible for a specific Program of Study. In each thematic unit, there is an educator who has a coordinating role for monitoring Tutors and students and is also responsible for the knowledge resources and activities in it. Students are enrolled in groups in each thematic unit and a Tutor is assigned to every group for lecturing and assisting them throughout the thematic unit's duration.

Successful completion of a thematic unit by a student, requires submission of a number of written assignments and a final examination that requires physical presence. Depending on the duration of each thematic unit, students have the opportunity to attend a number of organized group meetings with their Tutor. The primary goal of the OUC's learning methodology is to help students participate in their thematic units from anywhere and at any time without limitations to their academic progress. Having this goal in mind, and following the advancement of the technology, the OUC's learning methodology has evolved during the years, incorporating a number of educational and communication tools.

Nowadays, the OUC's eLearning Platform named eClass, facilitates every step of this learning methodology. This was not the case during the first years of the OUC's operation, as students were required to physically attend all the group meetings which took place in a physical class. These physical meetings occurred in major cities of Cyprus and Greece, where the majority of OUC's students were situated. This policy has recently changed by gradually decreasing the number of physical meetings and replacing them with virtual meetings using the Synchronous Learning service available in the eClass eLearning Platform.

As with group meetings, several other procedures in the learning methodology were refined and expanded, by using new technologies, like the Plagiarism Detection Service and the Video Lecture and Streaming Service. It is obvious that building an infrastructure for empowering distance education in the Open University of Cyprus is a crucial and huge step towards supporting the educational process.

3. The OUC eLearning Platform

The eClass eLearning Platform is a continuously evolving system based on Moodle²⁰⁷ open source learning course management system, which supports both blended learning and online courses. This platform is designed to provide educators, administrators and learners with a robust, secure and integrated system that provides tools for content creation and delivery and allows users to have a single point of entry to all the eLearning services of the OUC. Moreover, it hides the technical complexity of each of the different services provided, since users get only to see one platform that comprises of six core services:

- The Asynchronous Learning service where students and educators have 24/7 access to educational content, resources and activities,
- The Synchronous Learning service where students can participate in virtual classrooms and interact with their educators and fellow students,
- The Video Lecture and Streaming service where educators can capture their lectures and deliver them live or on demand and students have access to streaming video of lectures and events,
- The Assignment Submission and Plagiarism Detection service that enables students to submit electronically their coursework and automatically notify their educators for possible plagiarism,
- The Learning Activity Management System (LAMS) which provides educators with a visual authoring environment for creating sequences of learning activities for their thematic units and
- The Mobile Learning service where students can view their thematic units and participate in them through their smartphones or tablets

The eClass eLearning Platform is the only educational medium used in the OUC to facilitate its learning methodology. At any given time, eClass hosts the current Academic Year. The hierarchical structure in eClass resembles the academic hierarchy of the OUC. Each School comprises of Programs of Study and each Program of Study comprises of thematic units. User roles in eClass also match those of the educational model. This mapping makes it easier for new users to understand the academic hierarchy and how it works.

All the thematic units have the same basic structure in eClass. Moodle as a modular and customizable course management system, helps administrators and educators building their course the way they want. Educators use a basic structure, based on template, for building their thematic units so they can

²⁰⁷ <https://moodle.org/>

concentrate on the educational content. This homogeneity of the OUC's thematic units is preferred by the students, as they get familiar with the educational environment from the first thematic unit they attend.

The process of deploying a new service or software to the eClass eLearning Platform is not a trivial task. It requires a detailed investigation of currently available solutions, along with an internal requirement gathering process (Christoforou, Rodosthenous, Epiphaniou, Mavrotheris, & Christodoulides, 2015). More specifically, a number of teams are involved, to ensure that the selected service or software will fit the OUC educational methodology and will be able to integrate with the rest of the eClass eLearning Platform infrastructure. Furthermore, the sustainability of the selected solution is examined, taking under consideration future enhancements, total cost of ownership and service support.

During the selection process, the project team gives priority to open source solutions that have a large community backing them up, good documentation and numerous installations in academic environments. Another major factor in the selection process, is whether the framework and the technology in general employed by the system, match the technology that the OUC team has expertise on. Examples of such solutions are Moodle, LAMS and the mobile application.

3.1 Asynchronous Learning service

One year after the offering of the first two Programs of Study, the eClass eLearning Platform was established. Up to that time, students and educators used the email service for communicating and exchanging educational content. The first core component of this platform was the Asynchronous Learning service that was based on the popular and well established open source learning platform, Moodle. This service was widely accepted by both students and educators since it allowed continuous access to knowledge resources needed for studying and numerous activities for collaboration and assessment.

Using this service, educators can build courses using an intuitive and friendly user interface with a plethora of tools available. More specifically, they have the ability to add files, folders, webpages, links and create HTML content. They also have the ability to create activities for assessment, collaboration and self-assessment. Furthermore, they can combine these activities and resource using a number of conditions and restrictions, like showing a resource only on a specific date or when one or more activities are completed.

Students have access to communication tools like forums, instant messaging and chat. These tools can be used in various ways; forums for instance, can be used by students to ask questions and get answers from their educators or their fellow students and for peer reviewing student coursework. Instant messaging can be useful for an educator to get in touch with students that don't participate in the course and may want counselling to continue their studies.

The eClass eLearning Platform handles knowledge resources from the OUC Library that hosts a large digital collection of knowledge resources (eBooks, journals, etc.) and numerous subscription based content from publishers. These knowledge resources are accessible through the eClass eLearning Platform using the bibliographic tool. In each thematic unit, the Academic Coordinators in collaboration with the librarians set the core and optional bibliography for the subjects taught. This bibliography is represented using the bibliography tool (Figure 1) and allows students to just click and view the resource, instead of searching for it using external search engines. This tool also allows the addition of content from the conventional

collection through the Online Public Access Catalogue (OPAC), where students can click on a record, find the Library that it belongs to and book it.

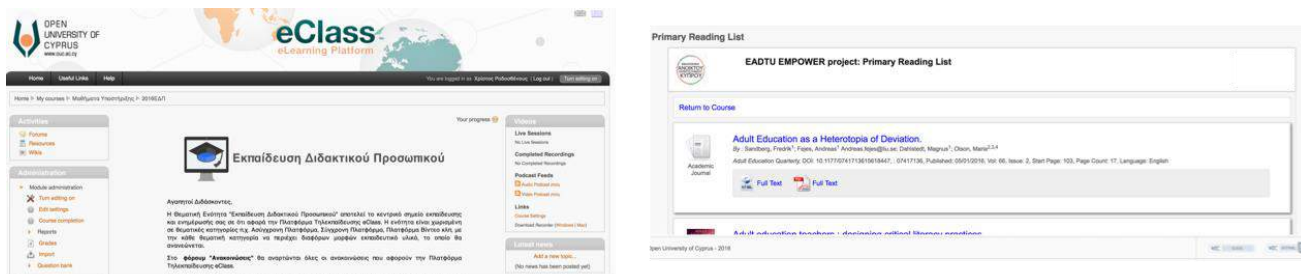


Figure 21 – Screenshots of a thematic unit (left) and the bibliography tool (right)

3.2 Synchronous Learning service

The blended education model used in the OUC for distance education, included a number of face to face meetings. The need for a more direct interaction between students and educators was apparent from the early years of the University operation. It was difficult for students to travel to a study centre and attend meetings. Two years after the offering of the first Program of Study, in 2008, the Synchronous Learning service was introduced. This service was based on Elluminate Live! Software (later Blackboard Collaborate™²⁰⁸) that was one of the leading web conferencing software in education. This service, simulates a class-like environment enabling educators and students to attend virtual classes, chat, talk, exchange emotions, watch each other and many more. Most importantly, these meetings can be recorded and reproduced whenever they are required, an ability that is highly valued by the OUC's students. These unique qualities of the Synchronous Learning service made it an essential component of all Programs of Study in the University. In each thematic unit, there is at least one virtual classroom available 24/7 for students to join.

This service is also used for thesis and dissertation presentations. Presenting students, with their advisor being physically present join a virtual classroom and setup the presentation. The public can join the room and attend the presentation. These presentations are recorded and are then published as reference material to other students preparing for their presentations.

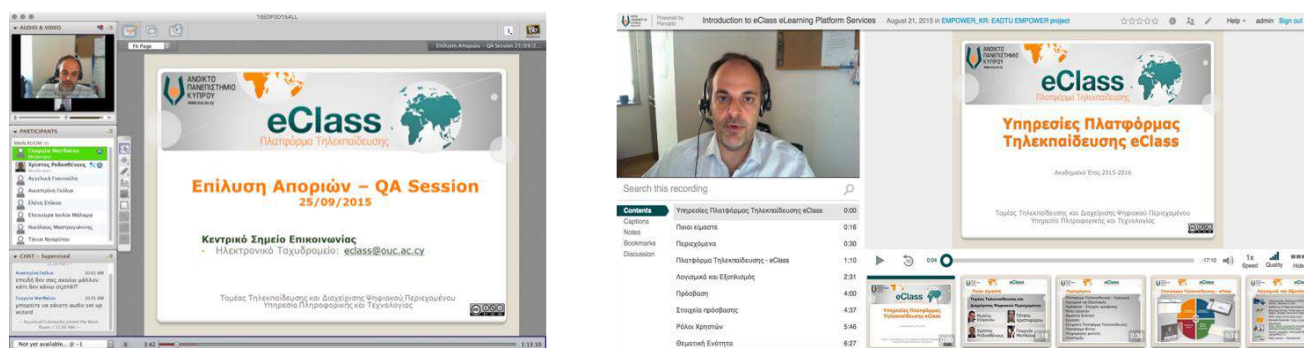


Figure 22 – Screenshots of a virtual classroom (left) and a lecture capture (right)

²⁰⁸ <http://www.blackboard.com/online-collaborative-learning/blackboard-collaborate.aspx>

3.3 Video Lecture and Streaming service

Video lectures are considered the most desirable educational content by students today. Coursera²⁰⁹ students that study distance online courses using MOOCs (Massive Open Online Courses), prefer video content over any other type of content (Korkut et al., 2015). The use of video as educational content is proved to provide unique advantages both to students and educators such as increased satisfaction, enhanced understanding of content, ability to generate more comprehensive course notes and increased accessibility to students with disabilities (Newton, Tucker, Dawson, & Currie, 2014). All these benefits, along with the OUC's experiences from recorded lectures with the Synchronous Learning service, let the OUC to introduce the Video Lecture and Streaming service in 2015, which is based on the Panopto system²¹⁰.

Video Lecture and Streaming service is fully integrated with the eClass eLearning Platform. Educators can record, upload, edit and publish videos to their thematic units and students can view them from within their thematic units. Moreover, students can search for text in lectures, either written or spoken, using Optical Character Recognition (OCR) and speech recognition technologies. For example, a student can use the global search function to search for a specific word. When found, all occurrences of that word in captured lectures will be identified and will be clickable, so that students can watch the specific time point that this word appears. This service is also used to transmit live events and to create welcome messages and short training videos for supporting students or educators.

3.4 Assignment Submission and Plagiarism Detection service

During the Academic Year, students are required to submit a number of written assignments to successfully complete a thematic unit. These assignments are graded and count towards the final grade of the thematic unit. This process is conducted completely electronically using the eClass eLearning Platform. Educators publish the assignment subject in the thematic unit's central page and students start working on it. Before due date, students submit their assignment online. Educators grade the assignment and provide feedback to the student in a separate file.

From 2011, when the Plagiarism Detection Service was introduced, every submitted assignment is automatically checked for plagiarism. In earlier years, 2007 until 2010, the plagiarism check was done manually by the educators, using standalone plagiarism detection tools, course content and search engines. During that period, the number of students grew rapidly and manual plagiarism check became very difficult. The need for an integrated plagiarism detection service for helping educators was obvious (Rodosthenous et al., 2015).

When an assignment is submitted, it is automatically compared to more than 300.000 previously submitted student assignments, assignments submitted at that time in the same thematic unit or group, internet sources, content from publishers and content from the University Institutional Repository (Rodosthenous, Themistocleous, Mavrotheris, & Christodoulides, 2016). Plagiarism reports provide summarised and

²⁰⁹ <https://www.coursera.org/>

²¹⁰ <https://www.panopto.com/>

detailed information for each detected source and present both submitted and detected text side by side, highlighting the changes made in the submitted text.

3.5 Learning Activity Management System (LAMS)

Continuous development in learning technologies and learning methodologies leads the development of new tools. This is the case of the Learning Activity Management System (LAMS) (Dalziel, 2003). LAMS is an open source learning environment which allows the design, management and provision of collaborate activities. It is fully integrated to the eClass eLearning Platform and it provides educators with a visual authoring environment for creating sequences of learning activities for their thematic units. These activities can be used for individual tasks or group work based on knowledge resources and collaboration.

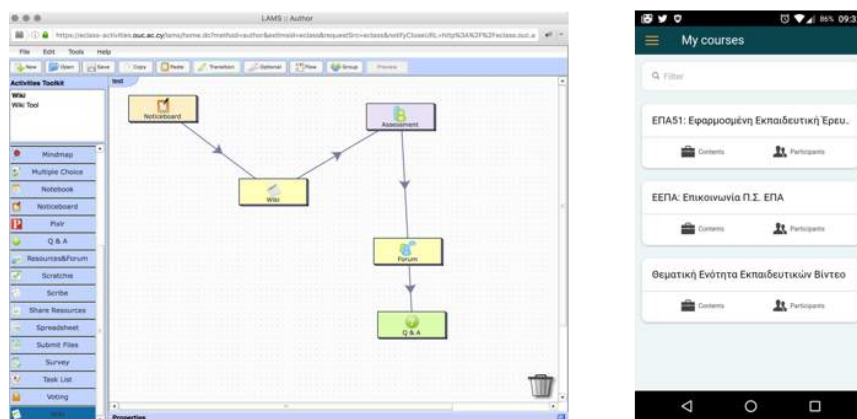


Figure 23 – Screenshots of the LAMS design screen (left) and the mobile app (right)

3.6 Mobile Learning

The increasing use and penetration of mobile devices in our daily lives couldn't leave the academic community untouched. Following this technological trend and its benefits of accessing content from anywhere, the OUC proceeded with the development of mobile learning tools, where students can view their courses and participate using their smartphones or tablets. The custom design "OUC eClass" application is based on the Moodle Mobile application²¹¹, and it allows students, using both iOS²¹² and android²¹³ devices, to have access to all knowledge resources and activities in their thematic units and get notifications on their smartphones when a classmate or educator posts in the forum or adds a calendar event. Students can also watch live or on-demand content using the Video Lecture and Streaming service application or join a virtual classroom using the Synchronous Learning service application.

4. Technical infrastructure

An academic environment, and more specifically a distance education University, requires a powerful infrastructure to support the various services offered to the academic community. Distance education also

²¹¹ <https://download.moodle.org/mobile/>

²¹² <https://itunes.apple.com/us/app/ouc-eclass/id1063671590?mt=8>

²¹³ <https://play.google.com/store/apps/details?id=ouc.test.id&hl=en>

requires that services are available continuously worldwide, so an infrastructure that allows 24/7 operation and continuous access to all eLearning services from external networks should be present.

The OUC currently has a datacentre physically located in its premises that hosts all active equipment needed for hosting its eLearning infrastructure along with the rest of the administrative services' infrastructure. There is also a secondary datacentre and in case of a catastrophic failure in the primary site, all critical operations will resume from there. This infrastructure is also connected to a number of cloud based services. For hosting the eLearning services, a number of web and database servers are employed in a clustered environment, that allows load balancing and redundancy. The majority of servers are hosted on a Linux based Operating System running the Apache web server software and MySQL databases.

The growth of the organization, both in terms of students and thematic units, required flexibility in scaling and sizing of the infrastructure, i.e. being able to allocate extra resources on specific services (storage, memory or processing power) on certain time points or even provide extra bandwidth for live broadcasting a major event or lecture. This flexibility got possible after the deployment of the OUC's virtual infrastructure. Both the server and the network infrastructure are presented in terms of abstract entities called virtual servers and virtual network respectively, which are independent of the physical infrastructure hosting them.

A large number of resources is dedicated to preserving historical data. The thematic units of each Academic Year are archived and stored on a separate server that allows limited access to content in read-only format. This allows easy search and retrieval of content used in previous Academic Years.

4.1 eLearning and multimedia auditoriums

At the OUC premises there are two eLearning and multimedia auditoriums used for conducting physical or hybrid group meetings, personnel training, thesis presentations and small events. Each auditorium is equipped with an automation system that allows all equipment to be centrally controlled from a tablet. The tablet's software is designed to help novice users to use the equipment by just selecting a usage scenario which activates only the equipment needed for that specific scenario. For example, the remote presentation scenario activates the auditorium's computer, HD cameras, interactive board and all the microphones. Video and audio feed is automatically transferred to the computer and hence to the Synchronous Learning service and the Video Lecture and Streaming service.

4.2 Integration of eClass with the OUC infrastructure

The eClass eLearning Platform is integrated to a number of services, including the OUC Library Information System (LIS), the "Kypseli" Institutional Repository, the Identity Access Management (IAM) system, the Single Sign On (SSO) system, the Student Information System (SIS) and the Enterprise Resource Planning (ERP) system. These integrations, allow the exchange of data (i.e. student and educator records, educational content etc.).

In each Academic Year, new and current students are enrolled in thematic units through the SIS. When this process is completed, student data are processed by the IDM and user provisioning occurs. In case of newly enrolled students, an email account is created and access to eClass, Kypseli and LIS is provisioned. Educators are recruited through the ERP system and their records and data are forwarded to the IDM for

account creation and provisioning. More specifically, email accounts are created for each educator and provisioning on each system takes place.

The completion of the above process marks the beginning of the student enrolment to thematic units in eClass eLearning Platform. Each thematic unit is created based on data that are forwarded from the SIS, i.e. its offering in the present Academic Year, full name, short code, semester and description. Next, data from the ERP, i.e. educator placements and groups are sent and each user gets the appropriate course role (i.e. Tutor, Coordinator, Academic Coordinator etc.). A similar procedure takes place in the SIS and for each thematic unit the student is enrolled in, he or she is given access to the corresponding thematic unit and group in eClass.

In eClass, coordinators are responsible for organizing and building the thematic unit. That is, both the structure and educational content. It is important and useful for educators to have the ability to search and add content from the institutional repository or the LIS system in each thematic unit. More importantly, educators can add theses, digital artefacts and books from the repository and distribute them in each week or theme inside the course. When students access this content, they will be automatically authenticated through the SSO system.

Integrating systems and allowing data transfer in a controlled environment through a workflow is not a trivial task. Each system's data are stored in a certain way and it is not easy to just send a record from one system to another. Each system keeps its data in a non-standard repository, and great effort is needed for extracting them and manipulating them. The majority of these systems provide an API or a web service (SOAP or REST), and for those that do not, another layer is added for exposing their API and functionality through a custom web service. Currently, all systems communicate with each other in a secured isolated network using an encryption algorithm for protecting the transferred data from possible attackers or eavesdroppers.

5. Support model

Although state-of-the-art hardware and best-of-breed software are mandatory elements for a successful distance education infrastructure, none of these would stand alone without a targeted and consistent training and support model for all users. This is identified in several researches that investigate the critical success factors (CSFs) which must be met for the acceptance of the deployment and operation of an eLearning project. According to Al-Busaidi & Alshihi (2010), faculty believe that these CSFs are related to the educator, technology and organization, that includes training, organization and technical support, while in Siritongthaworn, Krairit, Dimmitt, & Paul (2006), the crucial factor is identified as organization's policy and support for resources and training and in Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek (2012), infrastructure and system quality was the most important consideration for eLearning success. Technical support, as a CSF for the acceptance of eLearning, has a direct effect, according to users, on ease of use and usefulness of the technology (Sánchez & Hueros, 2010), while training can change users' attitude towards accepting and adopting new technologies (Boothby, Dufour, & Tang, 2010).

For educational technology to be successfully adopted, it needs support in each phase of the adoption and operation cycle (Moser, 2007). The phases of end-user training are identified as initiation, formal training and post training (Compeau, Olfman, Sei, & Webster, 1995; Gupta, Bostrom, & Huber, 2010). The initiation

phase firstly identifies the training needs and then the training environment is designed. The formal training phase is where the actual training is conducted and in post-training phase the evaluation of the training and the support of trainees is carried out.

Since the first day of the deployment of the Asynchronous Learning service (Moodle), the OUC has invested in the engagement of users to meet their needs. User engagement methodology is based on a number of theoretical models like Technology Acceptance Model (TAM) and service support is the last phase of this methodology (Epiphaniou, Rodosthenous, Christoforou, Mavrotheris, & Christodoulides, 2015). Furthermore, we have analysed service support, to address the adoption cycle of the educational technology to OUC's needs, by designing a three-phases support model. This model completes the cycle of a whole Academic Year. These phases are interconnected, in an on-going procedure, having first the pre-academic year support, second the support during the Academic Year and last the post-academic year support.



Figure 24 - Three phases support cycle model

5.1 Pre-academic year support

End-user support starts by defining the needs of our stakeholders i.e., the Academic Coordinators of Programs of Study, the Coordinators of thematic units and the governance of the University. Meetings are scheduled just after the end of the previous Academic Year and through a semi-structured interview process, user requirements are identified. These requirements are then presented in a document, that is communicated to the Academic Coordinators for their agreement on behalf of their Program of Study. Alongside this procedure, meetings are also being held with other sectors of Information and Communications Technologies Service, as with other administrative departments that are involved in the preparation process for the Academic Year like the Library Service and Students Welfare Service.

Infrastructure support includes all the necessary upgrades, updates of hardware and software systems. Each change is documented in the knowledge base system and all necessary modifications to the manuals are applied or new ones are created. Manuals are prepared for all the available operations in the eClass eLearning Platform. Furthermore, short step-by-step manuals for procedures that were identified as “most used” by users during the years are compiled. Following the advancement of technology, webcasts are now a key part for supporting end-users, as most of them prefer to watch a short explanatory video instead of reading piles of text in a document. Webcasts are being prepared using the Video Lecture and Streaming

service, making them a good example of how educators can use this service to prepare their own lectures and videos to be used in thematic units as educational content and knowledge resources.

During the period between Academic Years, Academic Coordinators and Coordinators, with the support's help, build their thematic units. During this process, they have the option to reuse educational content from previous Academic Years or even restore a complete thematic unit in its previous form and edit its content. Structure is maintained according to the agreement document from previous meetings and the academic calendar that is published. For emphasizing certain topics, training seminars are arranged additionally to all manuals and webcasts. Key users are trained more thoroughly in operations needed for building thematic units and not just using them. As the number of available tools and services offered increase, more specialized training and more frequent meetings are required.

5.2 During the Academic Year support

Huge part of the support during the Academic Year is being held at the beginning of it. This is the busiest time of the year for helpdesk support with ticketing, email and phone support having a huge traffic. Some of the most common problems of that period include resetting student passwords and troubleshooting software installation. A plan of specific steps is prepared at the start of Academic Year aiming to reduce the load of the first month. This plan includes training seminars on target groups and Question & Answer (QA) sessions for all educators, with both of them organized and conducted through the Synchronous Learning service. This is another example of how a training seminar can be used to learn the software that is being used for the virtual classrooms. Newsletters are regularly sent, informing users with important announcements about new features, critical updates, changes affecting them and for promoting new technologies.

Special thematic units are created for students and educators respectively. These thematic units are built by following the same structure as with all the other thematic units of the University. Their purpose is to become the central location for everything related to the support of the eClass eLearning Platform. Each thematic unit is organized in themes that correspond to the services offered. Each theme has all the necessary support content concentrated under it in the form of webcasts, files, links and webpages. Web conferencing rooms are available for the whole Academic Year and all the training seminars take place there. Each training seminar is recorded in order to allow users to watch it later at their own place and time. Last but not least, a number of frequently asked questions (FAQs) is made available in the form of wikis and forums. Forums are also used by users who ask support questions and cooperate with others having similar issues and needs.

5.3 Post-academic year support

Towards the end of the Academic Year, feedback is collected regarding user experience with services of the eClass eLearning Platform. To collect feedback, users are asked to complete a questionnaire and some of them are interviewed to express their reactions, feels and opinions about the eLearning Platform. The interviews with stakeholders that are conducted in pre-academic year support phase are used to clarify issues faced during the previous Academic Year. Post-academic year support continues with the categorization of problems by analysing helpdesk support calls and tickets. Furthermore, reviewing of learning analytics is an important part of the post-academic year support. These analytics are used to

identify possible problems during the Academic Year, to monitor the performance of students and measure learning tools usage.

6. Statistics and usage metrics

For monitoring the usage of services and user engagement in the eClass eLearning Platform, there is a series of monitoring mechanisms in place, that capture these details and present them to the educators and the Academic Coordinators of each Program of Study. In the following paragraphs, a list of statistics and metrics are presented for some of the core platform services. These statistics cover the Academic Year 2015-2016.

6.1 Asynchronous Learning Platform

Among the many advantages of using Moodle as the Asynchronous Learning service, is the ability to track users from the logging system. Figure 5 shows the number of thematic unit accesses per week day and time of day for the whole Academic Year. Monday is the day with the most thematic unit accesses and afternoon and evening is the most common time for studying at the OUC. This behaviour is expected, since the majority of OUC students are working people with family obligations.

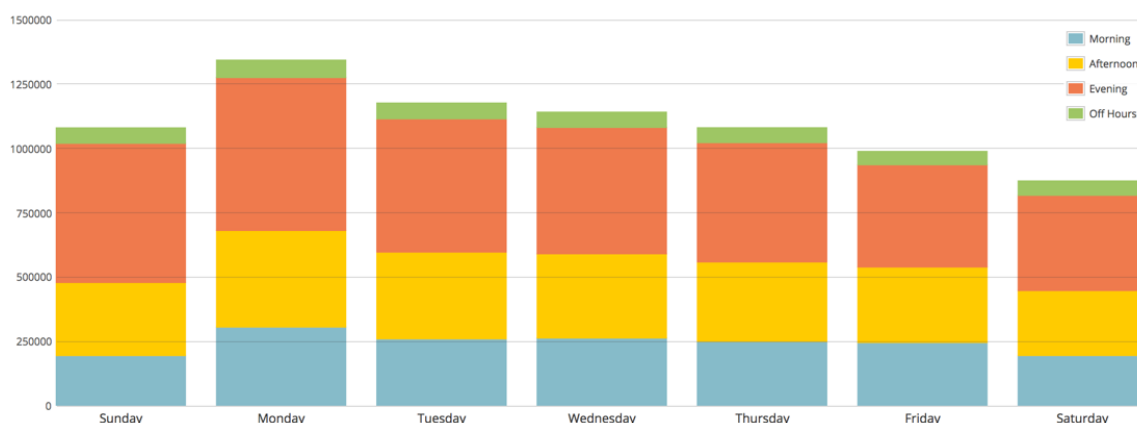


Figure 25 – Thematic unit accesses per week day and time of day

Forum is one of the most used activities. Users have created 12764 discussions and added 37778 posts during the Academic Year. More specifically, students have posted 23948 times, while thematic unit Coordinators have posted 7635 times during the Academic Year.

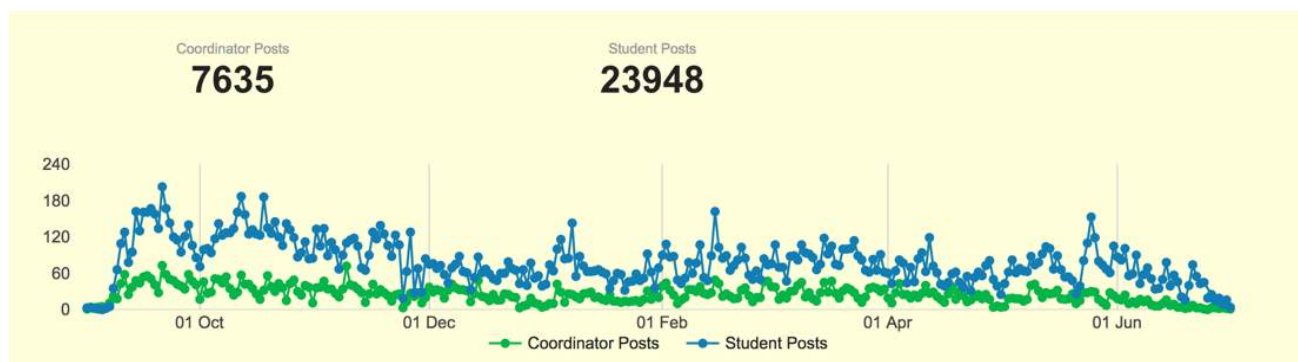


Figure 26 - Students and Coordinators posts in forums during the Academic Year

6.2 Synchronous Learning service

During the Academic Year 2015-2016, 775 virtual classrooms were created and 22421 sessions took place with a total number of 75977 participants. 3640 of these sessions were recorded (16.23%) for later viewing. These recordings were accessed 128375 times from students and educators. In total, 93% of total attendances were from a desktop device, in contrast with 7% that were made from a mobile or tablet device. Even though the mobile device usage is low, the ability to use a mobile device to join a session is a major advantage, since it allows students to join a virtual classroom even when they are away from home or office.

In Figure 7, the number of rooms and recordings per month is depicted. The majority of sessions (6455) took place in September, at the start of the Academic Year, where educators got in touch with their group of students for mentoring, collaborate to prepare lectures and OUC personnel to organise training events. The number of recordings per month was approximately 400 (excluding the examination period of June).

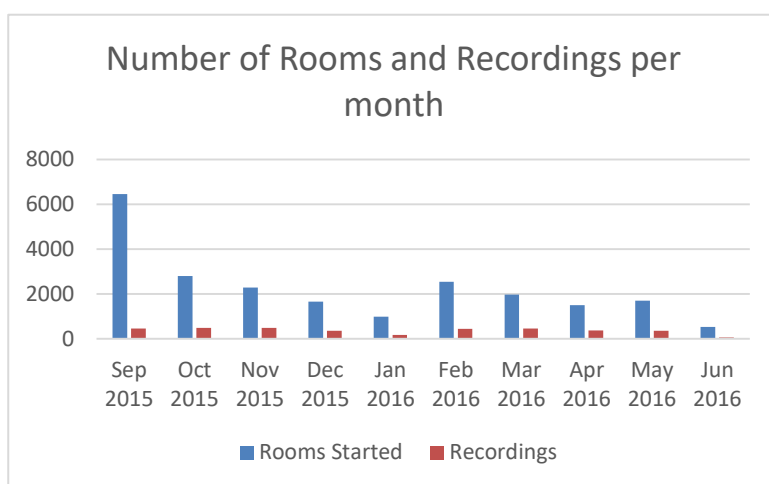


Figure 27 - Number of Rooms and Recordings per month

6.3 Video Lecture and Streaming service

Even though the ability to capture lectures and create videos is a newly introduced service, a number of educators have embraced it and created more than 700 sessions of around 592 hours of content (Table 1).

Table 10 - Video Lecture and Streaming Platform usage statistics

Number of sessions	705
Hours Recorded	592.39
Total number of views	17785
Hours Viewed	1101.81

The Video Lecture and Streaming service has a built-in functionality for monitoring viewers in each session. More specifically, a detailed graph with viewers per lecture time is presented to the educator (Figure 8). By analysing this graph, educators can understand if their lecture is interesting and what parts of the lecture are most viewed.

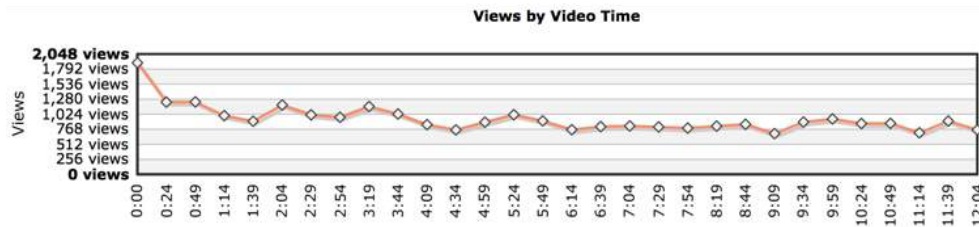
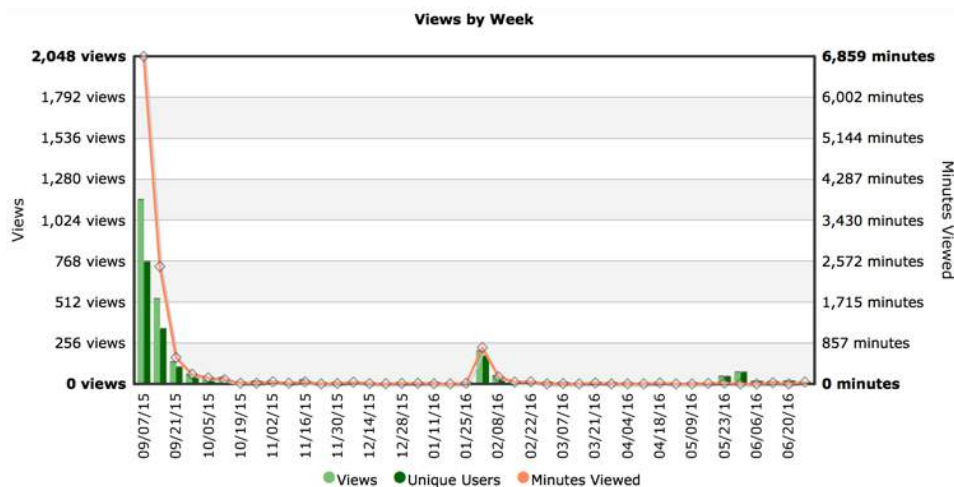


Figure 28 - Number of views per video time. Analytics from a student training video.

An example of lecture capture analytics is presented in Figure 9, where the student training video sent at the beginning of the Academic year was viewed more than 1000 times in that period (Figure 8). For the rest of the period, only few users needed to watch it, except from the beginning of the second semester where a peak is detected in the graph. Moreover, the first 24 seconds of the video were skipped by several users, since the content at that time period was just an introduction that most of the users were familiar with (Figure 9).



University. Also, the infrastructure used to empower the distance education experience in the Open University of Cyprus is described along with the extended support model provided for educators and students.

Organizations like the OUC, that depend on technology, have to coop with educational technology advancements. Future technologies like advanced learning analytics, adaptive learning and virtual reality (Johnson, L., Adams Becker, S., Estrada, V., and Freeman, 2015) may find their space in higher education and OUC should be ready to adopt them in its learning methodology and respectively in its eClass eLearning Platform.

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A Learning Analytics Methodology for Student Performance Assessment in a Distance and Open Education Environment

Vasileios Kagklis

Hellenic Open University, Educational Content, Methodology & Technology Laboratory, 278 Patron-Claus Str., GR-263 35 Patras, Greece
kagklis@eap.gr

Antonis Lionarakis

Hellenic Open University, School of Humanities, 18 Parodos Aristotelous Str., GR-263 35 Patras, Greece
alionar@eap.gr

Elias C. Stavropoulos

Hellenic Open University, Educational Content, Methodology & Technology Laboratory, 278 Patron-Claus Str., GR-263 35 Patras, Greece
estavrop@eap.gr

Vassilios S. Verykios

Hellenic Open University, School of Science & Technology, 18 Parodos Aristotelous Str., GR-263 35 Patras, Greece
verykios@eap.gr

Abstract

Advances in data storage devices and data collection techniques have enabled the capturing and persistent maintenance of all the information related to the interaction between students and instructors in the context of the learning processes, supporting a 360-degree view of the student profile. Data Mining, Data Analytics, and Exploratory Data Analysis techniques can be used to make sense out of these multidimensional and endlessly generated data in order to offer added value to the higher educational academic institutes and universities. In this paper, we present a learning analytics approach that has as its goal to improve both the learning experience of students and the instructional experience of tutors, as well as the institutional strategic view of the university. By exploring and analyzing all the collected data, we build models that explain and assess the effectiveness of the learning environment, so as to address the needs of the aforementioned members of these organizations. In this underlying framework, we also present and evaluate a case study that focuses on analyzing educational data for assessment purposes from a big data infrastructure, which is under development in the Hellenic Open University in Greece.

Keywords: Big Data, Learning Analytics, Student Performance Assessment, Distance Education

1. Introduction

The Hellenic Open University (HOU) was officially established in 1997 and is the only University in Greece that exclusively offers distance education courses. Since its establishment, the HOU has evolved and has been attracting more and more students of all ages, from different cities, and of a variety of profession and financial status, that have shown great interest in studying through a distance learning program. HOU consists of four Schools, offering undergraduate and graduate courses to adult learners. Each course consists of modules and students have to submit 4-6 written assignments throughout the 10-month academic year period and participate in a compulsory sit exam at the end of it. Furthermore, each course module includes five not compulsory face-to-face counselling group sessions that take place in 9 cities all over the country. Refer to <http://www.eap.gr> for a presentation of the undergraduate and the graduate studies and courses' structure in HOU.

Communication and interaction between tutors and students is mainly held via e-mail and telephone as well as through the Student Information System <http://open.eap.gr> and the Learning Management System (LMS) <https://study.eap.gr/>. Students at HOU are provided with a variety of learning materials (printed course material, audio and video material, CD-ROMs/software, etc.) specially prepared for distance learning, most of them located in the digital material repository <https://apothesis.eap.gr/>. Through the digital repository, students have access to digital educational material as a supplement or alternative material for their study. The Student Information System of HOU contains information supplied by the Register's Office of the HOU, concerning the students' record, the organization of modules into groups, the time, date and place of the counselling group sessions for each module, written assignments and final exams grades, etc. The LMS of HOU is based on the Moodle platform (<https://moodle.org>) and it has been offering services to students and tutors since the academic year 2013-14. Through this platform, students have the ability to submit their written assignments, work reports and answered questionnaires within their academic studies, while tutors are able to give feedback, annotate and grade their assignments or work reports. In addition, work spaces for asynchronous discussions at module level, discussion groups and online fora of students and tutors are available which are managed via an automated process. The service is configured properly to keep pace with the academic calendar of modules and to provide students and tutors with direct access to the activities of the current week. Moreover, the web conferencing platform <http://centra.eap.gr/> is used for synchronous teleconferencing between students and tutors, and offers the possibility for an interactive classroom experience, in addition to the face-to-face counselling group sessions.

The above platforms provide a vast amount of valuable educational and administrative data. Log files and activity reports, forum posts, participation in counselling group sessions, written assignments and final exams' grades, can give feedback about students' activity, attention, active participation and engagement. Along with information from student admissions, all these data can be combined and the exploitation and the analysis of them can provide knowledge to empower both student learning and tutors teaching experience, enrich educational experience and elevate the level of academic excellence.

In this study, we provide a proof of concept of a sample of such data, concerning the "PLS60 - Specialization in Software Engineering", a second year module of the graduate course Master's in Information Systems of the School of Science and Technology. The aim of this programme is to offer its students the opportunity to

acquire specialized knowledge in Information and Communication Technologies, and to prepare them for professional work in the design, development and management of integrated information systems. To fulfil the program requirements, a student has to succeed in four modules and submit and successfully defend a thesis of his/her choice. Module PLS60, in particular, covers subjects from Database Theory and Data Management (ER, MySQL etc.), Data Mining techniques (like classification, clustering, regression, and association rules), Operating Systems (concurrency and paging) and Modern programming paradigms (the Java programming language). To complete the module, students have to successfully submit six written assignments during the academic year, and succeed in the final written examination.

The rest of this paper is organized as follows: Section 2 gives a brief background insight of some previous related works. Section 3 presents the methodology followed for the analysis of the data, describes the data set and the software tools utilized for their processing. Section 4 demonstrates and discusses the results of the analysis and, the final Section concludes this work and presents some future ideas.

2. Related Work

Distance education (White, 1982; Byrne, 1989) is an alternative way of learning from a distance, without the need of physical presence in a classroom. In the last decade, it has gained a lot of attention and popularity. In distance education, online discussion fora are used as a means of communication, as they provide many benefits to students and teachers, countermeasuring the lack of face-to-face communication. According to Tiene (2000), students have been found to be in favor of the self-paced, self-regulated feature of asynchronous discussions compared to their face-to-face counterparts. Duffy, et al., (2002) report that students who have undertaken a degree from a distance obtained significantly higher average marks than those who have undertaken it on campus.

The application of data mining in education is an emerging research field known as Educational Data Mining (EDM) (Baker, 2010). It studies the development of methods for exploring data that come from educational environments. The aim of EDM is to provide a better understanding of students' behavior, to identify how students learn, and how the learning process can be augmented so as to improve the performance of the students (Berland et al, 2014). Each one of these issues asks for a specific solution and its own unique characteristics require a different way of treatment. Therefore, the knowledge discovery process has to be adapted in the needs of the specific problem each time. In their research, Baker and Yacef (2009) suggest four goals of EDM: predicting students' future learning behavior, discovering or improving domain models, studying the effects of educational support that can be achieved through learning systems, advancing scientific knowledge about learning and learners by building and incorporating student models.

The problem of predicting low performance or even the possible drop-out of students (Pierrakeas et al, 2004; Romero & Ventura, 2010; Pal, 2012) has long been recognized and is one of the hottest topics in EDM. A lot of research has been devoted on how to apply EDM techniques effectively, in order to create models that can predict dropout rates and school failure (Romero & Ventura, 2010). More specifically, statistical techniques, such as correlation analysis and regression, and data mining techniques, such as classification and decision trees, have been used to evaluate the prediction results for students' academic success (Hämäläinen & Vinni, 2010).

Data from the online discussion fora can be used to apply text mining and natural language processing (Manning & Schütze, 1999), along with social network analysis and sentiment analysis techniques (Pang et al, 2002; Turney, 2002), in order to extract useful knowledge about the behavior of the students, their mood during the course, their collaboration or communication patterns, or even try to predict their final performance based on these findings. (Turney, 2002) and (Pang et al, 2002) are among the first to use sentiment analysis, combined with machine learning algorithms. Currently, the existing approaches of sentiment analysis can be grouped into four main categories: keyword spotting, lexical affinity, statistical methods, and concept-level techniques (Cambria et al., 2013). Keyword spotting classifies text by affect categories based on the presence of unambiguous affect words (Ortony et al, 1988). Lexical affinity not only detects obvious affect words, but also assigns arbitrary words a probable “affinity” to particular emotions (Stevenson et al, 2007). Statistical methods leverage on elements from machine learning such as latent semantic analysis, support vector machines, "bag of words", etc. More advanced methods try to detect the holder of a sentiment and the target (Kim & Hovy, 2006). Lastly, concept-level approaches leverage on elements from knowledge representation such as ontologies and semantic networks and, thus, are also able to detect semantics that are expressed in a subtle manner (Cambria & Hussain, 2012).

In (Lotsari et al., 2014), social network analysis techniques were applied on educational data originated from the online forums of the Hellenic Open University, to obtain networks of students and instructors, according to their interaction. The analysis of the data has been accomplished by using the R and the Weka tools, in order to analyze the structure and the content of the exchanged messages in these fora as well as to model the interaction of the students in the discussion threads. Lately, in (Kagklis et al, 2015) sentiment analysis and opinion mining was applied on educational data obtained by the online forum of a graduate module, to analyze students’ attitude towards the course, model their behavior and detect how this affected their overall performance. Moreover, a recent study on Massive Open Online Courses (MOOCs) is that of (Wen et al, 2014). The authors apply sentiment analysis on students’ posts, in order to identify students’ opinion for specific features of the course, and to evaluate if there is a connection between the sentiments and the students drop-out rate.

To the best of our knowledge, most of the existing studies focus on the analysis of the data being collected during and/or after the distance learning courses. However, important knowledge can emerge from data obtained by student applications for acceptance in distance learning programs. In (Kagklis et al, 2016) demographical data related to student admission for acceptance in programs offered by the Hellenic Open University, were studied. The authors analyze data to discover patterns and knowledge that can be used to help the strategic placement of the University, and to improve students’ learning experience. Moreover, they attempt to correlate the discovered findings with the social and financial status of the applicants’ environment.

3. Methodology

As we explained in the previous section, EDM is a research area that investigates the automatic analysis of data coming from an educational context, spanning all levels and types of educational systems. EDM can be considered as a specific area of Data Science, that is a broader term used for encompassing all aspects of management and analysis of data. Learning Analytics (LA) is another term used in parallel with EDM to signify the analysis of data originating from a learning environment. We consider EDM a broader term than

LA, but there is definitely a lot of overlap between the two terms, as well as maybe some issues that are not common to these two concepts.

In this paper, we present a holistic LA methodology for analyzing educational data from a distance learning university. As we explained before, a distance learning university presents a number of singularities that stem from the specific nature of education offering as well as from the subtle characteristics of the student population. As far as the model of education offering that is used in HOU is concerned, it is considered a blended learning model, where distance offering of materials and tutor guidance and teleconferencing is offered along with a selected number of face to face counseling group sessions that are uniformly distributed in the timeframe of a module offering. Student population is biased towards adults or otherwise older generations, especially in the undergraduate programs, and this bias by itself introduces a lot of peculiarities that are dealt with both methodological and technological solutions that facilitate the learning process in various ways.

The LA methodology that we propose relies on assimilating and analyzing detailed data from all possible phases of student virtual or real presence in the academic environment and even beyond that. Specifically, we are focusing on integrating data from the whole students' lifecycle both static and dynamic as well as real time and historical, before, during and after their fulfillment of the requirements for the degrees they are seeking. The uniqueness of our proposal, is the multimodality, large dimension and size, as well as the complementarity of the sources all these different data reside. Even though we present only a partial view of the results coming from running a large number of experiments for data analysis purposes as a proof of concept, we strongly believe that a 360 degrees view of the students' presence in the university for accelerating and facilitating their learning is still a major step that needs a lot more of experimentation and testing.

The starting point in our methodology is the time that the student is applying for a position in one of the programs the university is offering. We should say here that HOU is one of the Hellenic public universities where the entrance of the students is by ballot, even though by the time of this writing, some of the programs are accepting all of the applicants. A lot of information about the people who applies can be found even from this subset of student admission data, and a lot of knowledge can be produced with respect to the patterns followed by applicants, so that the university can appropriately adjust well in advance the offering of new or the termination of not promising programs of study. A geographical distribution of the applicants can also shed some light to the urban or suburban areas the majority of the applicants originate from, so that new annexes of the university can be planned for future development to accommodate the increasing needs of the tentative student population among other strategic decisions that can be drawn about the placement of the programs.

A major component of the data that are fed into our methodology come from the student information system that contains information related to the student population from a university administration point of view, such as demographical data, previous student education related data, address data, family related information, courses enrolled, counseling group meetings schedule and student participation, grades and transcripts, payment information, and so on and so forth. The largest part of the data that support our LA methodology are coming from the learning management system used for the offering of the online courses.

A great amount of data spanning from logging data, posts to forums, assignments, grades, completion of various learning activities and quizzes have a central role in the analysis techniques used. In particular, we have so far applied in the past various social network analysis techniques for analyzing the group of students interacting with each other and with their instructors through the forums and chat rooms, as well as with fellow students in performing various collaborative assignments and tasks. A number of text mining techniques have been applied for analyzing the content of the messages exchanged through the forums in order to find out the main concepts in the studying materials that caused difficulties to the students, as well as the procedures in the course offering that challenged or puzzled the students most.

A number of classification and clustering techniques, like decision trees and classification rules or hierarchical agglomerative clustering can be used to analyze performance data from assignments and quizzes or various other activities and build a model that indicates what is the relationship between those and the final grade in the course, or even predicting in an early stage the students that have a high degree of probability of failing to complete a course or even that eventually will drop out of the program altogether. We should add to those techniques a number of sequential mining techniques that are important for analyzing logging data with a time dimension, in order to build a profile of the student engagement with the course site and the effect that such an engagement plays in the final performance of the student. A sample of experimental results related to such techniques can be found in the next section. Sequential mining techniques can also be applied to analyzing the participation in various video conferencing sessions offered throughout the academic year in the context of a course offering as an extra guidance for students in performing specific goals such as their software assignments or introducing a software in the form of a tutorial.

Finally, a number of sentiment analysis techniques have been applied to forum data to analyze the sentiment of the students from their postings in the forums they participate in. Even in a preliminary stage, this seems to be a promising direction of investigation, especially in case we start analyzing the student behavior from data posted in various social media sites the students may engage in participating, for collaborating with other fellow students for completing their assignments or preparing themselves for the final exams.

The last portion of the data we envision to use for building global profiles by analyzing the student behavior and engagement is the questionnaires answered during the end of the academic year for evaluating the course and the instructor by the student. HOU was a pioneer among the Greek universities to build an electronic system that supports anonymous evaluation of courses, teaching materials and instructors from students, in addition to allowing instructors to evaluate course materials and course coordinators and the other way around.

As a proof of concept we have used a sample of the data available in our databases related to the information systems program, and especially from the system engineering course, which is a graduate level course. The experimental results from applying some of the aforementioned techniques are presented in the next section, while the rest of the techniques have been applied to a similar set of data and the results can be found in a number of publications from our group.

For our first analysis we utilized a dataset consisting of 794,800 student applications, which were submitted towards 83 different distance learning modules, the equivalent of a course, during a 10-year period (2003-2013). The applications were made by a total of 362,311 different applicants, who could apply once a year in multiple modules. These data were used for geographical analysis, analysis of the applications that the university received the last decade, and analysis of the number of applications based on the age and the sex of the applicants.

We selected a small dataset of totally 61 students, who participated in the computer engineering module to perform a thorough analysis upon their learning activities. We combined the data from their applications, the log files from the online forum, their graduation grade and their performance in this module, and lastly the messages they posted in the corresponding online discussion forum.

The data preprocessing was implemented in Python (Rossum, 1995). The data were stored into an SQL database. The visualizations were created by using Tableau v. 9.3 (<http://www.tableau.com/>).

4. Results and Discussion

In this section we present the results of our experiments by visually presenting our findings in a number of graphs.

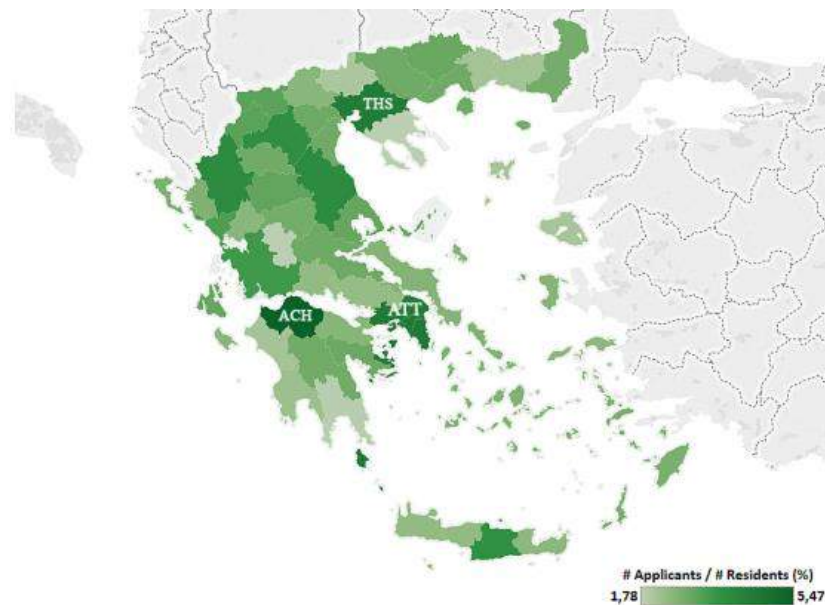


Figure 29 : Number of applicants per 100 people for each geographical region.

Figure 29 demonstrates the distribution of the applicants per region. Results are scaled per 100 residents. The data for the number of residents per region were retrieved from the (Eurostat Census Hub, 2016)²¹⁴. The three regions with the largest percentages are the regions of Achaia (ACH, 5.47%), Attiki (ATT, 4.49%), and Thessaloniki (THS, 4.45%), which are marked with their region code. In these three regions, the three largest cities of Greece are located, with their size and number of residents having the following descending order; ATT, THS, ACH. The region with the largest percentage (almost 5.5%) is the region of Achaia (ACH), in

²¹⁴ The data are from the last census, which took place in 2011, and covers the period 2001–2011.

which the base of the HOU is located. Despite the fact that regions with large cities do have public universities or other private institutes, in which people can study, these regions have large percentages as well. On the contrary, peripheral regions usually have no access to higher education and as a consequence, we would expect larger percentages of residents applying to HOU from such regions.

Figure 30 presents the total number of applications per gender during that period. The number of applications has its maximum peak in 2004, while its minimum peak occurs in 2012. The decreasing trend during 2010–2012 is associated with the financial crisis that stormed in Greece during that period. Moreover, each year the university received more applications from female than male applicants. The percentage of female applicants was higher by approximately 11 units compared to the percentage of male applicants.

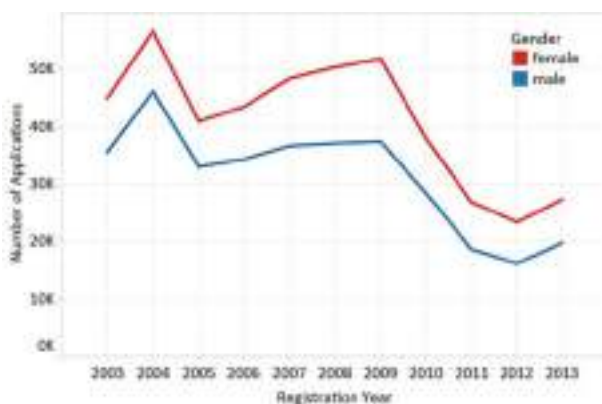


Figure 30: Number of applications per gender during 2003-2013.

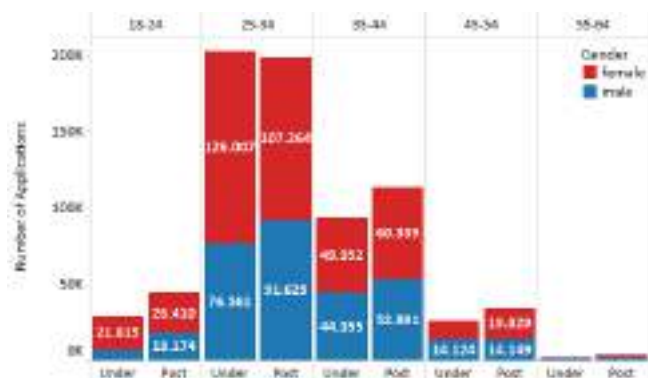


Figure 31: Number of applications per age group and educational level.

Figure 31 displays the number of applications made per age group, in combination with the educational level. We separated the applicants into five groups; 18–24, 25–34, 35–44, 45–54, and 55–64 years old. We chose to divide ages in these ranges because this setup has been used in demographics by numerous newspapers and advertising executives. The 25–34 age group held the majority of the applications. This can be explained by the fact that many students enter a public university to study a subject that quite often is not their first option. Then, after graduating or even after finding a job, they decide to either study or make postgraduate studies related to the subject that was their first option.

Figure 32 presents the number of events in the forum as recorded in the log files, separated by month. The activity of users reaches its peak early in the academic year, during November. Then, in December and January there is a descending trend, probably due to the Christmas holidays. During that period, students have free time to rest or study the material given to them. Therefore, less students participate in the forum. The forum activity then rises and has a small deviation from February until May. Exams take place during June and July, which is the beginning of summertime. Again there is a lower activity in the forum compared to the previous four months, which is almost equal to the one during January. This is probably because students focus on studying and have less time for participating in the online forum discussions.

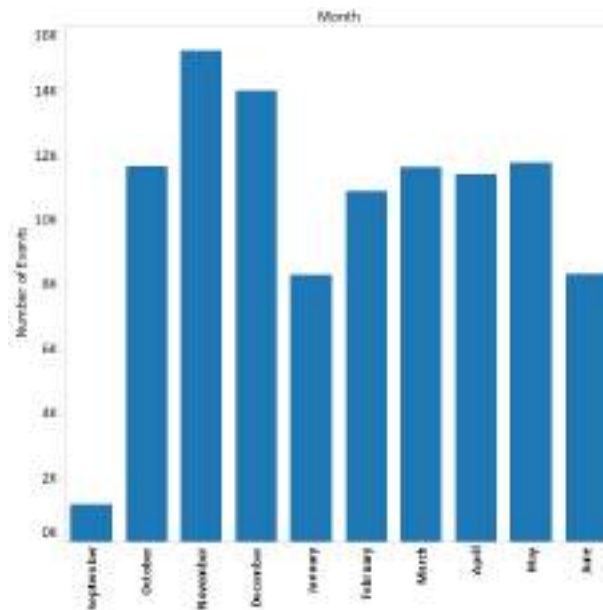


Figure 32: Number of events in the log file separated by month.

Figure 33 and Figure 34 demonstrate the distribution of the number of events in the forum based on the hour of the day. In Figure 33, the colour indicates the average of the average grade of the students' assignments, which they have to submit during the academic year in order to pass the module. Firstly, we observe that outlier hours such as 03:30 and 05:30 have not only the fewest number of events, but also the lowest averages. This is probably because these students work a lot of hours during the day and do not have a lot of free time to study, let alone participate in the online discussion forum.

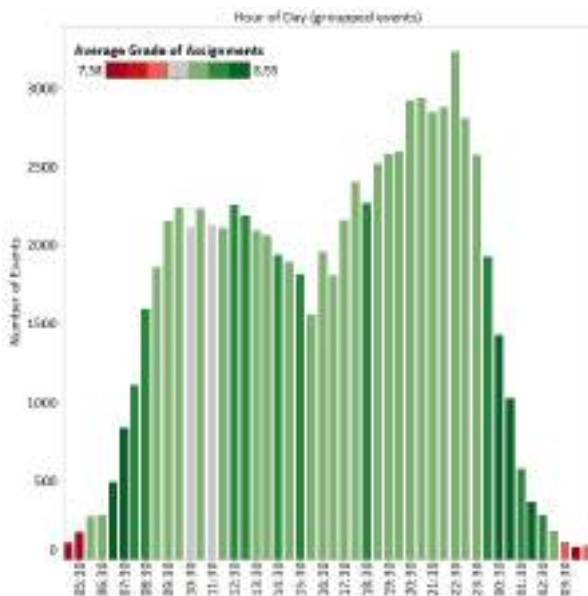


Figure 33: Distribution of the number of events in the log file based on the hour of day. Colour shows the average of the average grade of assignments of the students.

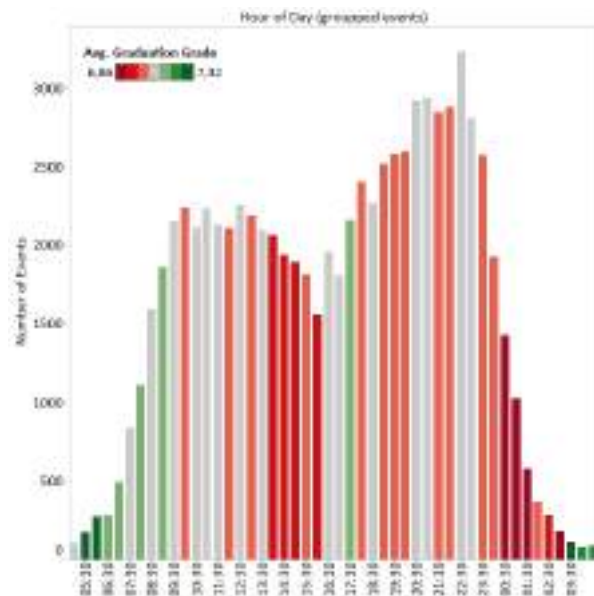


Figure 34: Distribution of the number of events in the log file based on the hour of day. Colour shows the average graduation grade of the students (from their previous education).

In *Figure 34*, the colour indicates the average graduation grade of the students from their previous educational organization, and follows the opposite trend as the one depicted in *Figure 33*. The very same hours of the day that appear with higher averages in *Figure 33*, appear with low averages of graduation grades in *Figure 34*. There is no clear explanation about this pattern.

Additionally, we observe that more events occur in the afternoon or later in the evening. This is not surprising considering that this is an online forum for a distance education module and that the majority of people work either from 9am to 5pm, or 9:30am-2pm and 5:30pm-9pm. Therefore, more students have free time to participate in the forum during afternoon or in the evening, depending on their working hours.

Figure 35 shows the distribution of the number of events in the forum based on the average grade in the students' assignments. The colour indicates the sex of the students. We observe that the bigger the average grade is, the more number of students and events there are. This may indicate that students who participate actively in the discussion forum achieve higher scores in their assignments. Figure 36 shows the distribution of the number of events in the forum based on the students' graduation grade from their previous educational organization. We note a normal distribution, with female students having a lower deviation. We observe that the highest number of events occur around the grade of 8. Students with a good graduation grade tend to participate more in the discussion forum compared to students with lower graduation grades.

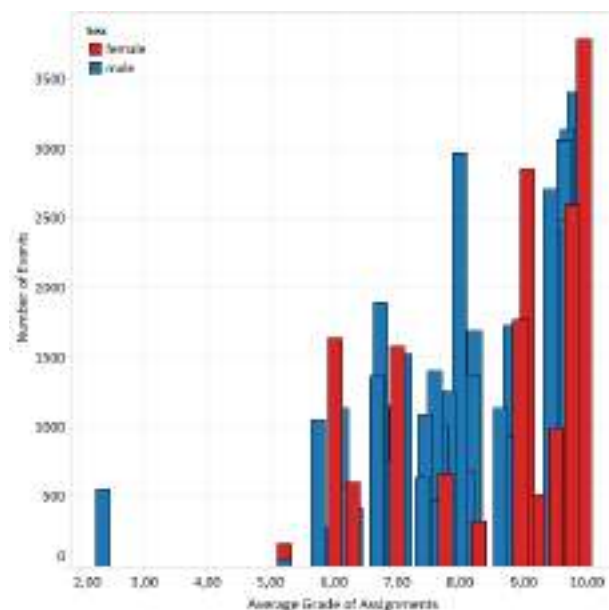


Figure 35: Distribution of the number of events in the log file based on the average grade in the assignments.

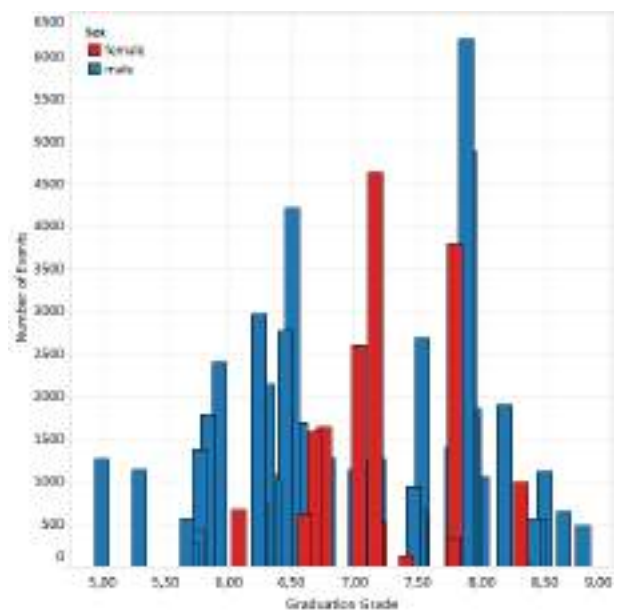


Figure 36: Distribution of the number of events in the log file based on the graduation grade of the students.

In *Figure 37* we depict the distribution of the undergraduate studies of the students. The colour shows details about the sex while the count shows the number of students for each Study.

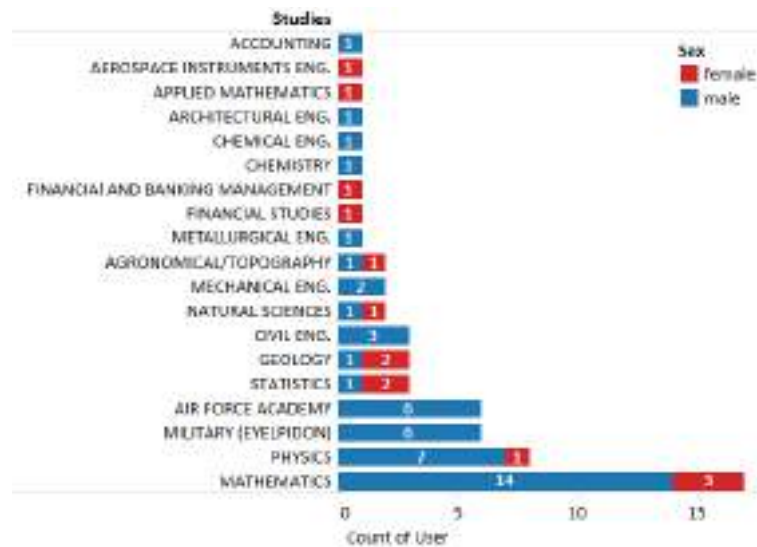


Figure 37: The distribution of students' undergraduate Studies.

Complementary data concerning students' behaviour in the forum are derived from the students' network that is built and presented in Figure 38. The students' network is based on their co-occurrence in the same thread and illustrates the interactions among them. Each node presents a student and each edge presents a correlation between two students. Students with higher levels of participation in the discussion forum are at the centre of the network. For instance, students with IDs 83117, 61122 and 83172 are located close to the centre as they have the highest frequency of participation in the forum being the most active participants. Figure 38 demonstrates the active as well as the peripheral students allowing the tutor to have a visual description of the interactions among his/her students. Furthermore, labels id1, id2, and id3 refer to the course tutors, who seem to be an important factor of the interaction in the forum and they have a central role in the network.



Figure 38: Students' network illustrating interaction among them and their instructors.

5. Conclusions

In this paper we used data from the HOU so as to provide useful information not only for the HOU itself, but also for the tutors who teach the offered distance learning modules. For our first analysis we utilized a large dataset originating from the student applications of the decade 2003-2013. We expected larger percentages of residents applying to the HOU from remote regions but this was not really the case. From our analysis, we concluded that despite the fact that regions with large cities do have public universities or other private institutes, in which people can study, they have larger percentages of residents applying in the HOU.

External factors (such as societal and financial) affected to certain degree the number of applications received. The results indicated that more females applied to the HOU than males, which means that more females wanted to study the subject of their choice in a second-chance organization like the HOU or even to counteract against the gender wage gap. Additionally, people that are between 25 and 34 years old are more likely to apply in distance learning programs, such as the ones offered by the HOU, looking to acquire a better resume for future work placement.

We then utilized a smaller dataset, from students participating in the system software module, and combined the data from their applications, the log files from the online forum, their graduation grade from the previous educational institute, their performance in the module, and lastly the messages they posted in the corresponding online discussion forum.

The amount of spare time that students have is an important factor that can affect their progress even when participating in distance education programs, which are far more flexible than the conventional ones that require their physical presence. The activity in the online discussion forum reaches its maximum peak during the first four months. Tutors should bare this in mind and should at least place a small part of the most important subjects in the curricula during that period, as students appear to have more time and to be more eager to participate and discuss in the forum. This in turn could lead in understanding difficult subjects and concepts more easily.

The majority of the applicants, and therefore the majority of students, were between 25 and 34 years old. At this age, people have a job or at least a part-time job. Thus, students participate in the forum in later hours of the day. Tutors can utilize this information and answer the questions in a shorter time after they have been posted.

Lastly, participating in the forum can have a positive impact on the overall performance of a student. Questions are posted, discussions are made, and knowledge is shared, not only between students and tutors, but also among students. This process helps every participant learn something new or, through repetition, the maintenance of knowledge that one already owns.

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Massive on-line learning: moving from web to mobile

Marco Mezzalama

Politecnico di Torino, Italy
marco.mezzalama@polito.it

Enrico Venuto

Politecnico di Torino, Italy
enrico.venuto@polito.it

Abstract

Nowadays, web and mobile technologies and new communication paradigms offer many opportunities to improve services within University Campuses.

Politecnico di Torino has developed various approaches to on-line (distance) learning, using a set of tools and methodologies to follow the rapid evolution of teaching paradigms: from traditional distance learning models to hybrid and blended models, up to the most recent flipped and MOOC approaches.

The on-line learning system is designed to be used by both face-to-face and remote students for a total of 33.000 people organized in 51 bachelors and master of science programs. Today it shows 1.000.000 logins/month and it provides access to 430.000 files of teaching materials for a total of 80.000.000 downloads/year.

Particularly relevant is the service of video recorded lectures with its 80 courses for a total of about 3.000 recorded, one hour lessons per year; this generates over 1.200.000 video streaming/downloads per year.

In this scenario, the use of mobile technologies is quickly growing, becoming the favourite medium to access services and information in the University context. According to the technological evolution, Politecnico di Torino improved its services moving from a traditional Web approach to a mobile APP model via the intermediate steps of web responsive and mobile web models.

This paper describes the strategies and the technical choices to design and implement the teaching portal of Politecnico including the new PoliTO App, the official App to step into the campus, providing learning, streaming, logistic and administrative services to student and teachers.

The paper also includes the efficiency analysis of the model which correlates the access to the video-lectures and the students' achieved performances.

Keywords: learning technologies, mobile learning, blended learning

1. Introduction

The ever more increasing diffusion of mobile devices in the last six years forced universities to adapt themselves to the change, making the deployment of their services evolve in the direction of mobile users. Figure 1 shows the evolution of mobile access to online services for didactics of Politecnico di Torino in the last eight years. We can see that the accesses through mobile devices grew from 0.2% in 2008 to 15% at the beginning of 2013, more than doubling in the following three years reaching 32% of the total in 2016. In Figure 1 the blue line plots the aggregate percentage of mobile accesses, the other ones plot the distribution per operating system.

This intense growth forced to redesign the methods of production and distribution of the information in order to allow for optimal fruition from any kind of devices, from small mobile phones to powerful workstations [Castaldo et al, 2013].

The lowering of the curve starting March 2016 depends on the introduction of the Athenaeum mobile APP “PolitTO App” (see section “From Web@desktop to App@mobile” below) that embeds direct access to services and didactic materials instead of the traditional web browsing from mobile devices.

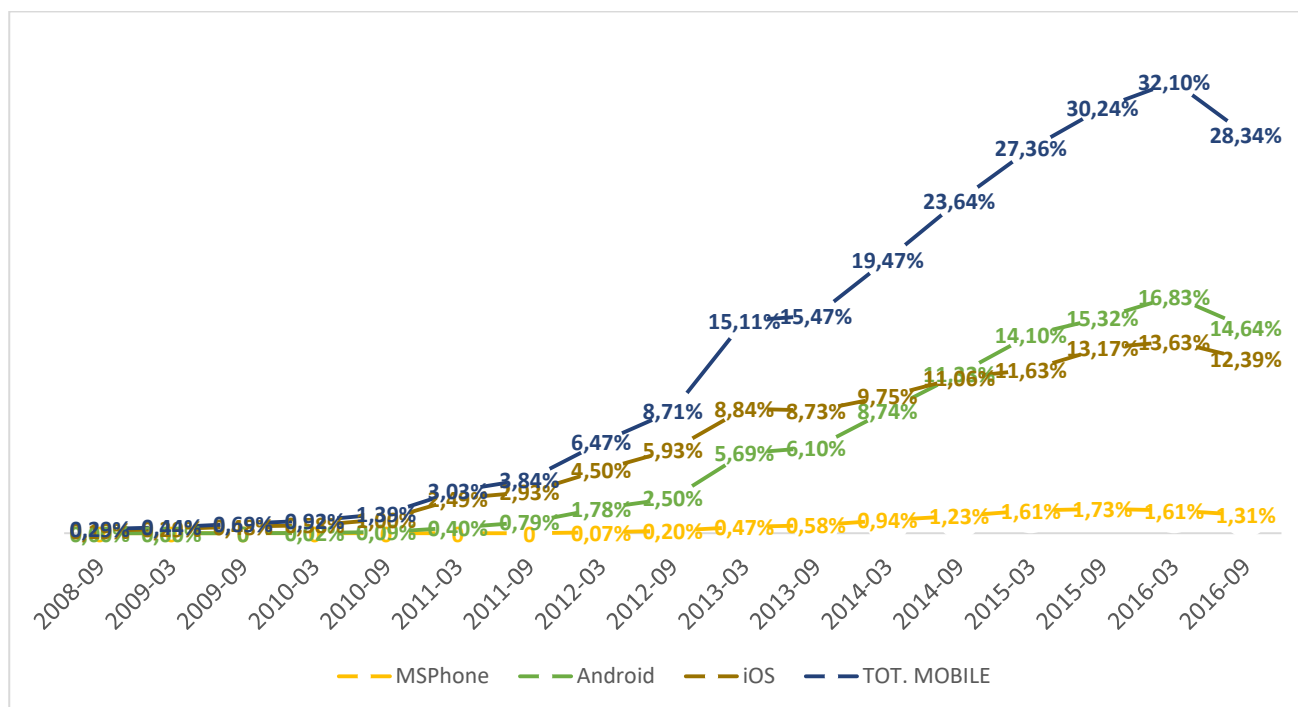


Figure 1: Evolution of mobile access to web services for didactics

Special attention should be paid to the access to multimedia materials like video-lectures (lectures fully video recorded in class) available in streaming for all web-enabled devices (including mobile).

Comparing the plots of Figure 1 and Figure 2 it is evident that the general average mobile access to teaching materials is greater than the mobile access to multimedia objects (computed on the total accesses to multimedia objects): in fact in 2012 the generic materials accessed from mobile devices represented 9% of the total, but the access to multimedia objects from mobile devices was only the 3% of the total accesses to multimedia materials.

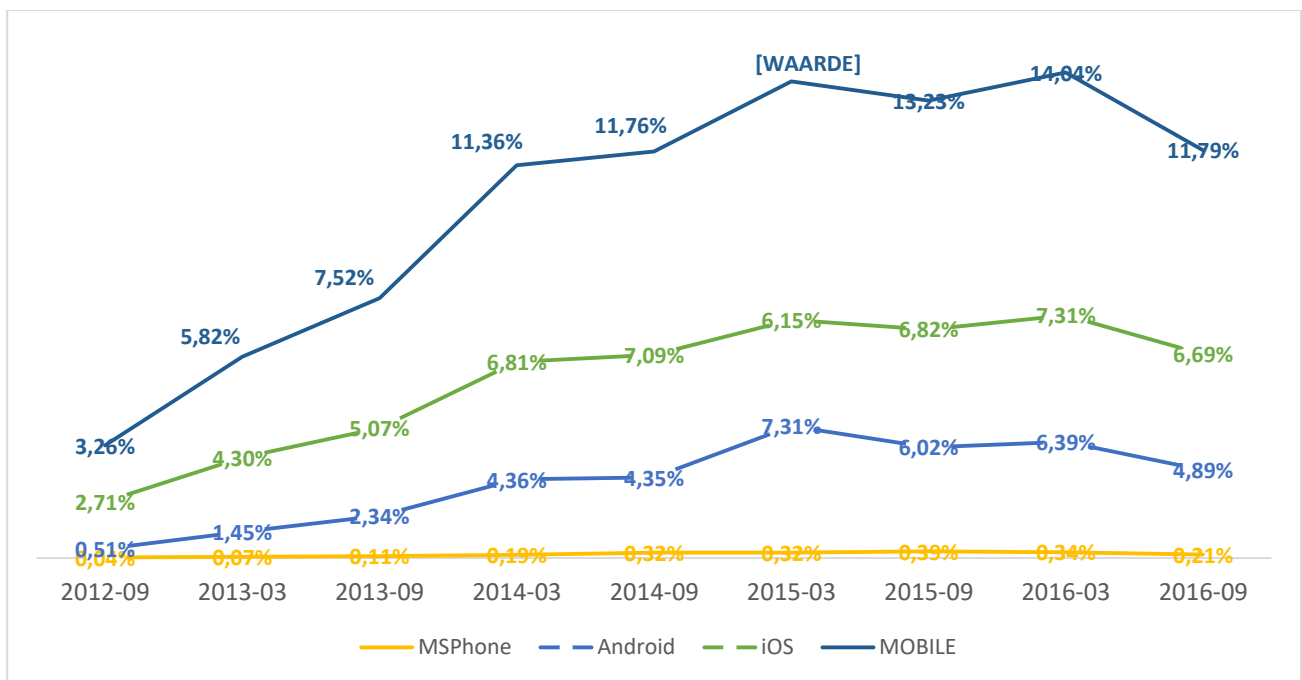


Figure 2: Mobile web access to multimedia objects (% of the total access to multimedia objects)

However in 2015 the quota of generic materials accessed from mobile device tripled (from 9% to 27%), but the quota of multimedia materials grew more than fourfold (from 3% to 14%).

This acceleration in the growth can be explained from a technological point of view with the increased availability of powerful devices, the rise of broadband connectivity, a lower cost of data communications and a higher number of ways to distribute rich multimedia objects, but also from a social point of view: students and young people have a different approach to the access to the Net, also for multimedia contents [Gedera, D., 2014].

A recent survey targeting the students of Politecnico di Torino (about 6.000 responses evaluated) shows their peculiar habits in using their mobile devices: first of all they have the tendency to use their smartphone for more than two hours per day. In Fig.3 their favourite devices are also shown: smartphones and laptops are the first choice; tablets are not so used (students were asked to sort their preferences with a value of priority from 4 to 1) [Moser et al, 2015].

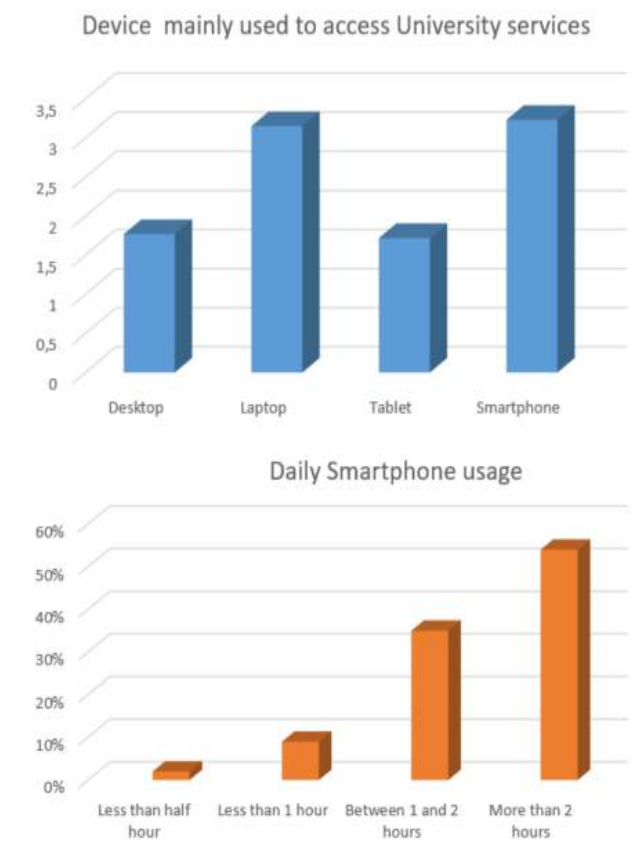


Figure 3: Students' habits in device usage

However, even if the smartphone is one of the preferred device, Figure 2 shows that the access to multimedia objects from mobile devices didn't increase in percentage after 2015. The curve reached his equilibrium and the preferred device for multimedia components remains a personal computer. Figure 2 shows also the incidence of the introduction of PolitoApp starting from March 2016 (-2.25 percent points).

2. Context

Politecnico di Torino, with its 31 Bachelor-level, 32 Master of Science-level, 16 PhD courses and with around 35,000 engineering and architecture students, is one of the most important Tech University in Italy. Every student has access to a Teaching Portal (Portale della Didattica), a virtual space where students and teachers meet each other playing proactive roles [Dominic et al 2014]. There they can find about 400,000 file of full text, indexed didactic materials like slides, notes and examination papers; they can take part to forums, deliver homework, find stage and job opportunities, perform exam booking and access to the contextual areas of the single courses.

Building on these bases, starting from 2010 the Athenaeum removed the rigid border between traditional front-side, in-class didactic and distance learning, starting to record all the lectures of the courses of the first year of engineering (6 programs), all the lectures of the Bachelor's programs in Mechanical Engineering, Electronic Engineering, Computer Engineering and the Master's Degree in Computer

Engineering [Castaldo et al, 2011].

Every year over 60 full courses are recorded in class, for a total of about 3,000 lectures per year, giving the opportunity to 15,000 students to access their curricular courses in video streaming.

Even though Politecnico di Torino - for organizational and pedagogical reasons - chose a fruition methodology like MOC (Massive Online Courses) limiting access to its students, it also tested for several years a completely different fruition method, totally free and very similar to the MOOC (Massive Open Online Courses) model one [Castaldo et al, 2014] for two teachings of the first year (Computer Science and Chemistry). For the course of Computer science, forty 90-minute lectures were published for free access. Even with no dedicated advertising, 50.000 accesses per year were detected coming from users outside the Politecnico di Torino students community [Abeer et al, 2014].

Figure 4 shows the number of accesses during the last six academic years for the six teachings of the first year of engineering. These teachings are the same for all 7,000 first year engineering students. The yearly total video-lecture streaming accesses for the first year is about 700,000: every student accesses an average of about 100 lectures.

To correctly understand the data portrayed in Figure 4 it's important to know that, although all the students of the first year of the Bachelors in Engineering are grouped into 22 parallel classes with 22 different teachers, only one professor is video-recorded and his video-lectures are deployed to all the students of all the groups.

Fig.4 shows that the video-lectures are valued from all the students, regardless the fact that the lectures aren't always from their own teacher. This result was achieved through a hard work of standardization of the programs and of the course content so that each parallel group of students shares the same contents, the delivery modes and the assessment and grading criteria.

However, accesses to video-lectures have different trends depending on the frequency at which the recording happens: courses recorded every year (es. Computer Science) have a lot of accesses, increasing in the years; courses recorded once or a few times (es. Mathematical Analysis I) have less followers, decreasing in time.

Students seem to appreciate more video-lectures of the current academic year even from another teacher rather than lessons from previous years.

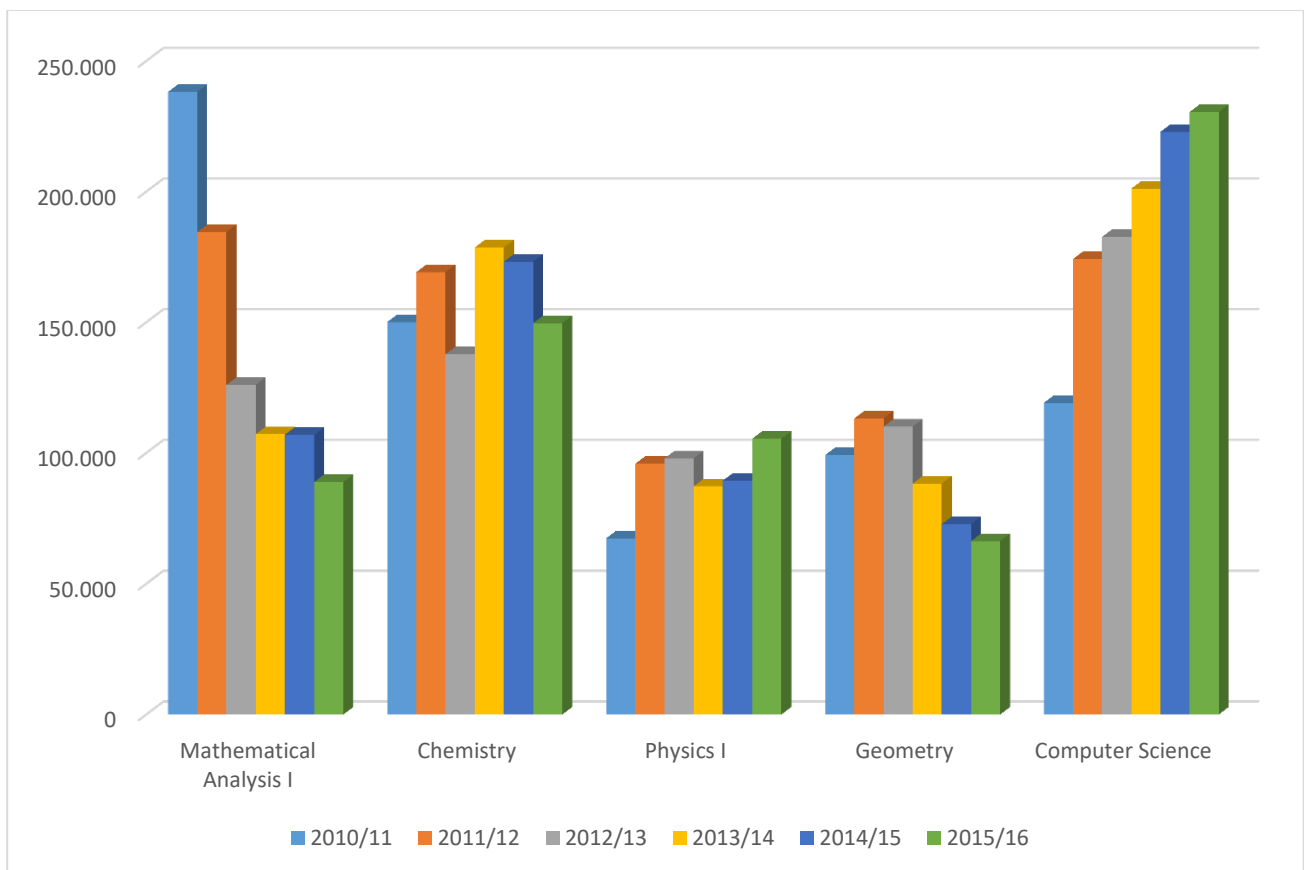


Figure 4: Video-lecture streaming accesses for the teachings of the first year of Engineering

Politecnico di Torino chose so far a blended didactic model with a deploying methodology typical of the MOC model (limited to their students) [Barbagallo et al, 2012].

Contrary to the MOOC model characterized by a lot of accesses at the beginning of the course and by a lot of drop-offs, with an inverse exponential access chart, the access charts to video-lectures of Politecnico di Torino testify the success of the model through forms repeated in the years for all the teachings, similar to a Gaussian curve with the maximum near the first exam session; also recognizable are the peaks corresponding to other exam sessions (see Figure 5) [Onah et al, 2014].

Focusing on the case of Computer Science, we found evidence that the trend of the accesses to the video-lectures is growing constantly, both during the period of the course and in the whole in the years. Politecnico di Torino has also experienced, keeping the same course contents, the deploying of the same recordings for many years. This approach has been proposed for example for the teaching of Mathematical Analysis I. By comparing the two curves in Figure 5 it can be seen how students prefer the video-lectures of their own academic years.

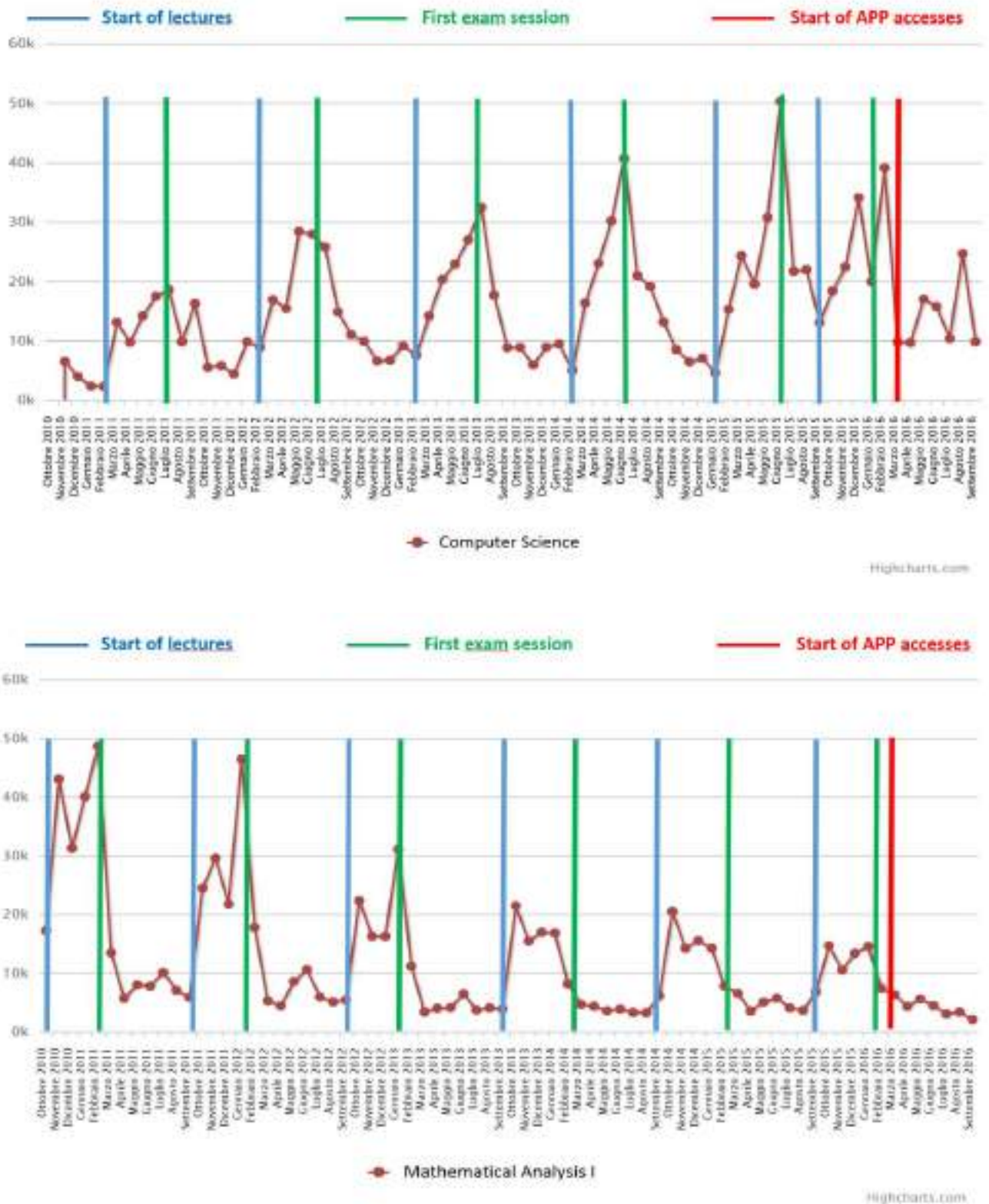


Figure 5: Video-lectures monthly web accesses charts

Some efficiency analysis of the blended model based on video-lectures have been performed to correlate the access to the video-lectures to the success in the studies. A brief review has been carried out on the teachings of the Master's Degree in Computer Engineering. In this environment all the lectures have been recorded every year and each student could access his own teacher's video-recording. The average student accesses has been tracked for each teachings (blue bars in Figure 6) and compared with the average accesses of the students that successfully passed the exam (green bars in Figure 6) and with the average accesses of the students that failed (red bars in Fig.6). So for example the students in Computer Architectures viewed in average 25.5 video-lectures; students that passed that exam viewed an average of 31.25, while those who failed only viewed 14.7.

There is an evident correlation between the average number of video-lectures viewed and the success in the exam; this fact proofs the effectiveness of the methodology also in presence of some anomalies that are probably due to different arrangement of the teachings or of the assessment and grading criteria.

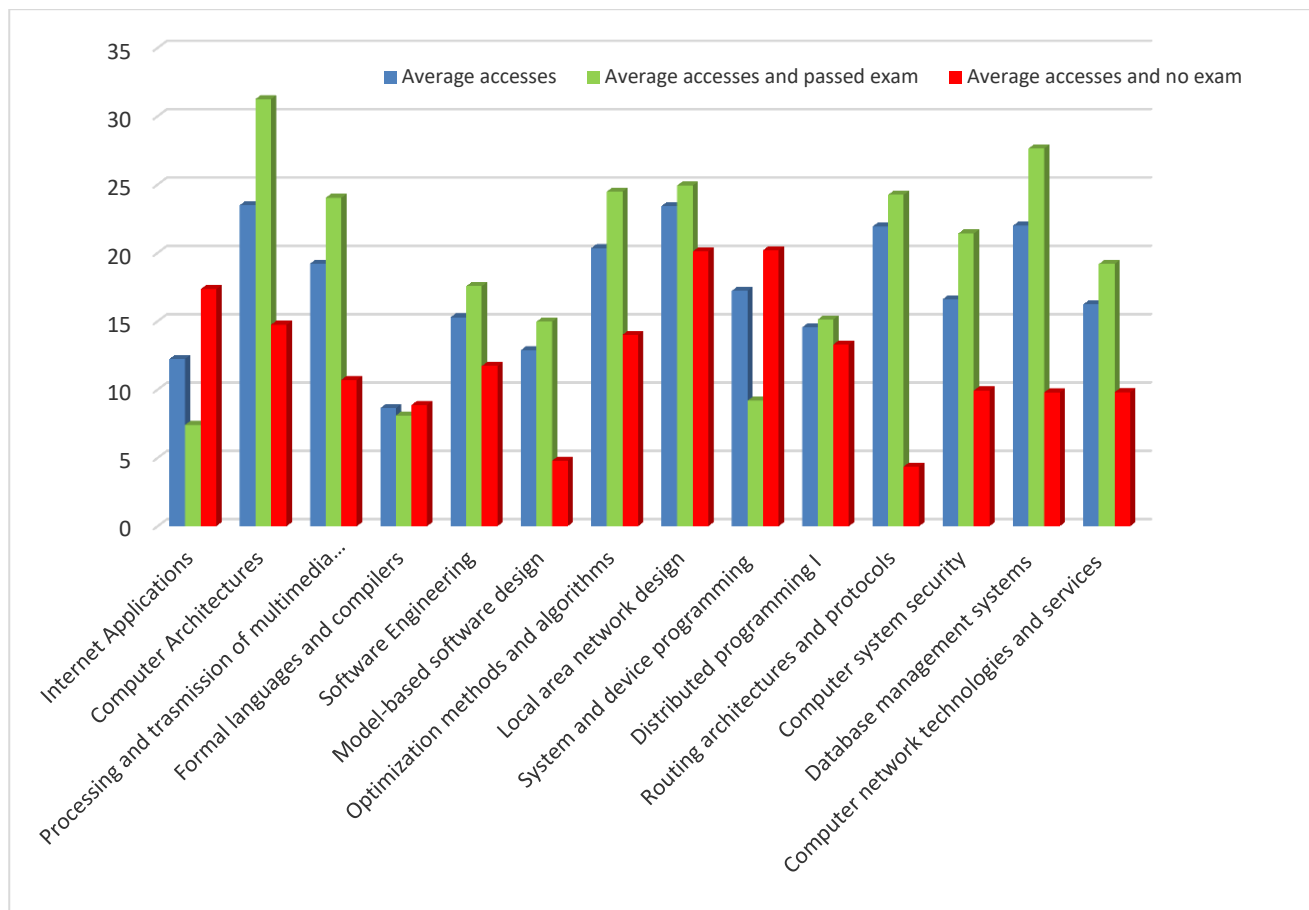


Figure 6: Average accesses per student – Video-lectures Master Degree in Computer Engineering 2013/14

3. From Web@desktop to App@mobile

In order to support the rapid migration of its students to mobile devices in accessing its services, Politecnico di Torino began a path in the direction of the mobile APPs that started with the making of websites and applications based on the “Web Responsive” paradigm: services able to use different styles of visualization depending the device in use [Castaldo et al, 2015].

In the Web Responsive model the content and its presentation on the display could be generated client-side, server-side, or both: content is stored and managed in just one repository, but a lot of different visualizations are possible on different devices, depending on their own dimensions and graphics capabilities.

However, even if the Web Responsive model allows the deploying of web contents on most of the mobile devices, the navigation model, the access to information and the data input are based on the browser and designed for “legacy” devices like desktop or laptop. [Serrano et al, 2013]

The following step in the path to mobile APPs was the adoption of the “Mobile Web” model that overcomes some of the limits of the Web Responsive model: it ensures a user experience for mobile users very similar to the mobile APP’s. Web applications are specifically developed for mobile devices and require the management of another set of web services that complement the “traditional” ones. The usage of web connector (API) to the pre-existent web-sites allow the realization of application servers for Mobile Web services not as “copies” but as “interpreters” of the same contents, usually in JSON format, coming from APIs and as distributor of these contents within a graphic and navigation framework that is specific for the mobiles [Richardson et al, 2013].



Figure 7: Screenshots from the Teaching Portal

This approach builds the basement of API's and JSON web-services that are mandatory for the development of Mobile APPs for accessing University and territorial services [Hussain F., 2013].

Mobile Web model allows for rapid and powerful response to the increase of mobile accesses; faster than APPs and more effective than Web Responsive. The mobile version of the teaching portal of Politecnico di Torino offers only the essential and frequently used services of the portal, but all of them can be used quickly and using only one hand. Figure 7 shows two screenshots from the Teaching Portal of the Politecnico di Torino taken from a laptop and from a mobile device: the design of the portal is Web Responsive.

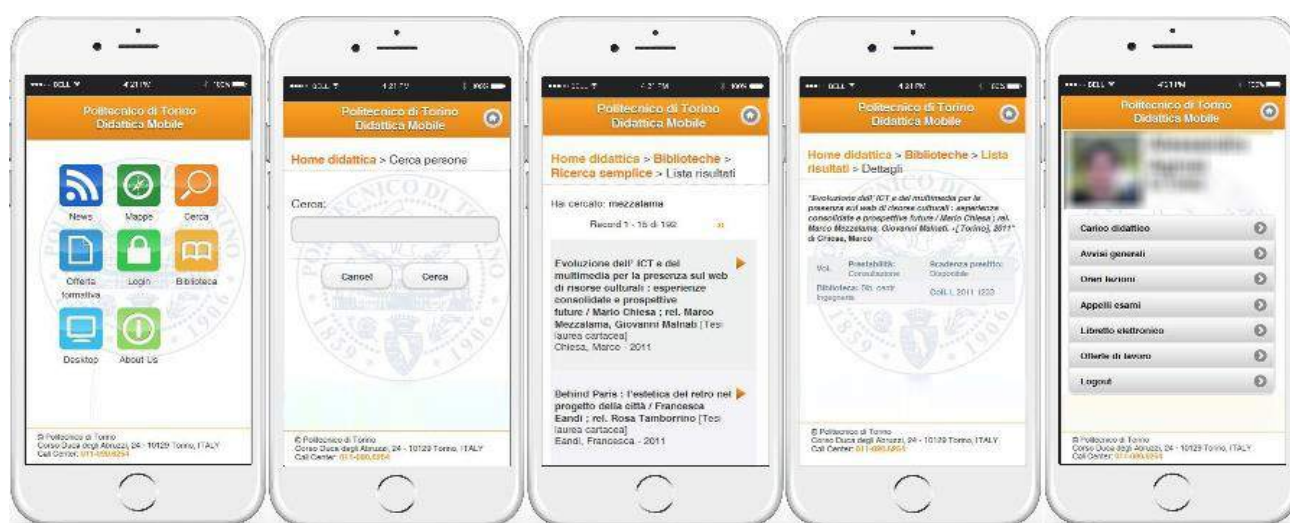


Fig. 8 – Screenshots from the mobile version of the Teaching Portal

Figure 8 shows some screenshots from the mobile version of the same Teaching Portal: the contents are similar, but the approach used in the interface design is very different.

The rapid and massive growth of mobile users connected to the services of the Athenaeum made the limits of the Mobile Web approach emerge [Sin et al, 2013].

The need to redesign the communication paradigm in order to take full advantage of the capabilities, the peripherals, and the sensors of the mobile devices leads to a new model. In fact new generations ask to be able, for example, to search the voice/social contact of a teacher and call/message him with only a few taps.

The Mobile web model is a rapid development model that allows for a rapid transition from traditional web to web for mobile users, however it can't be considered a permanent solution. Figure 9 shows that in the long run the Native/Hybrid APP approach is a winning model against the Mobile Web one.

**Average Time Spent per Day with Mobile Internet
Among US Smartphone and Tablet Users, In-App vs.
Mobile Web, 2011-2017**
hrs:mins

	2011	2012	2013	2014	2015	2016	2017
In-app	1:04	1:40	2:28	2:51	3:05	3:15	3:23
—Smartphone	0:35	0:56	1:24	1:35	1:43	1:49	1:52
—Tablet	0:29	0:44	1:04	1:16	1:22	1:27	1:31
Mobile web	0:29	0:38	0:50	0:51	0:51	0:51	0:52
—Tablet	0:15	0:19	0:24	0:25	0:26	0:27	0:27
—Smartphone	0:14	0:20	0:26	0:25	0:25	0:25	0:24

Note: ages 18+; time spent with each device includes all time spent with that device, regardless of multitasking; for example, 1 hour of multitasking on a smartphone while on a tablet is counted as 1 hour for smartphone and 1 hour for tablet.
Source: eMarketer, Oct 2015

194859 www.eMarketer.com

Fig. 9 – Growth of APP model vs. Mobile Web model

One of the main reasons for developing a mobile APP in a campus with many Web Responsive and Mobile Web services was the requirement to take advantage of the use of mobile features that are not available on other communication channels, first of all the ability to receive notifications: a system that enables the students to receive real-time notifications on general info or security warnings, but also personal messages profiled for individuals or groups of users without the need to access web sites to receive them.

4. Architecture and development of PoliTO App

The PoliTO App was developed, as much as possible, over a stack of open source components and software. The architecture is based on a central node hosting a database and an application server that performs the connections with all the information system of the Campus and the territorial services, but also with all the mobile devices running the APP. It is the unique end point for PoliTO App [Castaldo et al, 2016].

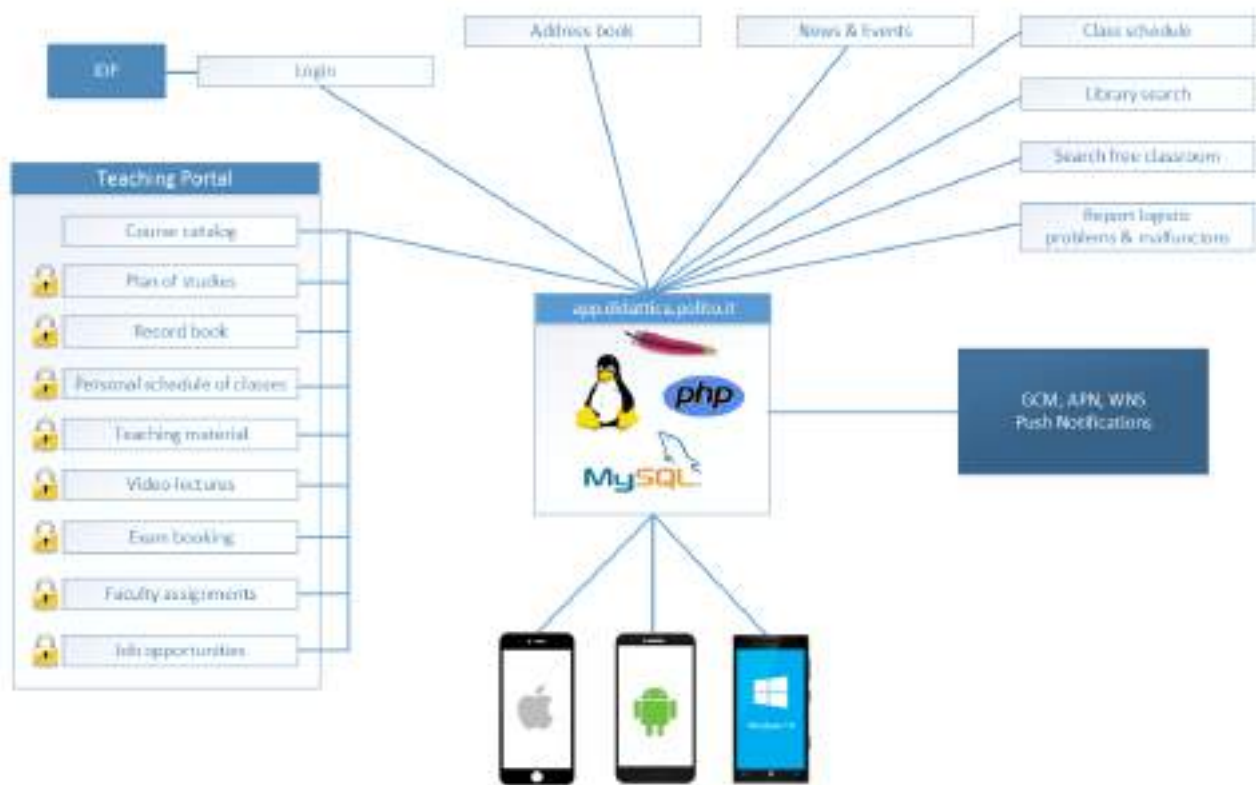


Figure 10: PoliTO App general architecture

4.1 Server-side architecture

The Central node is based on a LAMP architecture (Linux Apache MySQL PHP) and it hosts the application server: it is the heart of the architecture of the APP and it deploys all the information and the services to the mobile devices running the APP. All the API, written in PHP, reside there and are directly called from the APP.

Every API performs a transparent connection to one or more of information system of the university and to the territorial ones, also managing, transforming and aggregating all the data needed by the APP and sending them in a packet [Venturini et al, 2015].

The same node hosts the database that stores all the info on the devices that downloaded the APP and that are required for authentication and for push notifications operations.

4.2 Authentication

The authentication is performed, through the application server, on the Politecnico di Torino IdP (Identity Provider). Each user inputs her credentials - the same used to access the traditional web services and mail account. In case of success, the APP receives a token that will be included in all subsequent data exchange with the application server, so that the PoliTO App is always connected and authenticated up to the closing of the session (logout): the exit from the APP or the reboot of the device do not invalidate the

authenticated state.

Authenticated users have access to profiled and personalized services like lesson scheduling, exam booking, (exam management if teachers), plan of studies, didactic materials and also video-lectures.

4.3 Client-side architecture

The PoliTO App is a hybrid App developed using the Apache Cordova framework that, using its plugins, allows the reuse of the same source code for all the target devices (Android, iOS and Windows based). The client-side part of the APP is developed in HTML5, CSS, and JavaScript, using Onsen and Angular frameworks [Phuc Huy et al, 2012]. To reduce the network bandwidth usage, the APP has been designed to perform a minimum number of requests to the server and to work for some service also in offline mode. Contents to be displayed are searched in the local storage and, only if needed, requested again to the server.

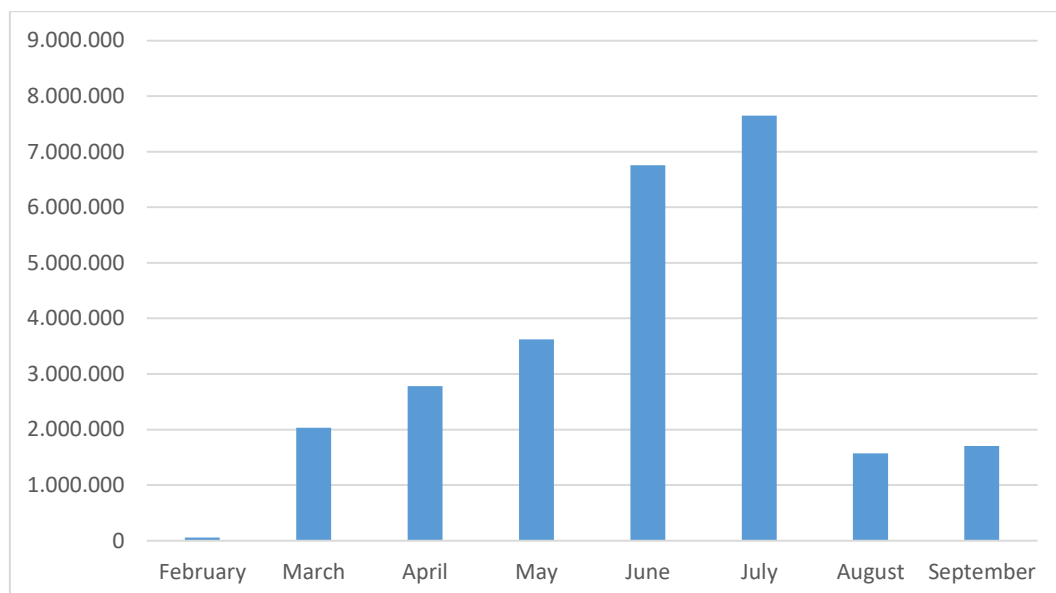


Figure 11: Monthly requests to PoliTO App PHP APIs

When the APP starts for the first time on a new device, all the info about the device and the APP (ex. operating system and version, APP version, unique registration ID), needed for succeeding use are recorded on the central database. Then a public data package with for example course catalog and contacts is sent to the device and stored in the local storage for off-line usage.

When the user logs in, another data set is sent to the device and saved in its internal storage, including that user's information about his career. Every time the APP is started, in presence of network connectivity, a check for update is performed; although many of the services are real-time and are available only in on-line mode (ex. research in the library catalog, search for free classroom, bus-stop timetable)

Finally, PoliTO App is able to accept and manage push notifications.

Figure 11 shows the monthly requests performed by the APP to the APIs: although PoliTO App has been designed to reduce the network requests, the number of requests is very high, up to over a quarter of million per day: students use the APP very much, especially during the most intensive part of the academic year like the July exams session.

4.4 PoliTO App services

The services and functionalities of the APP have been defined through a process that involved also interviewing some students, the evaluations of their works in mobile APP context, and some surveys on universities in collaboration with research groups with specific expertise in mobile phenomena.

PoliTO App provides information and customized services to students, faculty and administrative staff, such as news and events, educational and job opportunities, search class schedules, maps transport information, library search, report logistics problems and malfunctions, view Personal Study Plan, access to teaching material and video-lectures, electronic credits booklet, exam booking, feedback on teaching quality, notifications of key announcements, access to student e-mail account and finally, notifications of the principal events and info. Figure 12 shows some screenshots of some of the services provided by PoliTO App (menu, credit booklet, video-lectures, class schedules, notification settings).

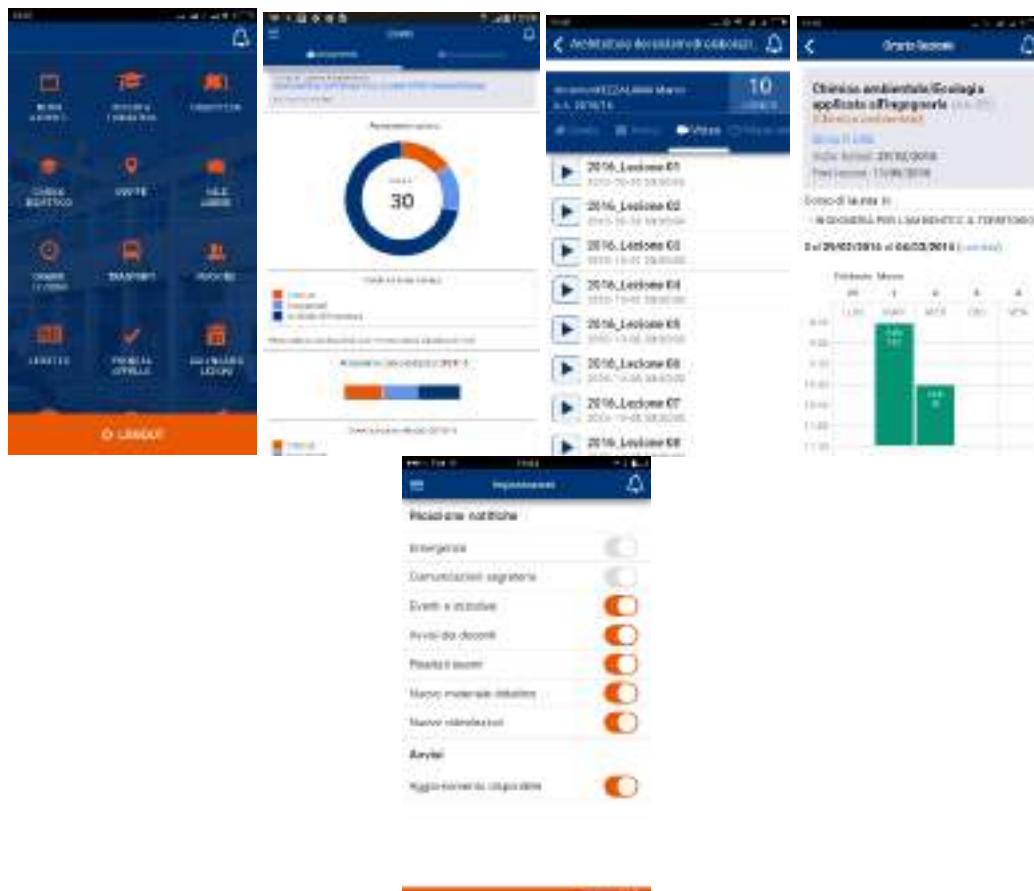


Fig. 12 – PoliTO App Screenshots

4.5 Notifications

The notifications and the persistence of the authentication are the true value added of the APP that other models of mobile communications like web responsiveness or mobile web normally don't offer.

Together they realize the "always logged-on and on-line" paradigm. Notifications overcome the restrictions of the "pull model" in which the user had to go and look for the info he needs, towards the "push model" in which the info, as soon as available, is sent to the students without any user intervention.

APP notifications have been categorized and split up in public and private. Each user can choose what kind of notifications he wants to receive (emergency warnings and secretariat messages can't be refused).

Everyone installing the APP can receive public notifications such as news and events. Authenticated users can receive also personal notifications for example for exam grading, new didactic materials or video-lecture made available.

Emergency warning notifications allow Politecnico di Torino to communicate in real-time with a huge numbers of students: this is an indispensable feature in emergency management and in ensuring security to its own members. Figure 13 show the daily notifications sent to devices based on Android (the grey bullets represent new version publications).



Figure 13: Daily Notifications for Android devices

4.6 PoliTO App in numbers



PoliTO App is the first official APP of Politecnico di Torino. It was released in the evening of February the 26th 2016 on Google Play. One month later the iOS version was released on the AppStore; the Windows 10 version was released at the beginning of September. Today the PoliTO APP is installed on about 15,000 Android devices and on about 9,000 based on iOS. The Windows mobile devices hosting the APP are currently a few hundreds (the Windows10 version runs both on mobiles and

laptop/desktop devices).

The score of the APP is fairly high: 4.3 stars on Google Play (based on more than 400 reviews), 4 stars on App Store and 5 stars on Microsoft Store.

5. Conclusion

The paper depicts the experience made by Politecnico di Torino in the last six years building a collaborative environment for the deploying and the exchange of teaching materials. Particular evidence has been given to the experience of the video-lectures. These initiatives are characterized by a high adoption factor and in general by a large number of users, so they can be considered massive, involving methodologies designed to follow the rapid evolution of teaching paradigms and the transformations of the devices used for the learning processes: increasingly powerful, multimedia enabled, smaller and mobile.

The article also reports the experience in the development of the first official mobile APP of the Politecnico di Torino, a hybrid APP for services mainly in the didactic and teaching contexts. The APP is the last (but not least) step of a path that, starting from traditional web sites and e-learning services, saw them evolve following the Web Responsive paradigm, passing for the Mobile Web and finally approaching the Mobile APP model. The hybrid APP is the right give-and-take between the native APP and the know-how and the competences acquired during the previous phases: the result is a product native for each device developed by the same team developing all the Politecnico web applications.

The success of the initiative is evident: in the first six months 25,000 people are constantly connected out of a base of about 35,000 students.

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Open badges – a new way of recognizing and demonstrating the skills of students and staff online

Jenni Meriläinen

Lahti University of Applied Sciences, Finland
jenni.merilainen@lamk.fi

Abstract

Open badges are online representations of skills and accomplishments. Open Badge is an open standard developed by the Mozilla Foundation to recognise and demonstrate learning. In Lahti University of Applied Sciences (Lahti UAS), open badges have been utilised as a new, more flexible and nuanced way of acknowledging the learning and skills of students and staff members.

Open badges have been utilised as a supplement to the existing credential structure to recognize student achievements in a more nuanced way and to signal finer-grained skills. A set of badges has been used to represent the different skillsets acquired in ICT projects and to motivate students to step outside their comfort zones by taking on different roles in projects. Open badges have also been used to acknowledge job search skills and professional-level communication skills in English as well as the ability to communicate in everyday working-life situations in another foreign language.

Lahti UAS has also utilised open badges as a way of promoting staff competence and professional development. Open badges have been awarded to teachers for publishing open educational resources under a Creative Commons license and acting as pedagogical peer-mentors. We are also planning to use open badges in validating skills acquired in a HR training programme focused on developing the pedagogical and digital expertise of teachers.

Keywords: open badge, digital badges, learning

1. Introduction

In this paper, the use of open badges in Lahti University of Applied Sciences (Lahti UAS) as a new, more flexible way of acknowledging the learning and skills of students and staff members is discussed. Open badges are applied as new online tools to visualise and illustrate learning and skills and to promote staff competence and professional development, especially the pedagogical and digital expertise of teachers. Potential benefits for organisations and learners are discussed.

2. Open badges as online representations of skills and accomplishments

Digital badges, also known as microcredentials, are online representations of skills, abilities or achievements. Open Badge is an open standard developed by the Mozilla Foundation to recognize and demonstrate learning. Open badges give individuals, employers and educators a framework to represent the full range of skills they earn in different areas of life. Open badges are not limited to educational institutions: also other organisations and individuals can issue open badges. Increasingly diverse types of

organizations are issuing open badges, including community organizations, museums and libraries in addition to traditional institutions of higher learning.²¹⁵

While traditional certificates produced by formal education are important, there is a growing need to recognize learning taking place in informal and non-traditional environments. Open badges can be seen as a response to this need as well as a phenomenon related to broader changes that have been made possible by the technical capabilities of digital technologies.²¹⁶

The Mozilla Foundation created the Open Badges Infrastructure (OBI) for issuing and managing digital badges with embedded metadata. Thus open badges have the potential to be evidence-based and verified digital representations of skills and achievements. The Open Badges Infrastructure is an open and free credential-issuing platform that acts as a validator between issuers and earners. Mozilla's Open Badge Infrastructure provides metadata that details the issuer's information, criteria for earning the badge, and if desired, a URL to evidence of the earner's mastery in addition to a digital image. This metadata is sent to the recipient with the digital image as well as stored on the issuer's servers. This way, the Open Badges Infrastructure provides a level of security and reliability that mere digital images do not. Open badges can contain specific claims about learning, detailed evidence supporting those claims, and links to additional claims and evidence.²¹⁷

Open badges have the potential to support learners to take ownership of their learning and support visualising and illustrating learning and skills in an online environment. Earners can decide for themselves whether to accept the open badge and manage the open badges they receive. One of the benefits of open badges is portability, which has the potential to increase the visibility of the earners' skills in an online environment. Open Badges Infrastructure provides a level of security and reliability that mere digital images do not. Open badges can contain specific claims about learning, detailed evidence supporting those claims, and links to additional claims and evidence. A badge recipient can display badges in any online location, such as an e-portfolio, a website or social media.

Open badges offer new ways of motivating learners and scaffolding the learning process, while also promoting values such as openness and learners' agency, participatory learning practices and peer-learning communities. For institutions, increased visibility is one potential benefit.²¹⁸ Open badges can take on a number of meanings depending on their implementation and function. In educational context badges have been discussed as a motivator for behaviour (related to gamification, the use of game design elements in non-game contexts) as a pedagogical tool (promoting particular teaching and learning activities) and as an alternative or supplement to traditional credentials such as diplomas. The open badge concept is complex and the idea of badges as a pedagogical tool and badges as credentials may in fact be specialized instantiations of badges as a motivator of some type of behaviour. Badges can encourage extrinsically or intrinsically motivated behaviours and may be interpreted differently by different learners. The process of

²¹⁵ Devedžić & Jovanović 2015, <https://wiki.mozilla.org/Badges>, <http://openbadges.org/participating-issuers/>

²¹⁶ Ahn et al. 2014.

²¹⁷ Brandon 2013.

²¹⁸ Devedžić & Jovanović 2015.

earning a badge is a form of feedback and well-designed badges can serve as signifiers of what knowledge and skills are valued, guideposts to help learners plan and chart a path, and as status mechanisms in the learning process. Theoretical constructs such as self-regulated learning, student autonomy, and student intrinsic motivation would suggest potential benefits provided by the additional choices and performance feedback offered by a badging system.²¹⁹

Using open badges allows educational institutions to recognize achievements that were previously outside the scope of their formal credentialing schemes. Open badges can complement an existing credential structure by recognizing learning that students develop through connecting experiences in formal courses, internships, projects, work experience, and personal pursuits. Open badges can be used as a tool to help students describe, visualise and illustrate their learning and skills. Open badges can also offer more flexible ways to respond to the needs of a quickly changing working life compared to traditional credentials.

3. Open badges in Lahti University of Applied Sciences

Lahti University of Applied Sciences is an international multidisciplinary higher education institution located in the city of Lahti in Finland. Fields of study include culture, business, social and health care, technology, and tourism. Lahti UAS currently has around 5,000 students studying towards a Bachelor's or a Master's Degree. The number of employees is around 400.²²⁰

The aim of implementing open badges in Lahti UAS was to find more flexible and nuanced ways of acknowledging skills and accomplishments of both students and staff members and to explore new online tools to help visualise and illustrate learning and skills. An open badge strategy was developed to build guiding principles for open badge creation and issuing in order to create a meaningful, consistent and sustainable badge system and to avoid badge inflation.

Students have been actively involved in designing the open badge concept. A graphic design student designed the templates for the digital badge images. A group of IT students made requirement specification for an open badge management system and compared different options for open badge management systems based on Mozilla's Open Badges Infrastructure. Lahti UAS chose to utilise the Open Badge Factory (OBF) developed by Discendum Oy as the platform to create, issue and manage open badges.²²¹

3.1 Open badges for students

For students, open badges have been used mainly as a supplement to the existing credential structure to recognize student achievements in a more nuanced way and to signal finer-grained skills. With open badges, learning is valued in new and diverse ways that move beyond standardized measures that do not capture the full richness of learning activities and achievement.

Get employed! -project aimed at supporting the employability of international degree students studying at Lahti UAS. By participating in the mentoring programme developed in Get employed! -project, the students

²¹⁹ Ahn et al. 2014; Randall et al. 2013; Devedžić & Jovanović 2015.

²²⁰ <http://www.lamk.fi/english/about/organisation/Sivut/default.aspx>

²²¹ <https://openbadgefactory.com>

developed valuable working life competence which otherwise did not fit clearly into existing studies or credentialing schemes. The open badge presented a possibility to recognize and validate this learning.

Professional Communicator and Expert Communicator badges have also been set up to promote professional-level communication skills in English as well as the ability to communicate in everyday working-life situations in another foreign language. Students are encouraged to invest in developing their language skills more than the required minimum that everyone must complete as part of their degree. The Professional Communicator badge can be awarded to students who demonstrate good professional-level communication skills in working-life and in business, and can communicate in most professional settings in English both in writing and orally as well as communicate in another foreign language in everyday working-life situations. In order to earn an Expert Communicator badge, a student has to demonstrate excellent expert-level communication skills in working-life and in business, and can fluently communicate even in the most demanding and varied professional settings in English both in writing and orally as well as communicate in another foreign language in most everyday and generic working-life situations with relative ease.

Business Information Technology programmes have project courses that aim to deepen the knowledge and skills gained on substance courses and develop skills required in ICT professions. To motivate students to try project roles they do not naturally feel comfortable with, an incentive was required. A set of open badges was designed to represent the different skillsets acquired in ICT projects and to motivate students to step outside their comfort zones by taking on different roles in projects. The teachers specified nine different project roles. Role badges with detailed criteria to verify the mastery of each project role were designed. Each student has to participate in at least four different student projects and in at least four different roles (one of which has to be project manager) to be able to apply for the ICT Project Master milestone badge (shown in figure 1).²²²



Figure 1: ICT Project Master badge

If the student has performed in the specified role at an excellent level, the teacher may grant the role badge as an expert level badge. By mutual agreement between the teachers, expert level has been specified to mean that the student's grade must be the highest (5) on the applied grading scale 0 – 5 of Lahti UAS. If the student manages to collect at least two expert level badges from different project roles, also the ICT Project Master milestone badge is awarded as an expert level badge.²²³

²²² Salopuro 2015.

²²³ Salopuro 2015.

Open badges can offer more flexible ways to respond to the needs of a quickly changing working life compared to traditional credentials. The potential advantages of open badges include providing credentialing which might reflect a finer-grained and nuanced reflection of a person's skills or experience. Rather than guessing a person's skills from a single credential, stakeholders can gather a nuanced picture of a person's skills through a collection of smaller credentials.²²⁴

3.2 Open badges for staff members

Lahti UAS is utilising open badges as a way of promoting staff competence and professional development. One of the aims of open badges is to make staff learning visible. So far, open badges have been awarded to teachers in Lahti UAS for publishing open educational resources under a Creative Commons license and acting as pedagogical peer-mentors. Through the use of digital badges, teachers can electronically display, share and revisit activities tied to their professional development.²²⁵

In Lahti UAS, a professional development programme for teachers has been designed. The focus of the programme is developing the pedagogical and digital expertise of teachers and all teachers are required to complete the programme. To provide customized workplace learning opportunities, a digital badge system was designed to recognise and validate the pedagogical and digital skills acquired in the programme. Open badges help making the objectives of the professional development programme tangible. Through rich metadata, digital badges offer transparency and depth into the learning and achievements of the learners which can then be reviewed by others.²²⁶ A new curriculum is being designed in Lahti UAS and the implementation of the professional development programme is closely connected to the implementation of the new curriculum. Teachers are required to demonstrate the acquired skills in their teaching and course implementations in order to be awarded open badges.

A pedagogical development group with representatives from all faculties and the student body has been actively involved in the designing of the professional development programme for teachers. Also a HR specialist and e-learning and educational technology specialists have been involved in the design and implementation of the programme. A workshop with teachers was organised for designing the learning outcomes and criteria of the open badges. By involving teachers in the designing process, we aimed to create ownership of the open badge concept as a way of demonstrating and validating professional development. The aim is to support the teachers to take ownership of their learning in the professional development programme.

The pedagogical and digital competence areas identified to be recognised with open badges are:

- future orientated thinking
- co-teaching
- transformative teaching practices
- assessment and feedback

²²⁴ Ahn et al. 2014.

²²⁵ Gamrat et al. 2014.

²²⁶ Gamrat et al. 2014.

- designing and implementing a learning process online
- utilising digital tools in face-to-face classroom situations
- utilising digital tools in collaborative work
- verifying skills online

Detailed criteria and learning objectives were then specified for each competence area and badge images (example shown in figure 2) were designed. The metadata will be defined both in Finnish and in English to enable the teachers to display the badges in international contexts and also to develop the badges as tailored learning solutions for continuing education in the global market.



Figure 2: Example of an open badge for teachers

We strive to communicate the value of the open badges to the teachers and assess the relevance of the planned learning objectives and criteria. The process of earning a badge is designed to be a form of feedback and the badges are meant to serve as signifiers of what knowledge and skills are valued and guideposts to help the teachers in planning their professional development. To earn a badge, teachers have to apply concepts within the badge to their work. Some teachers already have extensive competence on the specified fields of expertise, so it will be possible for them to demonstrate their skills and earn badges in their own pace. By reflecting on their current skillset with the help of the clearly defined criteria and metadata of the badges, teachers will be able to customise the learning activities to their individual needs in order to achieve the learning objectives of the programme.

The professional development programme is launched during autumn 2016. The teachers will be demonstrating their learning in implementing the new curriculum in 2017. Lahti UAS will provide both collaborative and individual learning opportunities in order to support the teachers' professional development. Seminars and workshops are organised to offer support and resources and materials specified for each open badge are provided in a Moodle platform (screenshot shown in figure 3). These resources are designed to support the teachers' engaging in personalised learning activities integrated in their work. Gamrat et al. (2014) emphasise the importance of affording ease of sharing in professional development programmes.²²⁷ A discussion group in the organisation's Yammer has been set up for teachers to share ideas and resources with colleagues.

²²⁷ Gamrat et al. 2014.

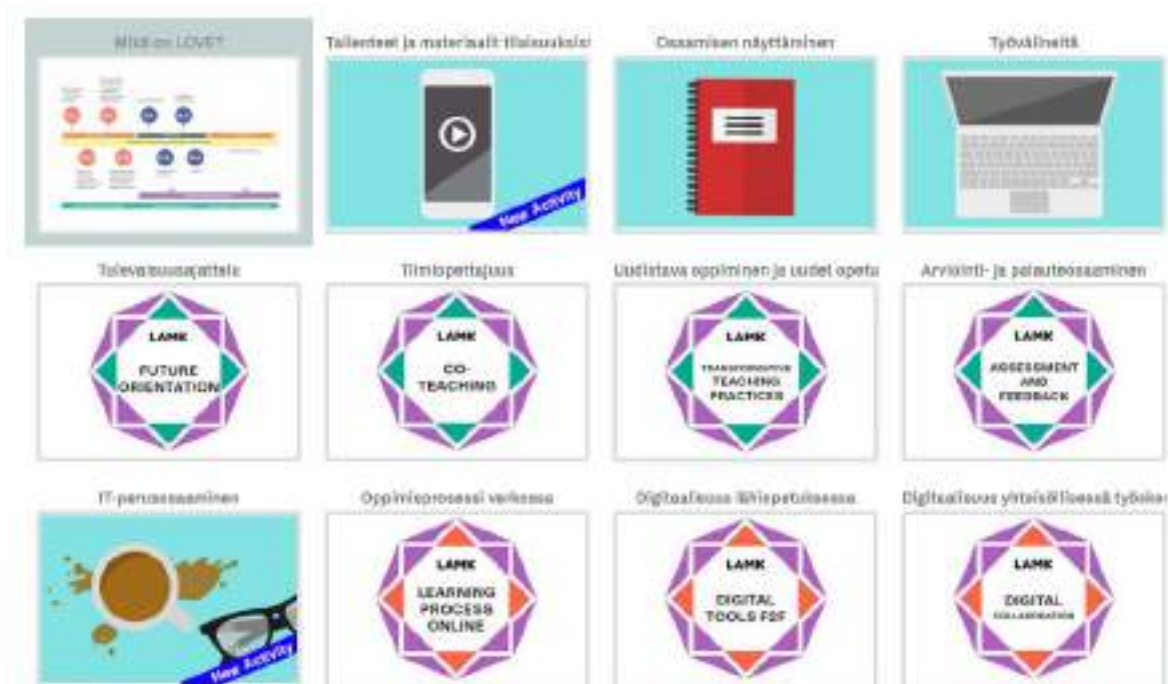


Figure 3: The Moodle platform of the professional development programme

Teachers will be organised into teams in which they demonstrate the required skills in the process of designing and implementing the course implementations of the new curriculum together. A few teachers from all faculties have been selected to act as peer mentors to support their colleagues in planning their professional development according to the learning objectives and criteria detailed in the open badges. Training on peer mentoring will be organised for these mentors and they will be the first teachers to complete the open badges. Gamrat et al. (2014) found that ongoing support as teachers implement new tools and content into their own practice helped teachers make decisions to meet their professional development needs.²²⁸ Each teacher will be able to customise their learning activities depending on the level they are at in relation to the learning objectives and criteria detailed in the badges. All teachers make a plan on how they will attain and demonstrate the competences detailed in the metadata of the open badges. Earners can decide for themselves whether to accept the open badge and manage and display the open badges they receive. The acceptance of the badges can be monitored by the issuing organisation in the open badge management system (OBF).

4. Conclusion

The professional development programme for teachers will be implemented during years 2016-2017. The acceptance of open badges will be monitored and feedback will be collected to re-assess the outcomes of the professional development programme. The aim is to develop the open badges as tailored learning solutions for continuing education in the global market.

²²⁸ Gamrat et al. 2014.

An open badge management system requires the input from staff members who act as creators and issuers of open badges. Costs of implementing a badging system include not only the maintenance and administration of the open badge management system, but also time spent in designing the open badges and evaluating the quality of the learning and work qualifying for a badge. The process of designing open badges can be valuable in making the learning objectives and evaluation criteria tangible and badges can be seen as a concrete way to communicate the desired learning outcomes to the learners. Follow-up is needed to examine how learners and other stakeholders experience badges and how badges influence the learning process.

As badges carry their brand and are potentially publicly visible, these credentials provide an opportunity for branding the organisation. Maintaining the credibility of the brand is an issue that needs to be considered. External stakeholders need to be involved and the value of the open badges needs to be continuously communicated to them.

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Agile practices taught online at a distance

Leonor Barroca

The Open University, UK
leonor.barroca@open.ac.uk

Karen Kear

The Open University, UK
karen.kear@open.ac.uk

Abstract

Agile software development has become, in the last twenty years, a popular approach to software development. It puts people and working software at the forefront of the development process. The emphasis on people stresses development carried out by teams of developers and stakeholders working together for the regular delivery of solutions.

There is long experience of teaching software development at a distance at the Open University, UK; however, teaching agile software development at a distance creates new challenges due to its heavy reliance on face-to-face communication. Developing these skills with students who are at a distance, studying online, and mostly part-time adds significant difficulties.

This paper reports a case study of the use of an online communication tool to help students develop agile communication practices, and to help tutors assess these skills. The tool is based on a studio-based approach to learning, where students work independently and in groups, learning from each other in an apprenticeship model. Using this tool, students share their mental models of problems and solutions, as they would in an agile development team.

A survey was carried out with students and tutors on the perceived impact of the use of this tool in learning; the results are discussed, in particular the importance of supporting students in using the peer feedback they receive in a reflective way in order to improve their work. The lessons learned for improving the quality of the collaboration and the richness of the learning experience are discussed.

Keywords: agile development, online distance education, studio-based learning

1. Introduction

Agile software development is an umbrella term used to describe a variety of methods and practices that encourage simpler, more lightweight, faster and nimbler software development. These practices enable software developers to adapt to the inevitable changes in customer requirements. This continual realignment of software development goals to the needs and expectations of the customer should result in software that better serves its purpose.

As seen in the agile manifesto²²⁹, agile development is an approach to software development that puts people and working software at the forefront of the development process. The emphasis on people translates, in agile, to development carried out by (usually) small teams of developers and stakeholders working together for the regular delivery of solutions.

Teaching agile software development is now common in the software engineering curriculum; research has identified some of the problems, and made suggestions for how to address them (Devedžić et al., 2011; Maher, 2009). However, research on how to teach agile development and related skills at a distance is still scarce.

In this paper, we present a case study of the use of a studio-based approach to distance teaching of some of the skills required for agile software development. Studio-based approaches to learning can be used to develop and promote the skills that are in demand for agile development: collaborative working, quick feedback, learning with and from peers, and problem solving.

The case study is in the context of a software engineering undergraduate module at the Open University, UK. An online collaboration tool was used to enable students to share visual models that they had created, and to give feedback on these models. In an evaluation of the approach, students and tutors completed surveys which explored the impact of this tool on their learning and teaching; we discuss the findings of the two surveys.

Section 2 discusses research on teaching agile software development, particularly in a non-colocated context; section 3 introduces the studio approach to learning; section 4 presents the case study; the findings are discussed in section 5; section 6 concludes the paper.

2. Teaching agile software engineering at a distance

The research on the teaching of agile skills in a distance learning context is sparse. Rodriguez et al. (2015) propose a virtual world environment that simulates the context of an agile team, but they only use it in face-to-face teaching. Brocke (2011) appropriates the term ‘agile’ from the software engineering domain to talk about ‘agile communication skills’. She discusses an eLearning environment to support the development of these skills in a university setting. Although she applies this environment in a context where students need to communicate with other non-colocated students, her context is not that of software engineering education, but rather of cultural studies, languages and social sciences.

At the Open University, UK, there is experience of around 30 years of teaching software engineering at a distance, both at undergraduate and postgraduate level (Quinn et al., 2006; Wermelinger et al., 2015). Technology has been used to support the teaching, and also the development of skills associated with the subject. At undergraduate level, for example, students experience teamwork mediated by technology within a module which teaches project and service management (Oldfield & Morse, 2007). The diversity of tools to support student collaboration and communication allows for the development, at a distance, of skills that are typically taught only in a face-to-face context (Kear et al., 2014).

²²⁹ <http://www.agilemanifesto.org/>

There is extensive literature on how agile teams that are not colocated work (Holmstrom et al., 2006; Hummel et al., 2012; Jalali & Wohlin, 2010; Paasivaara et al., 2008); this suggests that it should be possible also to teach agile development at a distance, and that the distance or online context should not therefore be a barrier. However, many issues need to be taken into account, mainly in the way technology is used and the constraints experienced by students.

3. The studio approach to learning

The studio approach to learning has its origins in the teaching of architecture, but has also been applied in computing education. It views learning as happening in a collaborative manner through the design and development of artefacts that are constructed iteratively, reviewed and refined by learners (Hundhausen et al., 2008).

The two main activities of this approach are the construction of visual artefacts and the sharing of feedback on these artefacts by peers and educators. Studio-based learning is an apprenticeship model that moves the learning from a focus on knowledge of concepts and techniques to an appreciation that communication, design and problem-solving are of key importance. These are especially relevant skills in the teaching and learning of software engineering, and agile development in particular; they are also skills that are increasingly in demand by employers (Shadbolt 2016).

In distance education, online tools can support the creation and presentation of artefacts by learners, and their active engagement in collaborative tasks involving feedback and problem-solving. Literature discussing studio-based learning in online environments is limited, although it has started being addressed in the generic area of STEM²³⁰ subjects (Cennamo et al., 2011; Thomas et al., 2016).

The Open University, UK, has developed an online studio environment called OpenStudio. It was initially developed for a photography module in 2007, for students to upload their photographs and get feedback on them from peers; it soon became very popular and started being adopted by other modules for different purposes (Jones & Lloyd, 2013). In OpenStudio students can upload artefacts, view the artefacts uploaded by other students, and comment on them. Tutors also have access to their students' artefacts and comments.

4. Case study: developing agile skills at a distance

The Open University (OU) is the UK's largest university, with more than 260,000 students, most of whom are enrolled part-time in undergraduate degrees. All our undergraduate students are at a distance, and they fit their studies around their professional and family commitments. They study printed or online learning materials provided by the OU, and they work towards fixed-date assessment points, both during a module (which typically lasts about eight months) and at the end.

²³⁰ STEM stands for Science, Technology, Engineering and Maths

Since 2011 we have been revising our curriculum for level 3 in Computing and Communications to take into account a major UK government review (Browne 2010) and to ensure that our qualifications are engaging, relevant, and will equip students for their current job roles and future careers. This work took place against a background of a changing landscape in computing: where desk top computing has been overtaken by ubiquitous computing, where web is the norm, and where outsourcing and globalization mean that technical skills need to be at a high level.

The case study discussed here is of *TM354 Software Engineering*, a module which is part of a theme relating to the way large technological systems are designed, built, used and maintained within organisations. TM354 teaches the principles, patterns, techniques and practices associated with requirements engineering, analysis, software architecture and design, as well as the principles and techniques of implementing and testing a software system. Students get a sound understanding of the quality issues involved in software products and processes. Many of these concepts are reasonably stable and have been taught at a distance for many years. The practices of software engineering have, however, been evolving, in particular with the surge of developers adopting agile.

4.1 The design

TM354 was designed with the intention of developing skills of abstraction, and promoting critical reflection. As a level 3 module, it also prepares students for a final year project in software engineering, developing skills such as conducting searches and reviewing found material. To promote an understanding of the professional context, the module includes (regularly updated) current topics on software engineering practice. This challenges students to consider what they are learning in the context of what practitioners do.

As part of the review of curriculum for TM354 the following elements were considered in its design:

- teaching agile approaches to software development;
- simulating some agile practices, such as the daily stand-up meeting;
- strengthening skills in sharing, discussing, giving feedback and reflecting on feedback received.

The last two elements are discussed here, as they were achieved with the support of OpenStudio.

Many agile teams use a whiteboard where sketches are kept, progress is shown, and collaborative modelling is displayed. Yu and Petter (2014) carried out a study of agile practice using shared mental models theory. This theory explains how teams develop a knowledge base that allows them to take decisions. In agile development, evolving a shared understanding among members of a team is a common activity.

The daily stand-up meeting is an integral part of agile practice. Practitioners spend no more than 15 minutes reviewing what has been achieved and what needs to be done; the meetings also promote conversations in order to reach shared understandings of problems and solutions. Yu and Petter talk about two types of mental models: taskwork and teamwork; the former is related to what is to be achieved and the latter related to the team interactions, communication and roles. The assessment developed for TM354 covers both these aspects: the task and the team.

TM354 has three assessments which are marked by tutors. The OpenStudio activities account for between 15% and 20% of each tutor-marked assessment (TMA). Students are asked to develop their own artefact, which is either a model to understand a domain problem, or a model to work towards a software solution to a domain problem. They upload their model to OpenStudio for other students to see. Students are also required to comment on other students' models, reflect on the peer feedback received on their own models, and improve their models accordingly. With the support of OpenStudio, students are encouraged to be creative and to work with others, sharing their artefacts and reflecting on feedback from colleagues. We decided against requiring any kind of synchronous (real-time) activity, as our students are mostly in full time employment, and find it very difficult to depend on others and align their disparate timetables. However, the way the activities were designed promoted the continuation of conversations and the reaching and sharing of an understanding.

In an agile approach, modelling should only be carried out as long as it is useful. Modelling can be used as part of a documentation of the process followed, but in agile development, models are not perfect artefacts. This is sometimes a difficult concept for students to accept, as they tend to focus on the correctness of details of the models rather than on the understanding that the model conveys. Students often apply modelling techniques mechanically, and find it difficult to stop until the model is 'perfect'. The assessment activities were intended to convey the message that conversation around the artefact, and reflecting on the shared meaning, is more important than the perfect drawing of the model. OpenStudio was used to promote these conversations and to strengthen the giving and receiving of feedback.

Figure 1 is a snapshot of the work uploaded by students for the first of their assessment (TMA01).

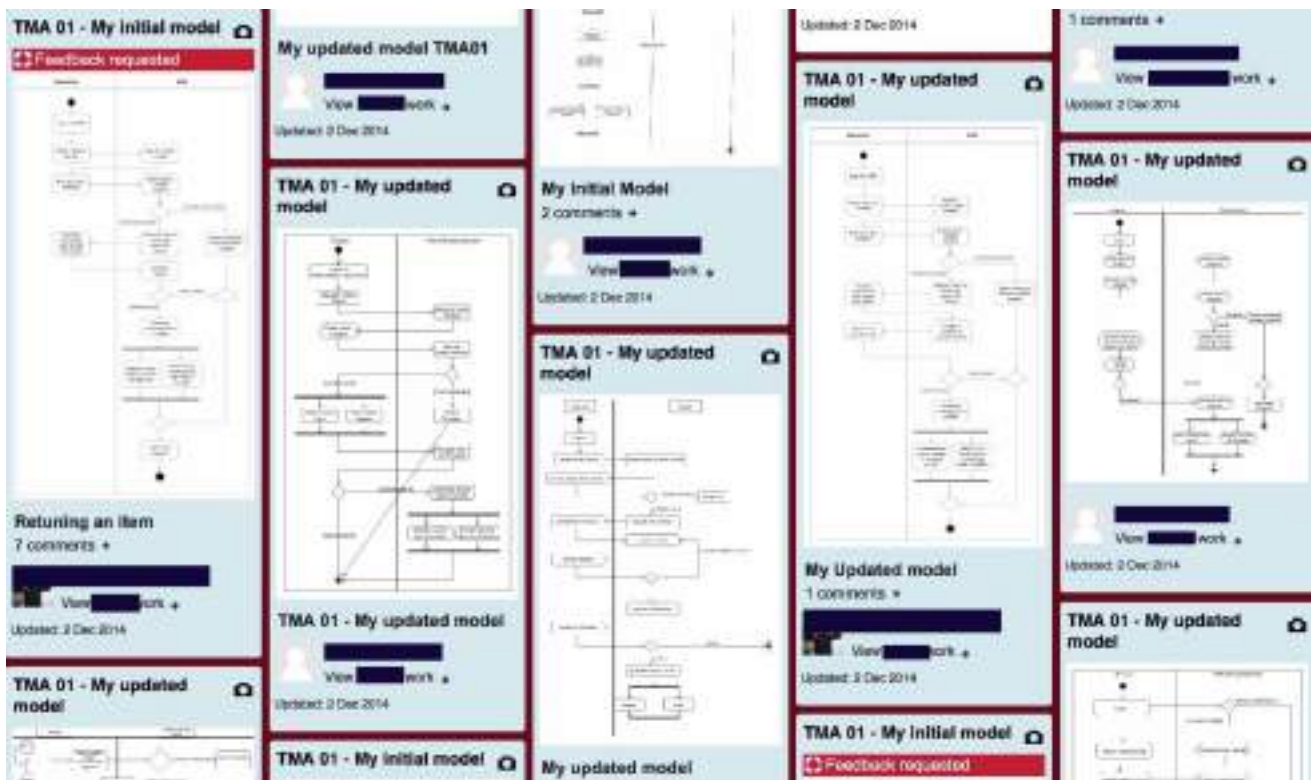


Figure 1: OpenStudio as used in TM354

Students were offered the opportunity of an icebreaker activity to familiarise themselves with the OpenStudio environment before they started work on their first assessment. They also performed a preparatory activity to help them with giving feedback.

4.2 The student survey

A survey was sent to 300 students and had a response rate of 13.6% ($n = 42$); this response rate is not untypical in the OU's distance learning context. The survey consisted of 11 questions to find out:

- whether students had uploaded their work; the clarity of instructions given; how well prepared they felt for giving feedback to their peers;
- whether they had viewed the work of other students; whether they had commented on other students' work; whether they had received comments from fellow students;
- whether their work had improved as a result of looking at other students' models; whether they became aware of the range of possible solutions; whether their work improved as a result of receiving comments from peers;
- whether they gained a sense of what it means to share an understanding of a model with peers; and whether they enjoyed carrying out the activities.

Students were also asked to add any further comments.

The results of the survey revealed that:

- 98% of the students had uploaded their work; 93% agreed that the instructions were clear; 85% felt adequately prepared to give feedback.
- 93% viewed the work of other students; 98% commented on the work of other students; 92% received comments from other students. (The high percentages of participation are not surprising, as the OpenStudio activities were a compulsory part of the assessment, although only 15 to 20% of the total marks.)
- 63% felt their work improved with the feedback; 67% agreed they had learned from feedback.
- 85% agreed they saw a range of possible solutions; 77% agreed they had shared an understanding.

A qualitative analysis was also carried out on the comments made by respondents, which helped to illuminate the findings from the quantitative data.

Students agreed that viewing others' work helped them realize that there are *'multiple possible solutions for the same problem, helping me to improve my work'*, and that *'It was interesting to see the variety of approaches to the problem'*.

Some students felt insecure about reviewing others' work: *"I did look but I wasn't sure if their work was up to standard and I had my own opinion so only by looking at other peoples work didn't learn anything new"*

Commenting was seen as a positive activity: *"[I] guess my comments help other students. My comments are based in my experience and knowledge trying to be constructive"*.

However, some students thought that it would be better if comments came from a tutor: *"As someone who was still studying the material myself, I was not fully convinced as to whether all my comments were accurate and I'm sure a qualified lecturer could have given a much more useful response"*.

The final step of the OpenStudio activity required reflection by each individual student upon the comments received, and action to make changes to their model, if appropriate and justified: *"It was good see other people arriving at a similar solution to me and I could take on board ideas for improvement by comparing my work to theirs; I found the comments very useful and was able to make changes accordingly"*.

However, some students resisted the idea of collaboration, as it imposes unwanted dependencies on others: *"Was done because it had to be done, not valued or taken on board. I didn't study through the OU to be working with others, I have enough work colleagues and work in the SDLC [software development life cycle] so teams are big with good communication"*. Figure 2 illustrates the richness of feedback comments that some students made to peers within OpenStudio.



Figure 2: Some TM354 students' comments²³¹ in OpenStudio

²³¹ Sharespace is the name given to OpenStudio in TM354

4.3 The tutor survey

The tutor questions were posted as threads in a tutor forum, and the discussion was kept open for a couple of weeks. There was an average of 9 replies per question from a total of 17 tutors. Tutors were asked:

- whether their students needed help uploading their work; what kind of support students needed; whether they felt their students were adequately prepared for giving peer feedback;
- the level of engagement of their students with the OpenStudio activities; whether tutors needed to contact students to encourage engagement;
- whether the activities provided a richer learning experience; and whether richness and variety of learning was reflected in students' answers to the assessments.

All but one of the tutors said that their students needed no help in uploading their work, but some reported some queries from students about why they could not initially see others' work. This was done intentionally; students' work was only visible to other students once they had uploaded their own. All tutors thought that students were adequately prepared to give feedback although the quality of feedback varied.

The engagement of students was very high, as mentioned above, partly because the activities were compulsory. However, timing was an issue: if students' work was not uploaded in time, and comments were not given in time, this would affect follow-up discussions. Most tutors had to send out reminders to some students.

All but one of the tutors agreed that the learning experience had become richer because of the OpenStudio activities, as students were able to *'learn from each other and to appreciate that there may be several valid solutions to a particular problem'*. Several tutors commented that the activities helped students to interact, see other solutions and reflect on differences.

Tutors also felt that the richness and variety of students' learning was reflected in their assessment answers, although some tutors were disappointed with some of their students' reflection on the process: *'had hoped they would have been able to say what they thought of the feedback they were given, and why they accepted/rejected it ... all too often they just enumerated the changes they'd made to their work.'*

5. Discussion of results

The use of OpenStudio in TM354 was intended to both simulate agile practices, such as the daily stand-up meeting, and to support the development of a set of skills, in the context of teaching agile software development. The overwhelming feedback from students and tutors was positive and this tool will continue as an integral part of the learning and assessment in TM354.

The emphasis in the design of the activities was on the development of skills rather than on the execution of the practices. This is justified as without the skills the practices cannot be easily adopted; also the teaching of agile practices fits better in a project module (which TM354 is not). However, the engagement of students with an iterative process of presentation, feedback and reflection can be considered as giving them the flavour of an agile practitioner context.

Using OpenStudio has helped students to gain a more realistic perspective of how modelling should be carried out in agile software development, and it has promoted rich interaction among students. Many students gave valuable feedback, and tried to reach a shared understanding of what the models represented. There were a considerable number of high quality comments, as shown in Figure 2.

There are, however, aspects that need to be improved: in particular, the quality of the reflection upon feedback (Kear et al., 2016; Walker, 2015). Students' reporting of how feedback had contributed to the improvement of their models was at times shallow and lacked a good critical discussion. One tutor commented: *'[students] were happy to say where the model they were commenting on could be improved, but did not always relate differences between the model and their own'*. Also the quality of feedback across the student cohort was variable, with some tutors mentioning that they had to provide extra support, as not many students *'were familiar with critically evaluating other people's work in an academic environment such as this.'*

We prepared students for giving feedback by running a preparatory activity; this was however, a fairly generic activity prepared by the University Library. We could customise this activity to more specific feedback on models and their understanding. A similar preparatory activity could be tried for engaging students in a critical discussion of options and rationale for decisions they take while modelling.

6. Conclusion

This paper presented a case study of a studio-based approach to support the teaching of agile software development at a distance. The case study and its evaluation demonstrate that the approach supports the development of a set of key transferable skills: sharing, discussing, giving feedback and reflecting on feedback received. These skills are all important for agile software development. The approach also gave students a flavour of some activities undertaken in an agile practice context. The feedback collected from tutors and students was very positive, so we will continue to use this approach in the module.

The evaluation suggested ways in which the approach can be improved. Students can be given more specific support and preparation, in particular for the development of deeper critical reflection and academic evaluation. Improvements are needed to the stage of the approach where students reflect on the feedback they have received, and decide whether and how to use it. We will be focusing on this aspect in future, and will provide preparatory activities to support students in reflecting on, and using, feedback.

The success of the studio-based approach in TM354 suggests that the approach can be extended to other activities and modules. Other OU modules that have used OpenStudio have experienced similar positive outcomes. In particular, the studio learning approach supports the development of core skills in demand by employers, such as: negotiation; receiving feedback constructively and incorporating it into one's own development; and application of analytical and critical thinking skills.

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Mobile learning: A one-year-old Italo-Japanese collaboration

Satoshi Yamawaki

Castalia Co. Ltd., Japan

Nicola Paravati

Università Telematica Interazionale UNINETTUNO

Atsushi Inutsuka

Castalia Co. Ltd., Japan

Yann Auffray

Castalia Co. Ltd., Japan

Abstract

In the next years, social learning is going to be a main tool to adjust our educational and business culture from a traditional mindset to a modern one, more adapted to our globalized societies. We will care about the results of this paper to see how relevant the shift toward social learning will be for the ongoing digital revolution in terms of scale and time in Arabic countries. To make such a statement, we will present how we, the International Telematic University UNINETTUNO the first Italian online University based in Rome and the Japanese IT company named Castalia based in Tokyo, collaborate since the Innovation Arabia 8 Congress where we first met.

Our paper will start by dealing with social learning from a generalized vision since we will first try to define the concepts and set the main challenges of social learning worldwide as an improvement of Open Educational Resources. Then, we will report all the benefits that social learning can bring to a society with opinions, facts and our assumptions about the subject. Subsequently our paper will aim at identifying the most appropriate innovative learning tool for all stakeholders. We will add to the knowledge we already have about mobile learning and distance learning practices in the Arabic market, thanks to our past researches, an analysis of how relevant is the dissemination of e-learning content in a mobile learning platform. We believe that such innovation of the learning process is the best option for Arabic countries to prepare the best way their employees, future executives and the educational institutes of the higher education with a life-long, and scalable learning. Finally, we will feature the projects between the International Telematic University UNINETTUNO, as a grantor of academic courses online based on a specific didactic model, and Castalia, provider of an educational platform called Goocus, to present practical application as recommended.

We used existing key researches of social learning, completed with updates of data and complement indicators more specific to the Arabic region and the local demands of education and vocational training. Then, we presented all the available options, with their advantages and drawbacks, for the Arabic market based on our knowledge, our previous projects and specific researches for each domain of expertise. Finally, after deducing the best solution, we introduced the thrilling collaboration between UNINETTUNO and Castalia as actors able to monitor the implementation of the best recommendation.

Keywords: Open Educational Resources, Mobile Learning, Social Learning.

1. Introduction

The quick rise of social media use in our societies made social learning a more and more viable option for education. This digital innovation will surely change teaching and learning practices in higher education as we already see the emergence of online universities around the world. This shift to an increasing mobile and ubiquitous social networks may rise some issues because of algorithms and coding accuracy. Nonetheless, this evolution seems inevitable for the societies willing to adapt to a new paradigm.

There would be a shifting from scalable efficiency to scalable learning. (Brown, 2012)

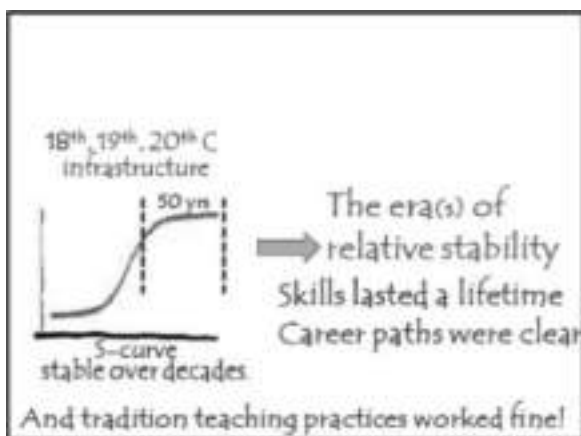
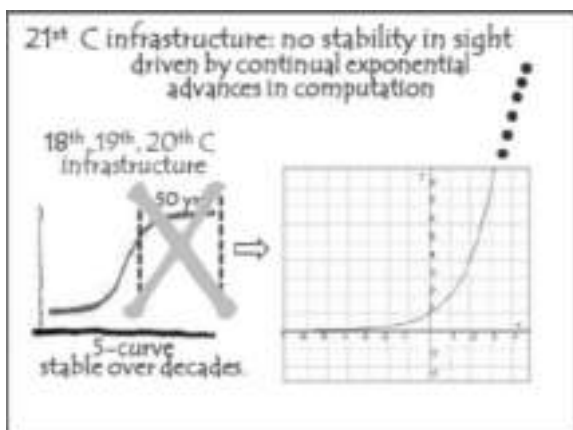


Figure 39 : The era of the S-curve (Brown 2012)

The last 3 centuries were known to be quite stable concerning the social and cultural development as the institutions had a clear purpose to train workers for a clear career paths with skills which lasted a lifetime. “The 21st century marks the beginning of the Big Shift” (Brown, 2012) because of digital innovations which leads to exponential advances in innovation.

Figure 40: The Big Shift? (Brown 2012)



The mainstream education system, which was based on efficiency, is not adapted to this constant flow anymore. (Brown, 2012) The research listed 5 points to change:

- From a Cartesian view to a social view: “I think, therefore I am” to “we participate, therefore we are” : “one of the strongest determinants of students’ success in higher education— more important than the details of their instructors’ teaching styles—was their ability to form or participate in small study groups.” study by Richard J. Light, of the Harvard Graduate School of Education;
- From explicit knowledge to tacit knowledge;
- From individual learning to social participation;
- Learning through online participation;
- Learning with network technologies.

Our paper will explore this challenge to implement social learning enhancement in the most appropriate way for the next years considering Arabic countries uniqueness, a region keen to adopt mobile learning according to financial data. Uninettuno and Goocus already have an experience of e-learning and m-learning issues in different countries, especially for higher education. We worked together to propose a product which would be a combination of e-learning knowledge and m-learning practice for the interest of Middle-East economies. The paper will focus on the knowledge required to implement successfully these new learning practices with clear definitions of terms and lessons taken of past experiences or insights for the next innovation with research papers.

Opportunity

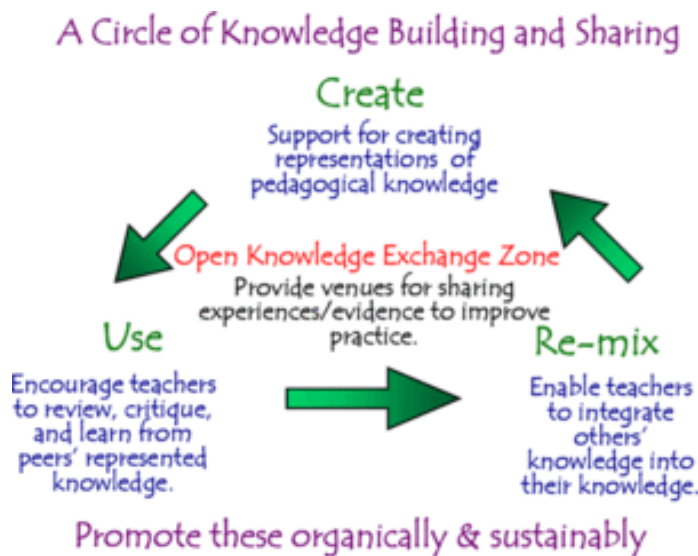
Future economy will require companies to have adaptable employees who learn continuously. Social learning is an ideal tool to respond to this expectation. However, it is a multiphase process, from e-learning, which has been largely democratized these last years, to mobile learning which is only at its early stage as a subset, to finally social learning. What would be the best option to take for Arabic countries to take advantage of this new learning paradigm?

Information summary

Opinions

The new approach needed is characterized by a demand-pull rather than a supply-push mode of bringing knowledge to students. The Cartesian educational system is now reversed as the students are “learning to be” by joining a community and developing the practice of “productive inquiry”- that is saying the process which aims at seeking the information needed: to carry out a designated task. Students will be able to participate in flows of action, by anticipation of upcoming innovation which requires new skills. Open Educational Resources enable the access to new kinds of open participatory learning ecosystem. They help students get a continuous, lifelong learning beyond formal learning at school. It might help students shift from traditional way of learning to acquire new knowledge and skills. We will achieve a circle of knowledge building and sharing which is based on the foundation of Open Educational Resources to create, use and re-mix skills for a sustainable knowledge management. (Brown & Adler, 2008)

Figure 41 How to build a sustainable knowledge management (Brown & Adler 2008)



“Training becomes obsolete because it deals with a past that won't be repeated. Learning will be re-defined as problem solving, achieving fit with one's environment and having the connections to deal with novel situations.” (Cross et al., 2010)

The key competencies will be based more on dialogue and guidance, as we are moving to the world of the sons of Socrates. The constant change of the modern organization is not adapted to the Taylorist perspective where individual training aims at preparing to jobs which are constant. Human Resources Department must find a way to prepare employees to job which doesn't exist yet. (Jarche 2010)

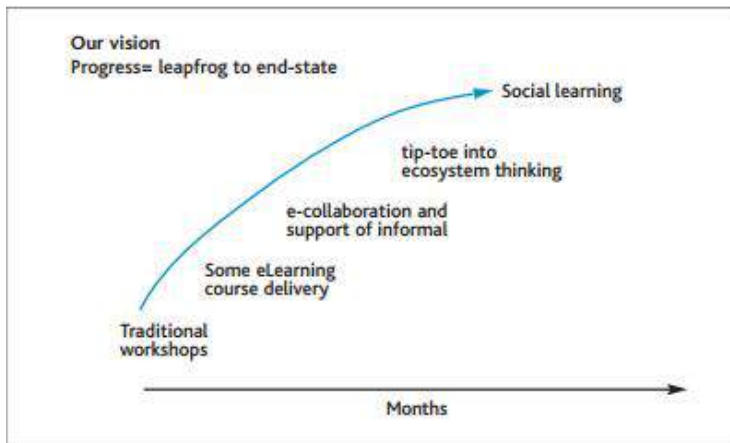
“A collective, social learning approach, on the other hand, takes the perspective that learning and work happen as groups and how the group is connected (the network) is more important than any individual node within it.” (Cross et al., 2010)

Learning really spreads through social networks, and preventing this access to social networks may be a huge mistake for a company as it may significantly slows the learning which is the main tool for effective work, so it might result in killing the entire organization. (Jarche, 2010)

For companies, adaptation is key and that's how we have seen “Wirearchy” defined as ‘a dynamic two-way flow of power and authority, based on knowledge, trust, credibility and a focus on results, enabled by interconnected people and technology’ by Jon Husband. That is one of the reasons firms such as Google and Twitter have been successful. Business hasn't been more social than nowadays, especially at higher levels of management with the ubiquitous access to networks. (Jarche, 2010)

Social learning will be a multiphase process from traditional workshops to social learning via e-learning course delivery, e-collaboration and support of informal which can be described as mobile learning, and tip-toe into ecosystem thinking. There isn't really a way to skip these steps as they are complementariness but it can be implemented in months depending on the motivation of the organizations.

Figure 42 : The steps toward social learning (Cross et al., 2010)



Social learning will surely change practice with more networks, a need to share, competency instead of curriculum, more complexity and less predictability, flow instead of stocks, and more team-centric than work-centric.

Figure 43 : What will bring social learning? (Cross et al., 2010)

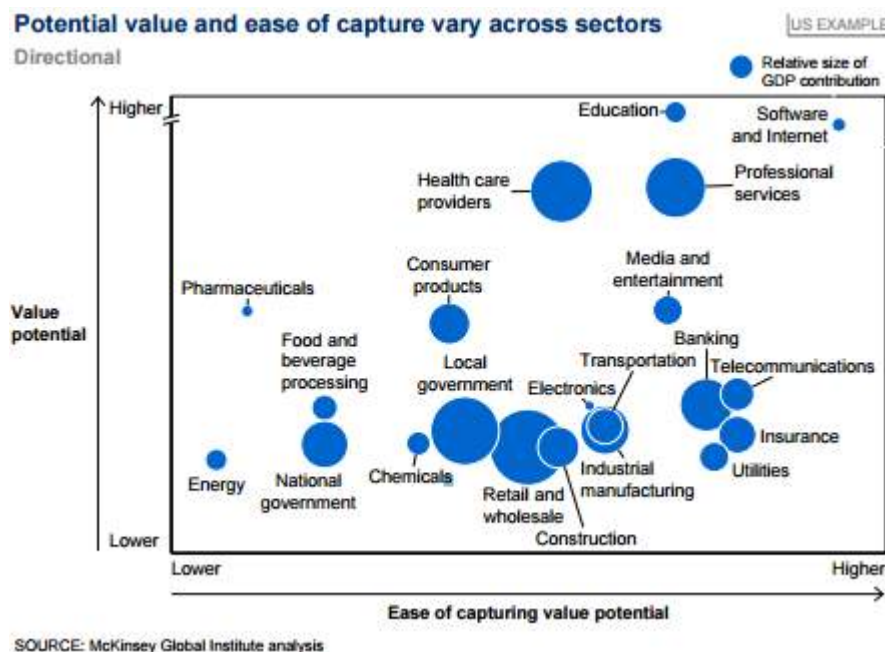
SOCIAL LEARNING GETS REAL	
Past	Future
Subject matter experts	Subject matter networks
Need to know	Need to share
Curriculum	Competency
Clockwork, predictable	Complexity, surprising
Stocks	Flow
Clock time	Time-to-accomplishment
Worker-centric	Team-centric

Jay Cross November 2009

Facts

This challenge might seem too engaging for companies but the efforts are worth it. Social technologies has the highest value potential, a great ease of capturing value potential but relatively low GDP contribution whereas Professional services combined the three criteria. (McKinsey Global Institute, 2012)

Figure 44: Education is promising (McKinsey Global Institute, 2012)



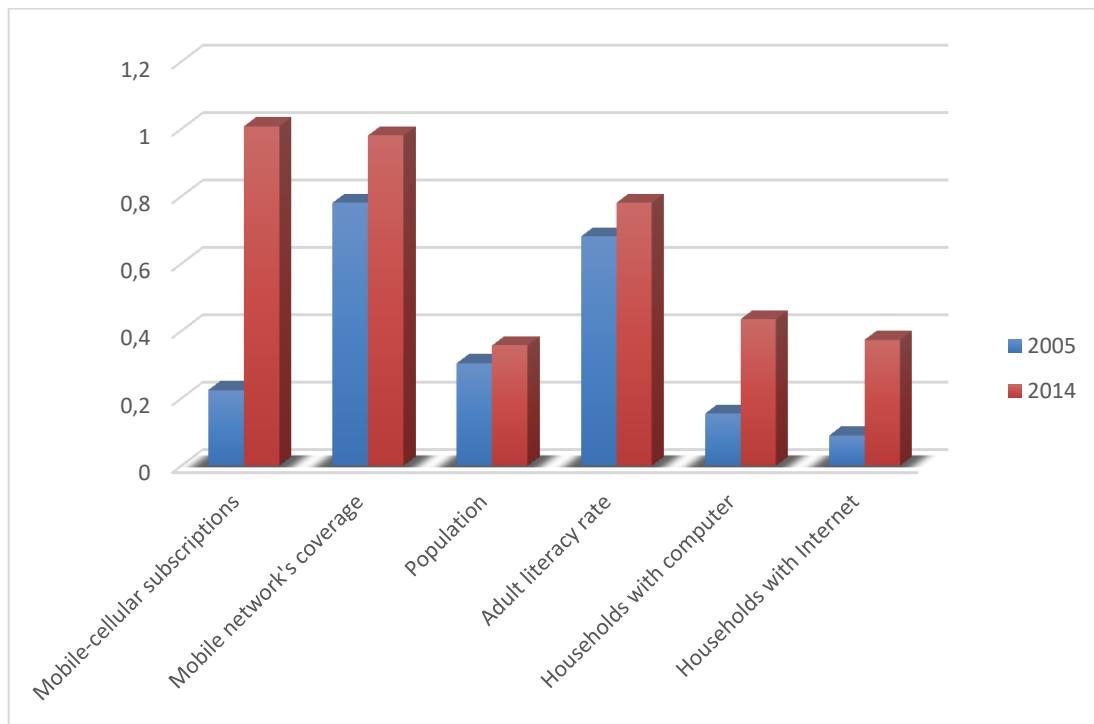
Higher education and professional places are markets largely untapped as the potential of social technologies got a great potential but still on its early stage. There are empirical studies which observes an improvement of academic performance of students and researches in Malaysian Higher Education thanks to social media. The best correlation found were satisfaction of students and researches with their academic performance, and the relationship between engagement and collaborative learning.

Of course, these new practices may lead to some issues, such as abuses to use these new tools as means to chat during class or at work. There are also issues raised about privacy of information and safety of networks. But the most concerning would be the harm caused by algorithms greatly used on social networks and any web browser. On May 2011, Ali Pariser already warned people about this issue which may weaken our use of social networks as means to get knowledge. Indeed, we may get trapped in “filter bubble” as our personal information is recorded and analyzed by these web services. It may lead to highly oriented flow of information, adapted to our beliefs and not confronting to other opinions, so a quite poor access to knowledge. That is the main reason we need to dissociate two platforms: the networks dedicated to learning and the other networks as soon as possible to have access to a tool of quality, with leveraged risks. (Beware online “filter bubbles”, 2011)

The Middle East & North Africa region got a 60% urban population, a slight rise of 3% compared to 2005, with 357 million of inhabitants in 2014. The adult literacy rate improved from 68% in 2005 to 78% in 2014 as well as the school enrolment from 69% to 77%. We can see a clear correlation between these 2 factors. The sector performance has recognized a surge of the mobile-cellular telephone subscriptions from 22.4 to 100.7 per 100 people. The percentage of households with a computer and the Internet access at home also improved during this same period but at a slower pace, respectively from 15.4% to 43.4 and

8.9% to 37.3%. The population covered by a mobile-cellular network has almost is maximal capability with 98% in 2014, 19% more than in 2005. (Figure 7) From these data, we can deduce that the market for mobile learning seems more adaptive than the one for e-learning as the mobile capability for ICT has the greatest potential in the region.

Figure 45: Evolution of the Information and Communication Technologies (ICTs) readiness in Middle East & North Africa between 2005 and 2014 (World Bank 2016)



Our assumptions

From our point of view, it is obvious that Arabian countries will be willing to use mobile learning to modernize their societies for the next years. It would be a great way for these countries to develop a new learning paradigm at the Knowledge Era to create the most competitive societies with adaptive and innovative workers and executives. This culture must begin at education, where mobile learning is the most efficient, that is saying at higher education.

Options

There are three different options to seize the opportunity of social learning in Arabic countries in the next years. This part will show the philosophy of the project between Uninettuno and Castalia. The reasons we are so optimistic, especially for the higher education sector, are explained on this part.

The first option would be to use mobile learning.

Providers using mobile learning and developing new vision to learn are more and more common. The detailed case studies at different prestigious business schools, universities around the world highlight the innovative application of mobile learning. The conclusion was to say this market is largely untapped despite the demand of senior executives to bring this technology in the classroom. (Ashridge, 2011)

Business schools must keep innovating to meet needs of employers and senior executives. The main reason why mobile learning is so accurate is because: “Using mobile devices to network socially or learn collaboratively as part of education is second nature to many undergraduates, (who) may well be tomorrow’s executive education participants.” (Ashridge, 2011)

Mobile technology is a great tool to provide executives with pre and post-course support, plus the mobile learning applications can add multimedia-rich education. The research summarized the benefits of mobile learning as follows:

- ‘Just enough’ learning – highly applied, easily digestible learning for busy executives.
- ‘Just-in-time’ learning – convenient, flexible and relevant learning at the exact moment learning is required.
- ‘Just-for-me’ learning – learning can be accessed via mobile devices in many different ways, which means that there are opportunities for it to appeal to many different learning styles.
- Mobile devices can facilitate collaboration. SMS texting reminders, knowledge sharing forums and ‘ask a question’ forums enable and enhance interaction between participants and tutors.

The recommendations were given by the Chairman of UNICON, Blish Shedden that: “The future of executive education is about choice and personalization. Our survey makes clear that providers should not wait for the industry to settle.” (Ashridge, 2011)

However, after this report made in April 2011, it seems that educational institutions largely opted for e-learning instead of m-learning.

Higher education institutions need to develop strategic plans considering students’ acceptance in order to include all critical success factors for the sustainable deployment of m-learning: Performance expectancy, effort expectancy, influence of lecturers, quality of service, and personal innovativeness.

Nonetheless, even if educational organizations bring a correct strategy, only 55% of the intention to accept m-learning in higher education context was explained by the proposed model. (Al-Rahmi, Othman & Yusuf, 2015).

The second option would be to focus on the development of e-learning in higher education.

Whereas there is no statistically significant difference in the level of satisfaction based on the gender, age, or level of study, “convenience” is the most cited reason for satisfaction whereas “lack of interaction” is the main reason of dissatisfaction. Online universities have chosen first e-learning because it

was the first step to make as we have seen in the “Information Summary” of this paper. Social learning is a multi-phase process beginning with the delivery of e-learning content. But, as e-learning becomes to be a mature market, students ask for more interactivity, which opens a lot of options such as blended learning, flipped classrooms. E-learning greatly helped opening access to the millions who couldn’t physically attend schools, who couldn’t afford it and who had to work at the same time. This system has proved itself to be effective both in quality and cost. (Bowen, 2013) But today it seems that students expect more. (Cole, Shelley & Swartz, 2014)

E-learning isn’t an innovation anymore but a requisite, the very first step, to reach social learning. As e-learning has greatly developed and is mature, it seems that it is the moment to bring mobile learning. However it shouldn’t be two independent tools, but an integrated technological innovation. Moreover, we have also seen that the Arabic market is more willing to adopt mobile learning than e-learning.

The third option would be to offer m-learning as a subset of an already existing e-learning content.

E-learning and m-learning are not competing against each other but still are rather more different than similar. Neither can wholly take over the functions of the other one. (Gutierrez 2014)

These differences can be explained by two factors. First, e-learning is formal whereas m-learning is informal. The formal model is “everything driven by external entity such as an individual, a school, a college, a company etc.; whereas “informal learning happens naturally as a consequence of a person being motivated and wanting to learn. In that sense, informal learning is driven by the individual his/herself”. Second, e-learning is collaborative whereas m-learning is situated learning. (Ozuorcun & Tabak, 2012)

These two distinctions are key to understand how e-learning can and m-learning can work together. We need to take into considerations these differences to adapt m-learning as a subset to e-learning. But, it is still possible to use them both as an integrated tool, respecting the limits, using their main strengths and absorbing their main weaknesses by their complementarity.

The best option is to support e-learning with situated learning – where learners develop their learning skills on themselves according to their own motivation. (Ozuorcun & Tabak, 2012)

Now that we determined that m-learning and e-learning, despite their differences, can work together, we need to know how we adapt a content of e-learning into m-learning.

On his article, Paul Clothier, learning specialist, designer and writer, has tried to determine the best way to adapt e-learning content to mobile learning. He introduced his article this way:

“Rather than quickly jumping to adapt your eLearning modules for mobile, think of ways you can supplement the eLearning you have rather than trying to duplicate it on a small screen. Having

eLearning on the desktop and something different on mobile to support that eLearning is more powerful than duplication of content.” (Clothier, 2012)

There are 9 levels of adaptation. The more efforts you make to adapt the content, the more valuable your mobile learning content will be to support your already existing e-learning materials. (Clothier, 2012).

Fourth option: To bring MOOC content on mobile devices:

MobiMooc was a six-week study from April to May 2011 to use mobile learning as the tool to disseminate Massive Open Online Courses (MOOCs). 40 people completed the survey around all ages with no significant difference in gender. Combining m-learning and MOOCs helped time and space autonomy, community/network building and contextualization. Connectivism and constructivism stress communicative dialogue as a vehicle for learning: 92.5% learned from insights from participants in other fields of expertise, 77.5% from knowledge transfer and 67.5% from face-to-face communication with colleagues. The research concluded that if we focus on the learning potential and impact of mobile learning, m-learning and MOOCs have the great potential to develop an informal and lifelong learning. Collaborative learning is supported by m-learning and MOOCs thanks to an emphasis on communicative dialogue. (DeWaard et al., 2011)

Advantages and drawbacks:

First option, M-learning:

Rationale: Demand-pull, the student wants to learn at the moment it is needed. To support an ongoing learning process where the learner needs quick access to bits of information.

Obviously mobile learning has many advantages, the main one is its adaptability: you can study at any place, at any time when the user is willing to learn. M-learning is great at sharing information as all learners can interact with each other in a system where they can share their knowledge and experience. Collaborative learning can be enhanced thanks to mobile devices capabilities. Latest implementation of gamification brings quality continuous learning system.

The limitations of mobile learning are the lack of face-to-face relationship between teachers and students. Teachers cannot directly interfere with students’ learning and affect their motivation. It is difficult to create a very accurate way of evaluation as students are always next to the information source. It is a learning process which is more adapted to universities and colleges than high schools students. (Marghescu et al., 2007; Hussein, 2010)

Second option, E-learning:

Rationale: Supply-push, you have to teach specific skills or impart in-depth knowledge on a subject to your audience. The key learning objectives are comprehension and retention.

The main advantages of e-learning are the predictability as you can set a schedule adapted to

personal or professional work. Overall cost is reduced for both learners and educational institutions in the long term. Learners can study at their pace with a learning material that they choose. Students take advantage of their motivation to learn as soon as they have access to their computers.

The disadvantages are the decrease of the relationship between students and teachers, the necessity to have computer skills for both teachers and learners, culture may be a limitation, as well as the technical requirements. E-learning brings new practices and can be quite challenging for some teachers without adequate training. (Mohammedi et al., 2010).

Third and fourth option, M-learning as a subset of e-learning or mobile learning with MOOC:

Rationale: Both supply-push and demand-pull depending on the purpose of the learner. It is the perfect way to combine comprehension and retention and continuous learning at the same time. Known as respectively the 2nd and 3rd step toward social learning.

Considering the projects we, Castalia, had so far to bring mobile learning to online universities, we can share our experience:

The advantages of mobile learning and e-learning are combined together and become to be numerous. The ubiquity of learning is quite maximal as the student can maximize his time of learning. The user can have both on-the-go learning for specific skills and in-depth knowledge, so a very complete learning content. A positive experience of mobile learning combined with e-learning is a real boost for the motivation.

The main drawback is that it is quite difficult to adapt the e-learning content to mobile learning. Most of the drawbacks of m-learning and e-learning will be mitigated as these two tools are supposed to help each other but they still exist and must be taken into consideration. Only the formation to teachers must be more advanced than before.

Using mobile learning with MOOC is quite similar. Only the adaptation of the MOOC content into m-learning will be even more challenging due to the load of information. Nonetheless, this new tool gets rid of a significant disadvantage as the interaction between learners will be greatly improved.

Recommendation

We would highly recommend the third and fourth option for the Arabic countries. Using m-learning as a subset of e-learning or mobile learning with MOOC are the most innovative and most accurate for the expectations of our new learning paradigm, the one which gives the most opportunities as it is on the way to develop social learning, and more and more advantages for an equivalent amount of disadvantages.

Using mobile learning is also a good option, but the content will be quite limited as you will not take benefit of the contents that are available on the e-learning platform and you will invest in a product which will soon show its limits.

Both of these technologies are in correlation with the expectation of the Arabic market as smartphones are largely used.

E-learning would be the least recommendable as it is not an innovation anymore but only a requisite for mobile learning. Also, it is not in correlation with the expectations of the Arabic market.

To illustrate the third and fourth option we highly recommend, please let us introduce our project between Uninettuno and Castalia to show you how to monitor the implementation of this option.

The actors:

- The International Telematic University UNINETTUNO, which grants academic courses online based on a specific didactic model with 25 years of experience on distance learning for the HE, students from 140 countries, has an offer of universities courses in Arabic, English, French, Italian and Greek, contents created by an international faculty selected together with European, Mediterranean and Arabs universities involved in several cooperation and partnership projects for online contents design, production and delivery.

- Castalia, which name derives from the nymph known as a “source of inspiration” in Greek mythology, is a creator of intellectual contents instrumental to academics. Its main vision is to offer learning as solution to social issues and to promote continuous learning as the ultimate self-learning tool. To do so, the firm is developing and operating the mobile learning platform called Goocus:

- Sales and development of mobile learning platform Goocus,
- Customization of Goocus and development of Goocus OEM,
- Consulting on digitalization / mobilizing of educational contents,
- Supporting sales of digital contents through Goocus.

Castalia will have a thrilling collaboration with UNINETTUNO with whom we already worked on a first project last year. The project was based on the adaption of UNINETTUNOs academic contents on basic computer engineering skills with the involvement of a target of students enrolled on the MOOCs portal UNINETTUNO-OpenupEd. The pilot project gathered 16 volunteers from mid-September 2015 to mid-November 2015. The first pilot project allowed us to collect feedbacks.

That is how we now want to implement the adaptation of the Goocus app with the academic online contents developed by UNINETTUNO created for the delivery and the certification of University Credits (ECTS/Bologna Process). The idea is that the content will be fee-based for courses delivering certification.

It is in our intention to offer a product which is purely innovative and useful for Arabic countries. Our collaboration aims at offering a quality, resourceful and sustainable tool for innovative learning adapted to the Knowledge era.

For the next future, we agreed to move forward together to bring more Open Educational Resources thanks to Massive Open Online Courses (MOOCs) on mobile devices for everyone, including those in the Arabic Region using also Arabic and involving Arabs professors. Including MOOCs on mobile devices would be one step ahead to go toward social learning.

Conclusion

Our paper tried to determine how crucial the adaptation to a learning paradigm where workers and executive learn continuously. We can deduce to our researches that the region of Middle-East got both the potential and the intention to innovate its learning practices; where social learning seems to be a really appropriate tool to develop. As we tried to evaluate the best options to take advantage of this innovation opportunity, we opted for the m-learning as a subset of e-learning and m-learning with MOOC as these are the most innovative and accurate tool to get closer to social learning in Arabic countries. Finally, we introduced our collaboration between Uninettuno and Castalia as actors able to take the challenge thanks to their respective expertise and experience.

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Innovative Practice Relating to Examination in Distance Learning

Pierre Beust

Normandie Université, UNICAEN, CEMU, 14000 Caen, France

MiPNES-DGESIP, Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche, 1 rue Descartes, 75231 Paris Cedex 05

pierre.beust@enseignementsup.gouv.fr

Isabelle Duchatelle

Normandie Université, UNICAEN, CEMU, 14000 Caen, France

isabelle.duchatelle@unicaen.fr

Abstract

Innovation related to interactive and pedagogical learning methods significantly grow in online education . The limited availability of remote examination is still an important problem. In many french higher education e-learning programs, students still need to be physically present in their host institute or university (or a partner examination facility) in order to undertake the exams. This can be very expensive for remote students enrolled in lifelong learning, time consuming and inefficient. In the past, technologies did not allow the institutions to propose proctored examination conditions at the students' homes. It is different today.

Here, we describe the first results obtained during a remote exams experiment (still in progress) that began in January 2016 at the "Université de Caen Normandie". This experiment is realised under the supervision of the Mission for Pedagogy and Digital Technology of the french Ministry of National Education (MiPNES), Higher Education and Research. The goal is to realise real conditions tests of a telemonitoring service, ProctorU (<https://www.proctoru.com/>), with currently enrolled students who will remotely undertake their examinations from their home place.

Keywords: online exams, distance learning, learning technologies

1. Evaluation in the French Higher Education System

In the French higher education system, students can undertake exams at several times in the academic year. One academic year is divided in two semesters : first from September to January and second from February to June. For each semester, different types of evaluations are possible depending of the choices of teacher teams : some are scheduled all along the semester (called "contrôle continu") or some are only scheduled at the end of the semester (called "examen terminal"). If a student does not pass their evaluations, a second chance can be offered. This is what we call "session de rattrapage". Most of the time, these second sets of exams for the two semesters are organised in the end of June.

We can offer alternative individual or collective activities to distance learning students for evaluations passed during the semester in our Learning Management Systems (LMS). For final exams on the other hand, the fraud and identity checking conditions are not as reliable as during an exam undertaken in an institutional place. This is the reason why many teachers involved in distance learning still want to keep the standard, "in the university or at a partner's place" evaluation mode for terminal exams.

Therefore, student enrolled in distance learning have to come to the university place to undertake the exams. In some cases, universities have foreign institutional partners that can organised exams close to the students living place (this remains very expensive in terms of workload for organisations and cannot be offered to a large number of students).

We can show that many distance students choose to come only for the “second chance” exams. This is understandable. For students who live far away from the university and/or for working students, having to travel to the institutional places may be very expensive (day of vacations from work, transportations, hotels bills, accomodations ...). For some students this constraint can even be a reason for not enrolling in a distance learning program at all.

Therefore we have to explore ways of remote examinations. We are now experimenting a service of proctoring exams by webcam at the home place of students at the Université de Caen Normandie. This paper shows the first results we obtained and the proposed follow up of our experiment.

2. The experiment

The idea of our experiment comes from the concept of constructive alignment first introduced by John Biggs (Biggs, 1996). This concept used in the field of educational sciences describes a quality feature of a learning program. There is constructive alignment when learning objectives and activities are linked to the kind of evaluations used in this learning program. Today, students enrolled in distance learning don't understand the coherence between at home learning activities on e-learning platforms and exams that still require to be present in some institutional place. This actually is a problem of constructive alignment. Moreover, this problem creates a lack of attractivity of distance learning. Today, different ways of providing remote examinations are available and can solve the constructive alignment problem. These ways must be tested and evaluated regarding their cost, security, fraud resistance and user friendliness.

The goals of this experiment are to run real condition tests within a French higher education program of remote proctoring exams using a US company specialised in telemonitoring service : ProctorU (<https://www.proctoru.com/>).

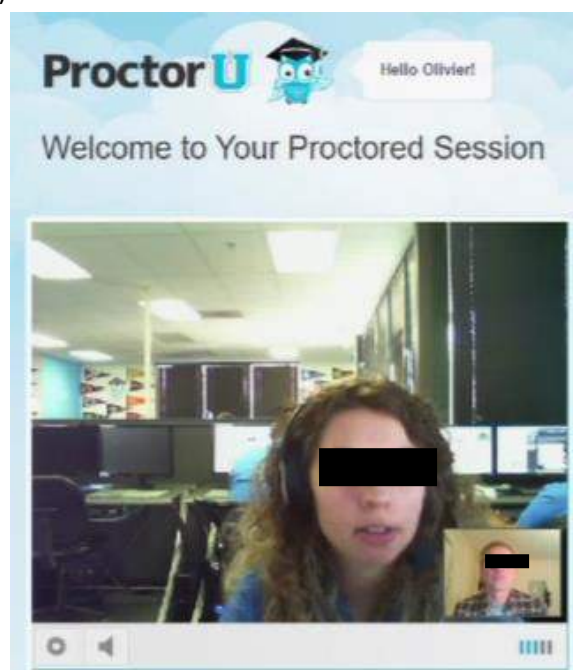


Figure 1: protor-test taker webcam interaction

Many questions or problems have to be explored :

- How to enroll a significative number of students in exams using teleproctoring ?
- How to evaluate the demand of students for new forms of exams and how to evaluate the potential resistance to change ?
- How to verify that the standard security features of a traditional “in house” exam are met ?
- How to integrate the cost of teleproctoring in the economical models of the French higher education ?
- How to succeed in generalizing such an experiment ?

From January 2016 to June 2016 the experiment involved 55 students enrolled in a distance certification of digital skills²³². They were all volunteered to undertake the exam at their home using the ProctorU service. This implied they had to create a user account on the ProctorU web site before the exam and to verify that their personal technical environment (computer, webcam, internet connection ...) would allow the proctoring.

Each exam was 45 min long and consisted in a multiple choices test (60 questions) on a LMS of the université de Caen Normandie.

Students had to connect to ProctorU web site several minutes before the beginning of the exam. Then they had to install a single use applet for distance control of their computer by the proctor. Students were then taken care of by a ProctorU proctor who verified the technical features (audio, video, digital environment) and proceeded to the identity verifications. When all conditions were met, the proctor then gave access to the exam platform by entering secret passwords students were not aware of.

3. Stakeholders

The Université de Caen Normandie is actively involved in the growing of e-learning providing almost thirty distance learning programs for over a thousand students (all over the world). Two university departments participated to this experiment : the direction of information systems (DSI, IT Department) and the department of multimedia technology and distance learning (CEMU).

ProctorU was founded in 2008 in the USA. To date, the company has proctored more than two million exams in 129 countries²³³.

To manage this experiment, the Université de Caen Normandie and ProctorU have signed an agreement in order to precise their relationships and also to define the financial conditions²³⁴.

In addition to the two main stakeholders, some other institutions are interesting in the running experiment :

- FIED (Federation Interuniversitaire de l'Enseignement à Distance) : a French association of 38 higher education institutions (mainly French universities) involved in online and distance learning.

²³² C2i Niveau 1 : Certificat Informatique & Internet (<https://c2i.enseignementsup-recherche.gouv.fr/>)

²³³ http://www.bizjournals.com/birmingham/news/2016/04/20/proctoru-forms-two-new-partnerships-amid-huge.html?ana=RSS%26s%3Darticle_search&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+industry_7+%28Industry+Technology%29

²³⁴ Each proctored exam is 45 minutes long and it is charged 17,50\$, paid by the Université de Caen Normandie for each voluntary student.

- ANSTIA (Association Nationale des Services TICE et Audiovisuels) : a French association of multimedia departments of universities.
- CNIL (Commission Nationale Informatique et Libertés) : French national institution for personal data protection and individual liberties.
- MiPNES (Mission pour la Pédagogie et le Numérique dans l'Enseignement Supérieur) : mission for pedagogy and digital technology, French ministry of national education, higher education and research. The objectives of our experiment had even been published on the official portal of digital uses in the higher education²³⁵.

4. Some results

The first result that it is important to point out is that there is no significative difference between online proctored exam and classical exam passed in the university places in terms of success rate. During the three previous years, we have observed 50% to 60% success rate with students undertaking “in university” examinations. Here, students staying home for examinations and online proctoring, the success rate was 53%.

Each student who participated in this experiment had to respond to an 18 questions survey that allowed to analyse how the online proctoring had worked and how. Among theses, some are particularly interesting to take into account and are discussed below.

4.1 Did you have problems for connecting with the service of ProctorU ?

83% no.

Two student had language problems at the first step, creating an account on the ProctorU web site. The ProctorU web site is English only and our students sometimes do not have an English speaking skills. Two students had technical problems in the applet installing step (the applet is necessary to allow the proctor to act in the digital environment of the student). Their home place was in a public low-cost student residences (CROUS) where the wifi did not allow the applet communication ports. Five student had problems understanding the web interface.

4.2 How was your interaction with the proctor ?

ProctorU is an American company. Therefore all proctors do not speak French. Only 16 exams have been proctored by a French speaking proctor. Most of the time, it did not cause any problem to students. To avoid speaking accents problems, proctors and students interacted using a textual chat box (mostly using automatic Google translations from the proctor side). The professional skills of proctors have been pointed out on several occasions. Students do appreciate proctors being attentive and helpful.

4.3 Do you think that the lack of a teacher during the exam is a problem ?

In classical exams undertaken in the institutional places under the teacher proctoring, students often ask many questions about the work to do in order to have some indications. Moreover teachers often indicate

²³⁵ <http://www.sup-numerique.gouv.fr/cid95454/protocole-experimental-de-telesurveillance-d-epreuves-a-l-universite-de-caen.html>

<http://www.sup-numerique.gouv.fr/cid94566/telesurveillance-epreuve-une-experimentation-formation-distance.html>

the time remaining until the end of the exam (which is not the case with online proctors; remaining time is indicated by a counter on the LMS platform). We therefore thought that the lack of teachers during the exams would be a problem for students. This is not the case. 92% of student thought it was not a problem. It even seems that students under the proctoring of their teachers feel they are twice evaluated : once on their actual papers and another time on the way they realise them. We also asked students if someone not belonging to the university checks their ID cards is a problem. That is not the case for 85% of them.

4.4 What do you think about the online proctoring regarding to the cheating risk ?

The cheating risk is often the first problem that teachers point out about the remote exams, thinking that it would be easier to cheat at home compared to a classical exam in an institutional place. First, classical exams are not as cheat-proof as we would want them to be. Second, the cheating risk depends on the feeling of students about cheat ability. This is what we wanted to evaluate. 61% of students answer that they feel proctored as effectively in remote exams as in classical exams, and even more. Some students told that they feel more closely proctored because the webcam never stops running. Proctors of ProctorU team cannot be in charge of more than 6 students at the same time. Students did not have this information and thought that they were in a one-to-one situation.

4.5 What is your global feeling about the online proctoring ?

The global feeling of students about the remote exams is very positive. Only 3% of student have reported the exam as an important intrusion into their private life. Almost 80% say they will agree to undertake the kind of exam again and would advise a friend to do the same. At least, 89% of students have very good feedbacks on their experiment. This shows that distance learning students prefer to assume the required technical features at their home than having travel to an institutional place.

Students often indicate that being taken in charge by a real human is very important. This most certainly contributes to the good global feedback. Other remote proctoring services than ProctorU exist. Some are completely automatic with algorithms based on biometric datas²³⁶. May be the student positive feeling would be significantly lower with a non human proctoring service. Moreover it would be problematic regarding to the personal data privacy.

5. some problems

As we could anticipate, our first experiment has pointed some problems out that need to be solved for the following experiment sets.

Seven students did have some technical difficulties (malfunctioning sound or webcam) or interface or protocol misunderstandings. That kind of problem will always happen. It is inherent to the use of a technical device. When a proctor observed a problem or a cheating tentative during the exam (not before the applet installing and ID checking steps) they produced an incident report that ProctorU sent to the university exam team. We had 2 such incident reports for non cheating reasons (in one case, the student took notes in the textual chat box and in the other case the connection was lost). Six students have noticed some other problems that normally should have lead to an incident report but did not. In these 6 cases, the problem was a lack of audio proctoring. One student had a telephone ringing during the exam and others

²³⁶ Smowl (<http://smowl.net/>) for instance.

had someone in their home place who had a short talk with them. We have analysed the reasons of this lack of proctoring with our ProctorU partners. It seems that, due to the language problems between French speakers and English speakers, some proctors have preferred to use a textual chat to communicate with the test takers (using automatical translations), but they had then switched off the audio interaction. This points to a problem, the proctoring service was not guaranteed with French speaking students. We hope this problem will be solved soon because ProctorU market is growing outside of the USA. In particular, ProctorU has been chosen as the remote assessment partner by FUN (France Université Numérique²³⁷), the public official organisation offering the French MOOCs platform to public universities and higher education public schools. To be able to point this problem in our further collaboration with ProctorU, we ask to have a video record of all the exam session of student. This will provide a proof in case of cheating doubt or problem with the student.

6. Conclusions

At the end of the first year of experiment the results are very positive. It confirms that remote exams at the student home is a relevant solution for the case of distance learning programs.

The experiment is still running. During academic year 2016-2017 we propose online proctoring to the students enrolled in a distance learning Health professional program. This program is mainly offered to people seeking professional evolutions. They often keep working during the program and thus choose a distance learning program. Therefore these students have not the same demands and the same motivations than people studying before their professional insertion. It is very possible that students in a professional activity represent the principal kind of student interesting in alternatives to traditional exams. At the end of our experiment we plan to write a guideline for all French higher education institutions interested in remote examinations at the student place. These guidelines are expected by the mission for pedagogy and digital technology, French ministry of national education, higher education and research and also by the FIED and ANSTIA.

At an international level, Université de Caen Normandie is involved, as member of FIED, in the new European project for two years long. In the “Online Proctoring for Remote Examination” (OP4RE) project, six leading higher education institutions and two private companies focused on technology-enhanced education innovations and will collaboratively work to develop a valid and reliable solution for remote examinations. OP4RE aims to develop, implement and disseminate innovative practices relating to remote examination and secure and trustworthy certification.

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²³⁷ <https://www.fun-mooc.fr/>

Emotions, engagement and self-efficacy in e-learning process

Francesca D'Errico

Uninettuno University

f.derrico@uninettunouniversity.net

Marinella Paciello

Uninettuno University

m.paciello@uninettunouniversity.net

Luca Cerniglia

Uninettuno University

l.cerniglia@uninettunouniversity.net

Abstract

The aim of the present study is to analyse the emotions experienced by students within different e-learning contexts (chats with teacher, private group discussions, forum threads and content activities) and understand their possible relations with students' engagement (Handelsman, 2006) and self-efficacy (Di Mele et al, 2015; Sun and Rueda, 2012).

In line with recent studies (Pekrun, 2007; Marchand & Gutierrez, 2012; Artino, 2012) our results specify the role played by self-efficacy's specific dimensions - social and task self-efficacy – in mediating the relation between positive emotions and students' engagement. Moreover, the study suggests the importance for an e-teacher to regulate students' negative emotions experienced across the e-learning activities, as they can negatively influence both affective and behavioral dimensions of engagement.

Keywords: emotions; engagement; self-efficacy; e-learning

1. Introduction

Educational psychology literature agrees in indicating the important role of emotions in promoting positive academic outcomes, focusing mainly on students' possible achievements such as grades or number of exams (Artino & Stephens, 2009; Daniels et al., 2009). Nevertheless, besides the student's learning achievements, a growing body of research is also considering variables involved 'in the process' such as engagement, which can be included among the qualitative indicators of the learning process, and can be more in general defined as a potential predictor of students' academic adjustment (D'Errico, Paciello and Cerniglia, 2016). Parallel to this, self-efficacy is considered by several authors one of the predictors of academic emotions (Pekrun, 2007; Goerz et al., 2010).

Particularly in online environments, affective dimensions and especially the relationship between individual variables (self-efficacy), emotions and learning outcomes (grades, learning strategies, and so forth) had been studied in a linear perspective, often ignoring the circularity of the process. In addition, self-efficacy has been addressed as a one-dimensional construct, underestimating the distinct characteristics of the task- and social self-efficacy. A recent study put it into evidence that, in online environments, self-efficacy can be distinguished into two components: an e-task, and a e-social self-efficacy. These two sub-dimensions can contribute in a different way to related variables (Di Mele et al., 2015). Adding to this, the contribution of Lee & Tsai (2011) clearly showed how the social dimension, with particular reference to

students' expectations, perception of collaboration and information seeking, is usually much higher in online contexts than in traditional universities.

Bearing on the above premises, the present study intends to shed a light on the following research questions:

- (1) Are students' positive and negative emotions associated with their self-efficacy and engagement during different learning activities, in an online educational context?
- (2) How students' positive and negative emotions affect their engagement? Could self-efficacy mediate the relationship between emotions and engagement?

2. Emotions in learning context

The affective dimension in the learning context refers primarily to socio-cognitive models (Castelfranchi and Miceli, 2009) and appraisal theories (Scherer, 2000), which define emotions as adaptive devices that monitor the state of achievement or thwarting of individuals' goals. Thus, emotions can be defined as multifaceted internal states, encompassing feelings and cognitive, physiological, expressive, and motivational aspects, that are triggered whenever an individual's goal is achieved/thwarted or it is likely to be (Poggi, 2008). Besides the appraisal models of emotions, that help understand the underlying cognitive features, we can also consider "dimensional" theories of emotions, that define cognitive processes as the attribution of a cause to some perceived physiological reaction. In this view, emotions can be framed within dimensions of *polarity* and *valence* (Russell, 1980), thus allowing a mapping of emotions encompassing positivity/negative polarity or activating/deactivating valence (for a review see D'Errico & Poggi, 2016).

Pekrun (2007) elaborated a theoretical model, which examines the emotions in academic contexts. He sets out a model of emotions functioning in relation to internal / external resources, thus to personal and contextual factors. In this framework, the cognitive task demand and the teacher's feedback seem relevant contextual factors, whereas, expectations, attributions (which are defined as "control") and the intrinsic and extrinsic task value are subjective factors underlying achievement emotions. The value can be particularly focused on two objects, 'activity' or 'outcome'.

Pekrun distinguishes 'activity focus' activating positive emotions (e.g. enjoyment), and deactivating ones (e.g.) relaxation; emotions related to academic outcomes include hope, pride, and gratitude, in the case of activating emotions, or relief and contentment in case of deactivating ones.

As to negative emotions experienced by students during their learning activities, Pekrun recognizes activating emotions such as anger and frustration, or those related to outcomes such as anxiety and shame. Similarly, deactivating emotions are boredom, sadness or hopelessness. This emotional taxonomy is interesting because even in the emotional experience the teacher can intercept a possible lack in students' appraisal of the learning process.

Not less important than subjective dimensions, other authors considered contextual factors. At this purpose, Tyson et al. (2009) postulated that emotions can be defined as subjective experiences, depending on the context where they are elicited. Yet, e-educational psychology has relatively deepened their role within specific e-learning contexts (Feidakis et al., 2014) and it has been suggested that emotions are pervasive in distance educational settings (Artino, 2012). In fact, they can be at the basis of the enrollment choice, and profoundly impact student's behavior in academic situations (Marchand & Gutierrez, 2012).

Pekrun and colleagues (2011) specifically created the definition of "academic emotions", which comprise both affective states (such as confusion, anger, stress) and cognitive states (for instance interest, boredom, fatigue). These authors identified classes of emotions and demonstrated that positive emotions can predict creative way of thinking and reflecting on notions, fostering good academic results, whereas negative emotions are more likely associated with low grades. More specifically, enjoyment, hope and pride have been positively associated with effort, self-regulation and more sophisticated learning strategies, whereas anger, frustration, shame, anxiety and boredom have been associated with lower performances and external regulation (Pekrun et al., 2011). It has also been posited that negative emotions can alter the use of cognitive strategies and motivation during learning (Kim et al., 2014). In addition, it has been proved that

e-learning students may experience specific negative affective states such as anxiety, boredom, fatigue and confusion during particularly challenging assignments, and some research has demonstrated that reporting on their own emotions to others or sharing them in the community of students can empower their achievement in the learning process (Pekrun, 2006). It is noteworthy that achievement emotions (Pekrun, 2006) in on-line situations are suggested to be context-specific, so that they can vary across learning activities. Thus, several authors have recommended assessing diverse learning tasks, formal (with teacher, for example chat discussions or videoconferencing) or informal (with peers but without the presence of the teacher, e.g forum discussions or chats among peers) (Efklides & Volet, 2005).

3. Self-efficacy and academic adjustment

Within social cognitive theory framework, Bandura (1986; 1997) considered the beliefs of personal efficacy to be one of the most focal mechanisms of human agency through which people can exercise influence over the nature and quality of their life and can be active constructors of their own life course (Bandura, 2001). The importance of perceived self-efficacy (SE) for successful human functioning has been well documented in different domains, including educational one (Richardson, Abraham, & Bond, 2012; Robbins et al., 2004). Indeed, educational literature has extensively attested that high levels of SE are associated with positive academic outcomes (Newby-Fraser & Schlebusch, 1997; Richardson et al., 2012), and concurrently with low drop-out and stress related problems during education (Chemers, Hu & Garcia, 2001). In particular, two forms of SE seem crucial to promote successful academic pathways: learning and social SE. The learning SE refers to students' beliefs about their abilities to execute learning tasks, regulate learning processes and actively orient courses of actions toward satisfactory academic results consistently with standards (Zimmerman, 2000). The social SE refers to perceived capabilities to build adaptive relationships with others, establish a friendship network and be capable of self-promotion (Hermann & Betz, 2006). Indeed, in university context, students set their goals, select their learning strategies, and organize their learning activities, but they also shape and establish the social environment in which they develop their knowledge and skills. As Coccoli et al. suggest (Coccoli, Guercio, Maresca, & Stanganelli, 2014) distance learning students must be considered as "creators" rather than "consumers of digital contents". Thus, the quality of the students' education depends on their ability to regulate their learning process through cognitive and metacognitive functions and to create supportive conditions for improving their academic progress through social and interpersonal experiences.

Recently, the academic and social forms of self-efficacy were investigated also in distance academic context (Di Mele et al. 2015). Specifically, previous results on Italian e-learning students have confirmed two forms of e-efficacy: a) Task e-efficacy referring distinctly to students' beliefs on capability to use e-learning tools to plan, control, and direct their learning activities in order to master academic subjects and achieve their educational goals; b) Social e-efficacy referring to students' beliefs in their abilities to form positive relationships and to interact appropriately through ICT in order to create constructive social interactions in e-learning environment. According literature while task e-efficacy has associated especially with performance, Social e-efficacy, as a proxy of social competences to promote social and reciprocal support, has especially associated with behaviours (for example prosocial behaviour) that favour academic functioning (Di Mele et al. 2015).

In sum, these preliminary findings confirm that also in e-learning contexts self-efficacy beliefs represent different ways in which students use their personal and social resources to manage learning activities and to cope with difficulties and stressors. However, despite the emerging interest on self-efficacy in distance learning (Tsai, Chuang, Liang & Tsai, 2011) it is still unclear how is possible to improve self-efficacy beliefs within these new learning environment. In the present study we focused on possible source of task and social e-efficacy since in on-line context could be particular crucial since social relationships and teaching are largely technologically mediated.

4. The relation between emotions, self-efficacy and engagement

The link between emotions, engagement and self-efficacy has been theoretically outlined in a number of models both in face-to-face and online contexts (Pekrun, 2007; Artino et al., 2009), but only in part empirically studied.

The well-known model called "Control Value Theory (Pekrun 2007; Pekrun et al., 2011) posits that self-efficacy, along with the motivation (intrinsic vs. extrinsic) and the "control", represented by attributions and expectations, are the antecedents of the so-called achievement emotions.

These antecedents allow experiencing positive and negative emotions depending on the object of focus. For instance, if I have good control with internal motivation, then I will mostly feel emotions such as enthusiasm, pride, good fuel for their engagement and learning strategies (i.e. metacognition). In this model, self-efficacy is an antecedent. Other studies highlight how a high self-efficacy promotes high levels of positive emotions such as hope, pride and enjoyment lower levels of negative emotions such as anger, frustration and hopelessness shame boredom (Goerz et al., 2010; Spence and Usher, 2007; Marchand & Gutierrez, 2012).

In addition to this, which is the role played by students' engagement? Is there also a significant relationship between emotions, engagement and self-efficacy?

Let us now more specifically define the notion of engagement; it can be considered more than just behavioral aspects as "time and energy spent by the student" and, as in Handelsman definition (2005) it is also composed by the *affective investment* of a person engaged in their on-line course. In this sense, Handelsman and colleagues suggest that engagement is marked by four dimensions: 1) 'skills' and 2) 'performance' - that can be considered as *behavioral* components - and two other *affective* ones that are 3) 'affective relevance' and 4) 'participation'.

A recent study (D'Errico, Paciello and Cerniglia, 2016) highlighted the link between emotions and engagement in different online contexts (forums, chat among peers and with the teacher) and that positive emotions are correlated with engagement, especially in contexts of peer interactions, while negative emotions (anxiety, shame) are correlated to students' engagement during interactions with the teacher.

At this purpose this paper will address the following research questions:

- (1) If and how positive and negative emotions during different learning activities, students' self-efficacy and engagement are associated in online educational context?
- (2) How positive and negative emotions affects students' engagement? Could self-efficacy mediate the relationship between emotions and engagement?

5. Method

5.1 Participants

Participants were 78 Italian university students attending on-line courses (females 71,8%), with a mean age of 38,6 years (SD = 12,09). Most participants were employed in a broad range of very heterogeneous jobs (90%), from freelance (11,7%) to office work (34,7%), teaching (5%), health care jobs (6%), representing humanistic (50%), technical-scientific (43%) and social-health sectors (5,2%). The majority of participants were attending the first (48,7%) and third year (37%) of the undergraduate program in a Faculty of Psychology.

5.2 Procedure and measures

The members of the research team informed students enrolled in their on-line classes about the study and have collected the written informed consent from voluntary participants. Thus, the data were collected through on-line self-report surveys including measures of emotional experiences during e-learning activities, engagement dimensions and socio-demographic variables.

Learning Emotions.

This is an ad hoc scale composed by 14-item Likert scale measuring the levels of intensity of different learning emotions (for example: anxiety, sadness, enthusiasm, satisfaction, surprise) during four conditions: chat discussions with teacher (CDT), private student chats (without the teacher – PSC), web-forum discussions (WFD), and content activities (CA). Response options were presented on a 5-point continuous scale ranging from 1 = not at all to 5 = very much, where in higher scores indicate more learning emotion intensity. Preliminary EFA attested the bi-dimensionality of the scale in all four learning activities (the average explained variance is 46%). The first factor refers to the positive e-learning emotions (8 items), the second factor refers to negative e-learning emotions (6 items). Internal consistency for positive e-learning emotions (Factor 1) and negative e-learning emotions (Factor 2) in the current sample range from .64 to .88

E-learning Engagement (Dixon, 2015).

This scale is a 19-item Likert scale measuring the affective and behavioral components of engagement. Respondents were asked which different attitudes, thoughts, and feelings characterize their e-learning engagement. Response options were presented on a 5-point continuous scale ranging from 1 = not at all to 5 = completely. The scale consists of four subscales: skills (item example: “being organized”); affective relevance (item example: “really desiring to learn the material”); participation (item example: “helping fellow students”); and performance (item example: “doing well on the tests”). Internal consistency coefficients in the current sample were .87 for skills, .83 for participation, .70 for affective relevance and .81 for performance.

Academic E-Efficacy (Di Mele et al. 2015):

The scale is a 22-item Likert scale measuring the two forms of self-efficacy identified in educational and e-learning literature. Task e-efficacy measures the students perceived capability to use e-learning tools to regulate their learning activities (item example is: searching documents or hyperlinks on websites useful to learning); Social e-efficacy measures the students’ perceived capability to strategically interact with peers and teacher in e-learning environment in order to achieve their own one academic goals (item example: ‘having constructive discussions with the other students in the web forum’). Response options were presented on a 5-point continuous scale ranging from 1 = not at all to 5 = completely. Internal consistency coefficients in the current sample were .92 for Task e-efficacy and .89 for social e-efficacy.

5.3 Plan of Analyses

Before performing analyses, the Student T-test was utilized to examine gender, undergraduate years and job specialization (humanistic vs technical-scientific) differences on positive and negative emotions during the four e-learning activities and on engagement dimensions. Moreover, age differences were examined using correlation analysis. The preliminary T-test results attested that there were no significant difference among gender, undergraduate years and specialization. Correlation analyses attested only one negative associations between age and negative learning emotion during content activities ($r = -.24$; $p = .03$). Based on these preliminary results, we decided not to consider gender, age, job sector and undergraduate years as control variables in the subsequent analyses.

In order to examine the relationship among variables under study, correlational and regression analyses were performed. Firstly, we examined the relationships of positive and negative emotions during different learning activities with social and task self-efficacy beliefs and engagement dimensions. Secondly we examined the correlations between the two self-efficacy sub-dimensions and the four engagement sub-dimensions. Finally, four hierarchical regressions were performed to verify if positive and negative

emotions influence engagement dimensions (step 1) and if their impact could be mediated by self-efficacy beliefs (step 2).

5.4 Results

Correlation analyses showed that positive emotions were positively associated with social e-efficacy across different learning activities and with task e-efficacy in the case of students interaction with and without teacher presence; negative emotions were instead negatively associated with both social and task e-efficacy in activities with teacher (chat and web-forum), moreover negative emotions during content activity were negatively associated with task e-efficacy. In line with previous studies (D'Errico et al. 2016) emotions also were associated with engagement dimensions. Specifically, positive emotions during private students group and content activities were associated positively with all four dimensions of engagement. Moreover positive emotions during interactions with teacher (chat and forum) were associated with social and emotional dimensions of engagement. Instead negative emotions during chat with teacher and private students group were negatively associated with affective relevance and performance (table 1)

Table 1. Relationship among positive and negative emotions across e-learning activities, e-Efficacy and Engagement

Activities	Emotions	Self-Efficacy		Engagement			
		Social e-efficacy	Task e-efficacy	Skills	Participation	Affective Relevance	Performance
Chat with Teacher	POS	,24 [*]	,25 [*]	,25 [*]	,29 [*]	,35 ^{**}	,08
	NEG	-,44 ^{**}	-,33 ^{**}	-,50 ^{**}	-,13	-,36 ^{**}	-,33 ^{**}
Private Students Group	POS	,47 ^{**}	,25 [*]	,28 [*]	,45 ^{**}	,36 ^{**}	,30 ^{**}
	NEG	-,24 [*]	-,16	-,33 ^{**}	-,08	-,22 [*]	-,25 [*]
Web-forum discussion	POS	,26 [*]	,14	,14	,24 [*]	,22 [*]	,04
	NEG	-,27 [*]	-,29 [*]	-,28 [*]	-,14	-,15	-,13
Content activities	POS	,41 ^{**}	,22	,43 ^{**}	,42 ^{**}	,36 ^{**}	,28 [*]
	NEG	-,19	-,24 [*]	-,28 [*]	,02	-,11	-,09

Note: * $p < .05$; ** $p < .01$; *** $p < .01$; POS= positive emotions; NEG = negative emotions

Correlation analyses also attested the strong and positive relationship between social and task e-efficacy beliefs and the four engagement dimensions (table 2). Thus the more students perceived themselves able to use e-learning tools and interact constructively with peers and teacher, they more affectively and behaviourally engaged in the on-line course.

Table 2. Relationship between Task and Social e-Efficacy and Engagement Dimensions

	Social e-Efficacy	Task e-Efficacy
Skills	,59**	,48**
Participation	,60**	,45**
Affective Relevance	,45**	,47**
Performance	,62**	,47**

Note: * $p < .05$; ** $p < .01$; *** $p < .01$

Finally, regression models attested that positive emotions are particularly associated with skill (22% of explained variance), participation (16% of explained variance) and affective relevance (17% of explained variance) of engagement. However, the impact of positive emotions was stronger in the case of affective relevance, since its effect remained significant when task e-efficacy entered at second step adding an incremental contribution in the explaining this outcome. Furthermore, analyses attested that social e-efficacy was significantly associated with participation and performance, suggesting a probable mediational role of this social cognitive dimension in the relationship between positive emotions and these two features of engagement. Finally it is interesting to note that the impact of negative emotions was particularly strong in the case of skills. Indeed its effect remained significant despite the additive contribution of social e-efficacy at the second step.

Table3. the influence of Positive and Negative Emotions and e-Efficacy on Engagement Dimensions

	Skills		Participation		Affective Relevance		Performance	
<i>step1</i>	(β^1) β^2	ΔR^2	(β^1) β^2	ΔR^2	(β^1) β^2	ΔR^2	(β^1) β^2	ΔR^2
Positive Emotion	(.25**) .07	.22***	(.41***) .21**	.16***	(.33***) .22**	.17***	(.14) -.08	.07
Negative Emotion	(-.35***) -.20*		(.01) .19		(-.20) -.06		(-.20) -.01	
<i>step2</i>								
Social e-efficacy	.34***	.19***	.47***	.26***	.14	.13*	.59***	.33***
Task e-efficacy	.09		.16		.30***		.10	
R^2		.41		.43		.30		.40
AR^2		.37		.39		.26		.37

Note: * $p < .05$; ** $p < .01$; *** $p < .01$

ΔR^2 = R change at second step; β^1 = beta at step 1; β^2 = beta at step 2;; R^2 = R Square; AR^2 = Adjusted R Square.

6. Discussion

Our findings confirmed the importance of examining emotions within e-learning contexts (D'Errico, Paciello & Cerniglia 2016; Pekrun, 2007; 2011; Artino, 2012), as they are strongly associated with e-efficacy and engagement. Specifically, positive emotions are significantly and positively associated with e-efficacy beliefs, especially social one, and engagement dimensions: the more students feel positive emotions during e-learning activities, the more they perceive themselves as able to interact constructively with other students and teachers through learning platform, and they more engage affectively and behaviourally during learning activities. On the contrary, negative emotions during formal activities (web forum and chat) are significantly and negatively associated to both social and task e-efficacy and in some cases (chat with teacher and private students group) are also negatively related to skills, affective, relevance and performance dimensions. Thus, the more students feel negative emotions during formal and informal learning activities (with and without teachers), the less they perceive themselves able to use learning tools and to regulate their learning, and the less they are organized, motivated to learn and able to do well on the tests they take.

Moreover, our results confirm the strong relationships between self-efficacy and engagement. Despite this associations is well recognized in the literature (Pekrun, 2007; Artino et al., 2009; Di Mele et al., 2015), it is interesting to note that while social e-efficacy predicts mainly the behavioral dimensions of engagement (skill, participation and particularly performance), task e-efficacy predicts just the affective relevance, that can be considered an index of effort and personal commitment. Furthermore the results of regression models suggest that positive emotions influence engagement, but their effect decrease when social e-efficacy was entered in the posited models. These results suggest that the relationship between positive emotions and engagement could be mediated by social e-efficacy. In other terms, it is plausible that positive emotions could be one possible source of social e-efficacy. When students feel positive emotions during learning activities, they increase their self-efficacy beliefs related to capacity to study well, together in technologically mediated learning environment, and consequently they more engage in e-learning process, particularly on two engagement dimensions: participation and skill. A different role seems to be played by negative emotions in the explanations of skills. In this case, the impact of negative emotions is direct and not necessarily mediated by social e-efficacy. However, effects of emotions on engagement need to be tested on a larger sample before drawing firm conclusions, nevertheless it would represent a starting point for future studies.

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Learning by testing. Spaced Education through Qstream platform in large number of students

Miguel Santamaría Lancho

UNED. Spain
msantamaria@cee.uned.es

Ángeles Sánchez-Elvira Paniagua

UNED. Spain
asanchez-elvira@psi.uned.es

Mauro Hernández Benitez

UNED. Spain

Pedro J. Amor Andrés

UNED. Spain

Abstract

Procrastination, poor planning and loss of motivation are some of the main risk factors leading to dropout in online and distance education students. The present work aimed to test the effectiveness of the use of *Qstream*, a platform based on *Spaced Education*, to improve students' retention, performance, motivation and satisfaction in two undergraduate courses of UNED (Universidad Nacional de Educación a Distancia): *Economic History* (Business Administration degree, B.A. from now on) and *Psychology of Individual Differences* (Psychology degree). Both courses have a large number of students registered, more than 3500 and 5000, respectively.

Spaced Education represents an innovative learning methodology that is delivered by Internet and by making use of any device such as PCs, laptops, tablets or mobile phones. This method presents large empirical evidence and was developed by Dr. Kerfoot (Harvard Medical School). Two main psychological effects are underneath: the *spacing effect*, which means that students learn and retain more effectively when information is presented and repeated over spaced intervals; and the *test effect*, which implies that testing is a learning tool that helps long-term recall when feedback is delivered in a systematic way. Kerfoot defines this process as *radically simplified learning*. Participants registered in the *QStream* platform receive daily questions and instant feedback by mail. This activity presents two other motivating elements of basic gamification: an organized sequence of questions for learning and a leaderboard.

In our work, students that volunteered to participate in this learning experience reported higher levels of preparedness, satisfaction, motivation and engagement. In this sense, mobile apps such as *QStream* may adapt to learners' progress in a more flexible way, and seem to promote engagement and reduce academic procrastination. Also, this type of learning technologies can offer formative assessment to large number of students in an easier and more sustainable way.

Keywords: QStream. Spaced Learning. Mobile Learning. Students' engagement

1. Introduction

Along the past years, the authors of this paper have been doing research on the positive effects of continuous assessment and formative feedback as key elements for students' engagement and performance (Gibbs & Simpson, 2009). In this sense, we have been testing their effectiveness in online environments through different types of activities along the academic course with students from the Faculties of Economics and Psychology (Pereira, Hernández y Santamaría, 2009; Sánchez-Elvira Paniagua & Amor, 2013, 2014; Sánchez-Elvira Paniagua, Amor & Olmedo, 2009; Sánchez-Elvira Paniagua, González Brignardello, Amor & Olmedo, 2011; Santamaría, 2015; Santamaría Lancho y Hernández, 2014). Our results have shown that continuous evaluation activities have a beneficial effect on students' performance, counteracting what literature in distance education relates as the biggest cause of student failure and attrition: poor planning time, inadequate self-pace study and early loss of student's motivation, which quickly decays around the first weeks of the course.

This paper presents the results of our latest research in this domain with a new type of learning activity, named Q-Stream, under a voluntary participation. Q-Stream is a learning tool developed by Harvard Medical School, which presents the following characteristics:

- It is based on the so-called "learning radically simplified" or learning through formative feedback to a sequence of questions, used on a daily basis.
- It is supported by a mobile technology that can be performed in any device connected to Internet.
- It includes simple gamification elements as motivators, such as: award points and a leaderboard on which the student can compare his/her own progress with other peers' performance.

According to Price Kerfoot's²³⁸ proposal, Q-stream is based on the idea of *spaced education* and responds to an innovative educational method for online training. Kerfoot himself has applied this method in different research with medical students at Harvard University (e.g. Kerfoot, 2012). Kerfoot explains that his proposal is based on two psychological research findings: the effect of *spacing* and the effect of *formative assessment* on learning outcomes:

- *Spacing Effect*: the information presented and repeated at intervals spaced time is learned and retained more effectively compared with traditional educational "binge and purge" methods.
- Effects of *formative assessment*: retention of long-term information is significantly enhanced by the use of formative assessment. This approach is consistent with the importance of formative feedback throughout the study process that experts, such as Gibbs and Simpson (2009), have identified as one of the keys for successful learning.

The QStream application enables an academic team to implement a course based on a bank of items with detailed feedback, to be run online at the Qstream platform. The system offers an adaptive reinforcement and that is why it could be said that it allows some adaptation to the student learning process (e.g. pace of learning). Main characteristics are presented in Table 1.

Table 1: Main characteristics of Spaced-based learning (adapted from the information included in the QStream platform)

Characteristics	Evidence
Effective	It improves knowledge acquisition and retention, and creates a better long-term knowledge (assessed two years after) with just a few minutes a day of practice.
Behavioural change	It has a positive impact on job performance and even changes ingrained behaviours. It promotes students' self-evaluation skills.
Efficient	When compared to more conventional methods, the adaptive algorithm reduces the time needed to acquire the same amount of knowledge.
Addictive	It is proven that daily learning that requires no more than 5 minutes per day, and provides instant feedback on the progress, is addictive.

²³⁸ P.Kerfoot. Spaced-out learning. *Training Journal*. Marzo de 2014.
<https://www.trainingjournal.com/articles/interview/spaced-out-learning>

The aim of the present study was to test the effectiveness and usefulness of the application Qstream to increase students' motivation, engagement, self-regulation and satisfaction with their learning process, as well as their feelings of being prepared for the exam, in two different disciplines of UNED undergraduate studies.

2. Method

2.1. Participants

322 students enrolled in "Psychology of Individual Differences" and 321 in "Economic History", (both undergraduate courses of second and first year, respectively), registered in the QStream platform to participate in the learning activity, after a general call in the virtual course during the first week of each subject.

2.1. Instruments

Upon completion of the course, and before the final exam, participants in the QStream experience were asked to complete, on a voluntary basis, a questionnaire about their experience with the activity. The experimental questionnaire was developed "*ad-hoc*" for the present study in order to collect relevant information about basic socio-demographic data and the way in which QStream had been used, as well as students' opinions about usefulness and experience with QStream. The questionnaire was developed with the *Google form* tool, and was available on Google Drive.

The questionnaire consisted of four main blocks of questions:

1. **General Block:** socio-demographic data (age, sex, previous studies and professional situation) and month of registration in the Qstream platform.
2. **Qstream Usefulness:** a 12 items scale in a double entry matrix format with Likert responses (from 0 to 5, with 0 meaning "Nothing" and 5 "Completely"), to evaluate the utility of QStream for the development of self-regulated learning strategies and intrinsic motivation (two key elements for autonomous learning).
3. **Qstream Experience:** a 16 items scale in double entry matrix format with Likert responses (from 0 to 5, with 0 meaning "Nothing" and 5 "Completely") to evaluate students' perceptions, thoughts and emotions while using Qstream.

4. **Other questions of interest:** students were asked about the type of device they used to answer the questions, the moment/s of the day when they answered questions more frequently, how often they used technologies, and to what extent they felt prepared for the final exam.

5. **Block of open questions:** Finally, the students had the opportunity to respond open questions about what they liked most and least of the experience, and to add other opinions or reflections, as well. Also, those who had abandoned could explain the reasons for giving-up.

2.3. Procedure

2.3.1. Course design and tracking

Two courses based on a question bank were developed. Items presented a balanced distribution of questions per main topics of each subject and only one answer was correct:

- 88 items of three alternatives correspondent to a second-year undergraduate course of Psychology (Psychology of Individual Differences).
- 94 items correspondent to a first-year undergraduate course of Business Administration (Economic History). The 10 first items were about the contents of the Study Guide, referring to organizational aspects of the subject that student should know. Single and multiple-choice items were used.

In both courses, a detailed explanatory *feedback* for successes and failures were given, including precise indications about where to find out the correct answers in the basic textbook, as well as other related information and contents of relevance to be remembered and consulted to consolidate learning.

The configuration of learning activities at the QStream online platform were as follows:

- Information about the course and items were edited on the platform of *Qstream* (Figure 1).
- QStream was programmed to send three daily questions by email, once a day. Students could receive these questions in different devices (computer, tablet and mobile phone) and answer them in the same way (Figure 2).
- Students received immediate feedback after having answered to each question (Figure 2).
- Questions answered wrongly were sent again by the system seven days after.
- Questions answered correctly were sent again after fifteen days.
- Questions answered correctly twice were removed from the system.

Editando "Psicología de las Diferencias Individuales: Bloques I, II y III (Temas ...)" (88 preguntas,, 322 Participantes)
Agregar pregunta
Vista Previa
Inscribirse
Invitar Otros
Borrar

Psicología de las Diferencias Individuales: Bloques I, II y III (Temas ...)

Introducción
Publicando
Frecuencia
Completar
Redacción de Cursos

Título: Psicología de las Diferencias Individuales: Bloques I, II y III (T

Descripción:

Edit
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Plan de estudios:

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[Enlace a los contenidos de la asignatura Psicología de las Diferencias Individuales](#)

[Enlace a la página del OCW de Psicología de las Diferencias](#)

Público destinatario:

Edit
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Estudiantes de la asignatura de Psicología de las Diferencias Individuales del grado de Psicología de la UNED.

Categoría:

Health

Guardar
Imprimir el contenido

1. Historia
2. Historia
3. Historia
4. Historia
5. Historia
6. Historia
7. Historia
8. Historia
9. Concepto
10. Concepto
11. Concepto
12. Concepto
13. Concepto
14. Concepto
15. Concepto
16. Concepto
17. Método
18. Método
19. Método
20. Método
21. Método
22. Método
23. Método
24. Método
25. Inteligencia: Naturaleza y estructura
26. Inteligencia: Naturaleza y estructura
27. Inteligencia: Naturaleza y estructura
28. Inteligencia: Naturaleza y estructura
29. Inteligencia: Naturaleza y estructura
30. Inteligencia: Naturaleza y estructura
31. Inteligencia: Naturaleza y estructura

Figure 1: View of course edition at Qstream platform

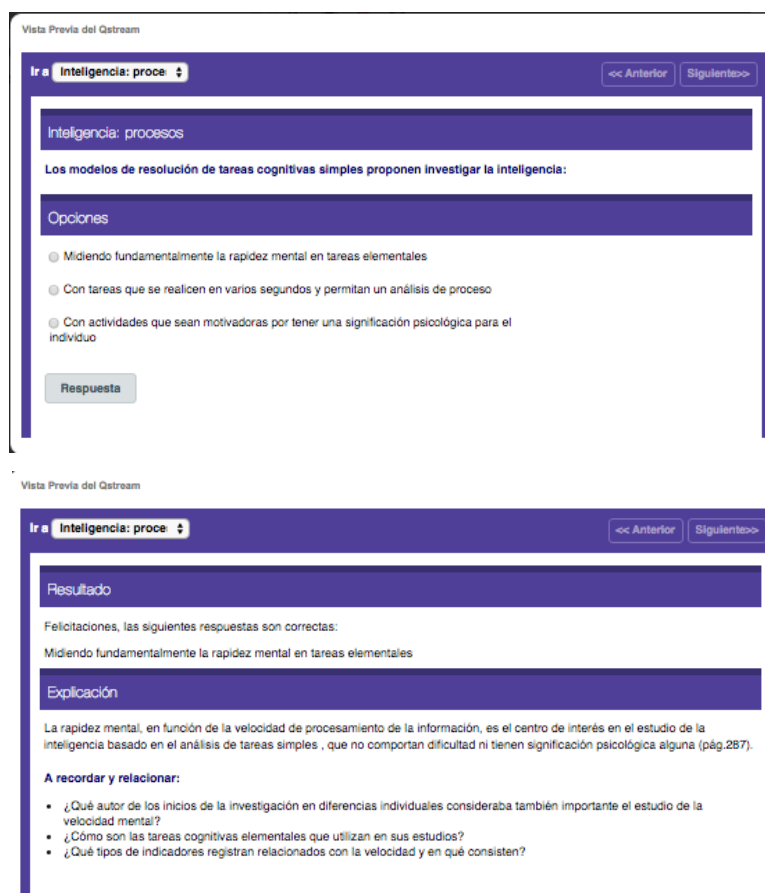


Figure 2: Examples of items and feedback received from QStream

Once the formal academic course had started, students were informed via the *Board of advisors* in the virtual course, about the opportunity to participate on a voluntary basis in the activity of *Qstream*. Participation results were not considered in the final grade of the course. A specific **forum (Qstreamers forum)** was opened to monitor the activity along the course only for those participants registered in the QStream. Those students that were interested in the proposal had to register online in the QStream platform and received clear instructions in the virtual course for that process. To stimulate motivation and engagement, *Qstream leaderboard* was regularly offered in the *Qstreamers forum* under a gamified approach, showing the best 20 positions.

At the end of the academic course, and before final exams, students were asked to fill the questionnaire about their experience with QStream. Students could also rate the course (1 up to 5 stars) and leave comments on the QStream platform.

3. Results

In the present paper, descriptive results of the questionnaire are presented with the aim to explore students' appraisal of the experience. Due to the restriction of space, a summary of main results is here presented.

3.1. Main results from QStream learning analytics

QStream platform offers detailed on-going analytics, on the one hand about the general functioning of the group of students and how each item is working, and on the other hand about the individual performance of each student. In this sense, it delivers a quite interesting approach to learning analytics to be explored. Main results reflect a quite identical pattern of behaviour among students of both subjects: between the 83.2% and 83.9% of students had finished the course in QStream by the end of the academic year and a 0.9% registered but were never active.

3.2. Main results of the online questionnaire about QStream experience

3.2.1. Socio - demographic data

The online questionnaire was answered by 58 students of Psychology (42 women, 72.4%, and 16 men, 27.6%, with a mean age of 40.83 years, $Sd=11.41$, range 21-61), and 31 B.A. students, (20 women, 64.5%, and 11 men, 35.5%. Regarding their professional status, most participants were employees (55.2% in Psychology and 61.3% in B.A.), mainly followed by unemployed (15.5% in Psychology and 25.8% in B.A.) and then by those only dedicated to their studies (13.8% in Psychology and 3.2% in B.A.).

3.2.2. QStream uses and experience

Regarding the question about when students enrolled in the *Qstream*, the data showed that the majority of Psychology students' registrations occurred during the first month (54.2%), followed by the second one (37.9%); however, the opposite occurred in B.A. students with 40% of students enrolled in the first month and 60% during the second one.

3.2.2.1 Usefulness of the experience with the QStream

Tables 2 and 3 show the distribution of percentages in the answers about the usefulness of QStream. Main results showed that, in general, the tool was perceived as very or quite useful for the majority of students, helping them to consolidate, check and deepen in what they have learned, to increase their motivation and to feel better prepared for the exam (especially B.A.students). Also, B.A. students informed higher levels of

usefulness for reducing procrastination and a better organization of study time than the students of Psychology did, although answers went always in the positive direction for all of them.

Tabla 2: *To what extent do you think the Q-Stream by sending daily questions was helpful to ...*

Distribution of Percentages in Psychology of Individual Differences

Useful for...	0	1	2	3	4	5
	%	%	%	%	%	%
Better use of the time while studying	0	12.1	10.3	15.5	29.3	32.8
Not procrastinate	0	3.4	13.8	13.8	31	37.9
A more efficient organization of the study time	3.4	5.2	19	22.4	27.6	22.4
To increase motivation to study	0	0	3.4	12.1	29.3	55.2
To increase interest for the subject	0	1.7	12.1	6.9	36.2	43.1
Better planning of the study	1.7	3.4	19	19	37.9	19
More precise information of study progress because of <i>feedback</i>	1.7	1.7	8.6	13.8	36.2	37.9
To be better prepared for the final exam	0	1.7	5.2	19	25.9	48.3
Better learn the subject as a whole	0	0	10.3	17.2	27.6	44.8
The questions allow to review and deepen what has been learned	0	1.7	5.2	19	19	55.2
The questions allow to test knowledge	0	0	3.4	6.9	32.8	56.9
Receive the same question several times was helpful to consolidate what has been learned	0	0	5.2	5.2	17.2	72.4

Tabla 3: *To what extent do you think the Q-Stream by sending daily questions was helpful to ...*

Distribution of Percentages in Economic History

Useful for...	0	1	2	3	4	5
	%	%	%	%	%	%
Better use of the time while studying	0	13.3	6.7	26.7	13	40
Not procrastinate	0	0.3	0.3	13.3	33.3	53.3
A more efficient organization of the study time	0	6.7	0	33.3	33.3	26.7
To increase motivation to study	0	0	0	0	26.7	73
To increase interest for the subject	0	7.7	0	0	13.3	80
Better planning of the study	0	0	6.7	26.7	40	26.3
More precise information of study progress because of <i>feedback</i>	0	0	0	13.3	26.7	60.3
To be better prepared for the final exam	0	6.7	6.7	6.7	26.7	73.3
Better learn the subject as a whole	0	0	0	0	26.7	73.3
The questions allow to review and deepen what has been learned	0	13.3	6.7	26.7	13	40
The questions allow to test knowledge	0	0.3	0.3	13.3	33.3	53.3
Receive the same question several times was helpful to consolidate what has been learned	0	6.7	0	33.3	33.3	26.7

3.2.2.2. Experience with Q-Stream

Regarding students' opinions about the experience with QStream, in general it was very positive for all them. The great majority informed they would like to repeat the experience in other subjects because they

really liked to work in the activity, they found it very interesting and felt it was an opportunity for them (Tables 4 & 5). Also, in general, students did not feel tense or anxious while working on the activity.

On the other hand, there were some differences between the students of the two disciplines. Economic History students seemed to be more expectant for the daily arrival of the questions and found the experience more fun than the students of Psychology; also, they thought that participating had improved more their study habits than their mates of Psychology considered. Another interesting difference was that Economic History students felt very stimulating to receive points and to be able to compare themselves with their peers, whereas the Psychology students did not; in other words, the gamified elements related to competition seemed to work only for B.A. students. Finally, in general, students did not seem to feel very confident regarding their satisfaction with their performance on the QStream or when comparing themselves with their peers; answers showed higher dispersion in these items.

Table 4: *To what extent each of the items reflects your experience with the activity of Q-Stream*
Distribution of Percentages in Psychology of Individual Differences

QStream experience	0	1	2	3	4	5
	%	%	%	%	%	%
I really liked working with the QStream	0	0	3.4	10.3	15.5	70.7
I felt that doing this activity was an opportunity	0	0	6.9	12.1	24.1	56.9
Every day I was awaiting the arrival of the questions	6.9	8.6	6.9	27.6	27.6	22.4
I think I'm pretty good at this task	1.7	6.9	15.5	39.7	27.6	8.6
I found this activity very interesting	0	0	5.2	3.4	27.6	63.8
I felt tense while doing the activity	37.9	29.3	17.2	8.6	3.4	3.4
I think I've done pretty well, compared to other students	12.1	12.1	43.1	24.1	6.9	1.7
It has been fun	0	5.2	6.9	15.5	31	41.4
I am satisfied with my performance in this activity	0	3.4	10.3	25.9	39.7	20.7
I felt pressure while doing the task	41.4	31	15.5	8.6	3.4	0
Having worked in this activity for a while. I felt more competent to study the subject	0	6.9	12.1	22.4	34.5	24.1
I think this is an important activity for the assimilation of the subject	0	3.4	5.2	8.6	34.5	48.3
I think this activity has improved my study habits	0	10.3	22.4	27.6	20.7	19
I would like to do this activity in another subject	0	0	1.7	1.7	13.8	82.8
I found stimulating to receive points	15.5	8.6	12.1	19	20.7	24.1
The possibility of comparing scores with other colleagues helped me to beat	34.5	19	12.1	15.5	8.6	10.3

Table 5: *To what extent each of the items reflects your experience with the activity of Q-Stream*

Distribution of Percentages in Economic History

QStream experience	0	1	2	3	4	5
	%	%	%	%	%	%
I really liked working with the QStream	0	0	0	6.7	6.7	86.7
I felt that doing this activity was an opportunity	0	0	0	13.3	6.7	86.7
Every day I was awaiting the arrival of the questions	0	0	0	13.3	6.7	86.7
I think I'm pretty good at this task	0	0	13.3	26.7	33.3	26.7
I found this activity very interesting	0	0	6.7	0	13.3	80
I felt tense while doing the activity	26.7	26.7	26.7	6.7	13.3	0
I think I've done pretty well. compared to other students	6.7	6.7	13.3	33.3	26.7	13.3
It has been fun	0	0	6.7	0	6.7	86.7
I am satisfied with my performance in this activity	0	13.3	6.7	20	26.7	33.3
I felt pressure while doing the task	40	13.3	26.7	6.7	6.7	6.7
Having worked in this activity for a while. I felt more competent to study the subject	0	0	13.3	13.3	13.3	60.1
I think this is an important activity for the assimilation of the subject	0	0	6.7	0	26.7	66.6
I think this activity has improved my study habits	0	13.3	23.	6.7	33.3	74
I would like to do this activity in another subject	0	0	6.7	6.7	6.7	79.9
I found stimulating to receive points	0	0	0	0	26.7	73.3
The possibility of comparing scores with other colleagues helped me to beat	0	0	6.7	0	20	80

3.2.2.3. Time of the day to answer questions and devices used

The majority of students of Psychology made use of "dead times" to answer daily questions (almost 40%) while 22.4% did it when they received them. In a similar way, 86.7% of Economic History students answered at any time of the day and only 13.3% while there were studying. Therefore, another benefit of this method is that it allows taking advantage of downtimes along the day.

We found, again, differences between students of both disciplines. A great majority of B.A. students informed they have answered QStream questions in their computers (73.3%), whereas the rest used their mobile phones (26.6%). However, students of Psychology seemed to be more familiar with the use of different types of technologic devices: 41.4% Mobile Phones, 22.4% Computers, 27.6% Laptops and 8.6% Tablets.

3.2.2.4. Perception of being prepared for the exam

Finally, students were asked about their perception about being prepared for the final exam. A 72.4% of students answered they felt enough prepared, while a 27.6% indicated that only somewhat.

4. Conclusions

Our results with the use of Qstream show that this type of tools, based on spaced education (Kerfoot, 2012), can provide a stimulating, motivating and systematic support to distance education students in their daily and continuous learning, helping them to prevent procrastination and promoting engagement, both relevant predictors of students' academic performance and well-being (González-Brignardello and Sánchez-Elvira Paniagua, 2013). Also, the experience seems to have been a source of satisfaction for students. In sum, a large number of participants finished the course and, even after its completion, some participants still kept on accessing and giving answer to items *"just for having fun"*.

In general, when asked about their experience with QStream, students considered that:

- It was an interesting, useful and fun experience.
- They felt their motivation to study was increased and their interest in subject contents, as well, through the process of give answer to the questions.
- It was helpful for a better management of their time. The majority of students reported they answered questions in small dead times, thus, it was a complementary activity that did not reduce their study time.
- It helped them to keep self-pace study and reduce procrastination.
- To answer questions in a daily-based exercise helped them to prepare the subject.
- They found themselves better prepared, not only to cope with the study of the subject, but also for the final exam.
- Only B.A students considered the leaderboard as an incentive to overcome obstacles.

In sum, we believe that the use of Qstream was very positive and contributed to the two stated objectives of our study:

- To improve time management and maintain a proper pace of study, which has to do with promoting self-regulated learning (Sánchez-Elvira, 2014).
- To increase students' interest and motivation for the course.

The main limitation of the present study is that it only relies on students' opinions under a descriptive approach. A comparative analysis of students' academic performance, with a control group of those students that did not take part in the experience, will be also done to analyse to what extent the participation in QStream could have contributed to improve students' performance in the final exams.

To conclude; on the one hand, there is more than enough evidence about the positive effects of formative assessment and continuous evaluation for learning. On the other hand, distance education students and lifelong learners enrolled in open, online, or blended-learning courses, are usually adults with professional and personal responsibilities that report frequent difficulties at *“finding a suitable time slot to learn during the day”* (Tabuenca, Kalz, Börner, Ternier & Spetch, 2014, p.2). Taken present results into account, we support the idea that *“providing in-context support and feedback for lifelong learners is key to identify the best learning moments, identify available resources in each context, self-organize their learning day, and set realistic goals* (Tabuenca, Kalz, Börner, Ternier & Spetch, 2014, p.2).

Therefore, it would be desirable for distance education institutions to invest more in the development and/or acquisition of mobile learning tools. This effort is clearly necessary as, in the near future, ubiquitous and personalized learning environments, with adaptive capabilities to students' learning progress, will have a central role in the educational systems as they will be able to support more and more students' learning process in “real time”.

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Use of technology and analytical thinking in university students: the positive impact of the psycho-pedagogical model of the International Telematic University Uninettuno (UTIU)

Ileana Di Pomponio

International Telematic University Uninettuno, Italy
i.dipomponio@uninettunouniversity.net

Mariangela Cersosimo

International Telematic University Uninettuno, Italy
m.cersosimo@uninettunouniversity.net

Gianni Serra

International Telematic University Uninettuno, Italy
gianniserra@gmail.com

Arrigo Pedon

International Telematic University Uninettuno, Italy
attivamentis@gmail.com

Abstract

Researches demonstrated that humans are “cognitive misers” (Kahneman, 2011; Stanovich, 2004). Empirical evidence shows that people tend to prefer effortless intuitive processing to costly analytic thought (Baron, 1998; Evans, 1989; Evans & Over, 1996; Kahneman, 2003; Stanovich & West, 2000). Particularly, Barr et al. (2015) revealed that smartphone users who are intuitive thinkers — more prone to relying on gut feelings and instincts when making decisions — frequently use their device’s search engine rather than their own brainpower. Smartphones allow them to be even lazier than they would otherwise be. In contrast, analytical thinkers second-guess themselves and analyze a problem in a more logical sort of way.

More generally, one potential consequence of the accessibility of technology is that the general disinclination and/or inability to engage analytic thinking may now be applicable not only to reliance on intuitive and heuristic thinking, but also to no thinking at all. (Barr et al, 2015).

What happens in the case of technology-mediated learning?

The aim of the study was to test whether the relationship between use of technology and analytical thinking was moderated by web-based e-learning environment, particularly the psycho-pedagogical model of UTIU. We also investigated the moderation role of age and gender.

Participants were students attending traditional universities and the International Telematic University Uninettuno (UTIU).

Results showed that the association between heavy smartphone and technology use and lower cognitive abilities is moderated by gender, QI and by web-based e-learning environment.

UTIU students, even if they usually spend a lot of time using technology, they are not less willing and able to engage effortful reasoning processes, compared to traditional university students.

1. Introduction

The number of smartphone users worldwide is highly increased. Statistic reveal that the total number of smartphone users worldwide for 2017 is forecast to reach 2.29 billion.

So, the anticipated power of such devices is expected to continue to grow at a rate reminiscent of science fiction rather than sciencefact (Miller, 2012). Smartphones have undeniably become a medium with a very important message – a message that has yet to be deciphered.

The extended mind – the notion that the mind goes beyond grey matter – is an idea that allows an understanding of human cognition as acting in a coupled system with the environment (Clark & Chalmers, 1998; Clark, 2008). Clark and Chalmers (1998) define an extended cognitive system as an external object that serves to accomplish a function that would otherwise be attained via the action of internal cognitive processes.

The technological properties of Smartphones provide an exciting and interesting new means of externalization. Such devices go beyond assisting memory through simple maintenance, as has long been done with various media, and in fact accomplish much in the way of the storage and retrieval of memory as well (Pennycook, 2015).

Given the significance of the central tenet of this idea, as well as the staggering efficiency with which ‘cognitive’ functions can now operate externally, it is surprising how little work has directly explored Smartphones within such a framework. Empirical support for the notion that the internet, an integral component of the Smartphone’s utility, acts as an extension of the mind comes from research demonstrating that people think of, and use, the internet as a transactive, or external, memory source (Sparrow, Liu, &Wegner, 2011).

A lot of researches has demonstrated that humans are “cognitive misers” (Kahneman, 2011; Stanovich, 2004), a term adopted from early information processing frameworks (Dawes, 1976; Taylor, 1981). Empirical evidence shows that people tend to eschew costly analytic thought in favor of comparatively effortless intuitive processing (for reviews, see Baron, 1998; Evans, 1989; Evans & Over, 1996; Kahneman, 2003; Kahneman, Slovic, & Tversky, 1982; Shafir & Tversky, 1995; Stanovich & West, 2000). But what’s the difference between intuitive and analytical thinking? To better understand it, we can consider this example problem given from the Cognitive Reflection Test (CRT; Frederick, 2005):

A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost? _____ cents.

The bat and ball problem cues an intuitive response (i.e., 10 cents) that can be shown to be obviously incorrect using a very simple mathematical operation ($.10 + 1.00 + .10 = 1.20$). College students and participants recruited online tend to have a great deal of difficulty correctly solving the problem – with typical scores falling around 33% correct (Campitelli & Gerrans, 2014; Frederick, 2005).

The difficulty that people have with problems like the above example is easily understood under a dual-process perspective of cognitive functioning (Evans & Stanovich, 2013).

Dual-process theories distinguish between autonomously cued intuitive processes that require few cognitive resources and more deliberative processes that require working memory capacity on the other (Evans & Stanovich, 2013; Evans, 2009; Sloman, 1996; Stanovich, 2009; Thompson, Prowse Turner, & Pennycook, 2011). Under this explanation, performance on the bat and ball problem is relatively low because the features of the problem cause intuitive processing to rapidly output a response that requires resource demanding analytic processes to override.

In a recent study (Pennycook, 2015), researchers measured the verbal and mathematic skill of 660 participants, along with analyzing their cognitive style (intuitive vs. analytical). Participants' smartphone habits were also reviewed. Results showed that intuitive thinkers — that is, those who think an act more based on instinct and gut feeling — used their smartphone's search engine more often to answer questions and solve problems. The study suggests that “smartphones are making our brains lazier”, that is smartphones are making intuitive thinkers even lazier, as they are using phones as extensions of their own mind. The study warns how this increased reliance of smartphones could have an especially negative impact on the aging brain. Researchers stop short of suggesting that smartphones actually decrease intelligence, however.

Participants in the study who demonstrated stronger cognitive skills and a greater willingness to think in an analytical way spent less time using their smartphones' search-engine function.

2. Method

2.1 Aims

One potential consequence of the accessibility of Smartphone technology is that the general disinclination and/or inability to engage analytic thinking may now be applicable not only to reliance on intuitive and heuristic thinking, but also to no thinking at all.

Pennycook (2015) has demonstrated that there is a relation between these two forms of cognitive miserliness, such that those more prone to rely on intuitive cognitive heuristics should be more prone to heavy Smartphones use.

The aim of this study was to test whether the relationship between use of technology and analytical thinking was moderated by web-based e-learning environment, particularly the psycho-pedagogical model of UTIU. We also investigated the predictive role of age and gender.

2.2 Participants

Participants were 159 students, divided into two groups. Experimental group consisted of 63 female (mean age: 41,63; sd: 10,387) and 35 male (mean age: 44,83; sd: 10,813), attending the International Telematic University Uninettuno (UTIU). Control group consisted of 45 female (mean age: 37,20; sd: 10,044) and 16 male (mean age: 42,69; sd: 6,906), attending traditional universities.

2.3 Measures

Cognitive Measures

Cognitive style measures included 4 syllogisms (De Neys & Franssens, 2009), 4 base-rate problems (De Neys & Glumicic, 2008), a 14 item “Heuristics and Biases” battery (Toplak, West, & Stanovich, 2011) and a Cognitive Reflection Test (CRT; Frederick, 2005). In summary, we had four cognitive scores: Syllogism (range: 0-4), Base-Rate Problems (range: 0-4), Heuristics and Biases Inventory (range: 0-15) and Cognitive Reflection Test (range: 0-3).

Smartphone and computer use

After answering a set of demographic questions, participants were asked to indicate whether they own a Smartphone (SP). Participants who reported owning a SP were asked to estimate how much time they spent online and specifically using search engines on their SP. We also included two additional questions asking participants to estimate the amount of time they spent on their SPs using social media and for general entertainment. Finally, participants were asked to indicate how many minutes per day they spent online using a computer (generally and specifically using search engines, social media, and for general entertainment).

3. Results

Four multiple regression analyses (Stepwise method), one for each cognitive measure (Syllogisms, Base-Rate Problems, Heuristics and Biases Inventory and Cognitive Reflection Test) were conducted, with cognitive measure as dependent variable, SP use, age, gender as independent variables and the group (UTIU vs control) as moderator variable.

Regarding Syllogisms, there was a significant effect of the moderator variable. UTIU students who reported a high level of SP usage scored higher on Syllogism measure than traditional students (table 1 and 2).

Table 1

Multiple regression analysis: Syllogisms					
Step	R	R ²	R ² change	F change	Sig.
1	0,196	0,038	0,038	5,904	0,016
2	0,272	0,074	0,036	5,640	0,019
3	0,272	0,074	0,000	0,024	0,876
4	0,298	0,089	0,009	1,418	0,024

1. Predictor: SP use

2. Predictors: SP use, age

3. Predictors: SP use, age, gender

4. Predictors: SP use, age, gender, SP use X group

Table 2

Multiple regression analysis: Syllogism				
		Beta	t	Sig.
1	SP use	-0,196	-2,430	0,016
2	SP use	-0,261	-3,110	0,002
	Age	-0,200	-2,375	0,019
3	SP use	-0,259	-3,044	0,003
	Age	-0,201	-2,366	0,019
	Gender	0,013	0,156	0,876
4	SP use	-0,265	-3,112	0,002

Age	-0,201	-2,367	0,019
Gender	0,025	0,303	0,762
SP use X group	0,186	1,191	0,024

-
1. Predictor: SP use
 2. Predictors: SP use, age
 3. Predictors: SP use, age, gender
 4. Predictors: SP use, age, gender, SP use X group

Regarding Base Rate Problems, there was no effect of the moderator variable (table 3 and 4).

Table 3

Multiple regression analysis: Base Rate Problems					
Step	R	R ²	R ² change	F change	Sig.
1	0,070	0,005	0,005	0,723	0,397
2	0,089	0,008	0,003	0,446	0,505
3	0,089	0,008	0,000	0,016	0,899
4	0,129	0,017	0,009	1,288	0,258

-
1. Predictor: SP use
 2. Predictors: SP use, age
 3. Predictors: SP use, age, gender
 4. Predictors: SP use, age, gender, SP use X group

Table 4

Multiple regression analysis: Base Rate Problems				
		Beta	t	Sig.
1	SP use	-0,070	-0,850	0,397
2	SP use	-0,051	-0,583	0,561
	Age	0,058	0,668	0,505
3	SP use	-0,049	-0,556	0,579
	Age	0,057	0,642	0,522
	Gender	0,011	0,127	0,899
4	SP use	-0,055	-0,621	0,535
	Age	0,057	0,645	0,520
	Gender	0,023	0,268	0,789
	SP use X group	0,095	1,135	0,258

1. Predictor: SP use

2. Predictors: SP use, age

3. Predictors: SP use, age, gender

4. Predictors: SP use, age, gender, SP use X group

Regarding Heuristics and Biases Inventory, there was a significant effect of the moderator variable. UTIU students were less “cognitive misers” compared to traditional students (table 5 and 6).

Table 5

Multiple regression analysis: Heuristics and Biases Inventory					
Step	R	R ²	R ² change	F change	Sig.
1	0,233	0,054	0,054	8,505	0,004
2	0,241	0,058	0,004	0,619	0,433
3	0,387	0,150	0,091	15,698	0,000
4	0,489	0,239	0,002	0,260	0,006

1. Predictor: SP use

2. Predictors: SP use, age

3. Predictors: SP use, age, gender

4. Predictors: SP use, age, gender, SP use X group

Table 6

Multiple regression analysis: Heuristics and Biases Inventory				
		Beta	t	Sig.
1	SP use	-0,233	-2,916	0,004
2	SP use	-0,211	-2,493	0,014
	Age	0,067	0,787	0,433
3	SP use	-0,164	-2,012	0,046
	Age	0,023	0,278	0,782
	Gender	0,311	3,962	0,000
4	SP use	-0,167	-2,033	0,044
	Age	0,023	0,278	0,781
	Gender	0,316	3,985	0,000
	SP use X group	0,229	0,509	0,006

1. Predictor: SP use

2. Predictors: SP use, age

3. Predictors: SP use, age, gender

4. Predictors: SP use, age, gender, SP use X group

Finally, regression on Cognitive Reflection Test showed a significant effect of the moderator variable. UTIU students were less “cognitive misers” compared to traditional students (table 7 and 8).

Table 7

Multiple regression analysis: Cognitive Reflection Test					
Step	R	R ²	R ² change	F change	Sig.
1	0,243	0,059	0,059	9,281	0,003
2	0,243	0,059	0,000	0,042	0,838
3	0,272	0,074	0,015	2,352	0,127
4	0,307	0,094	0,004	0,692	0,041

1. Predictor: SP use

2. Predictors: SP use, age

3. Predictors: SP use, age, gender

4. Predictors: SP use, age, gender, SP use X group

Table 8

Multiple regression analysis: Cognitive Reflection Test				
		Beta	t	Sig.
1	SP use	-0,243	-3,046	0,003
2	SP use	-0,237	-2,801	0,006
	Age	0,017	0,205	0,838
3	SP use	-0,218	-2,562	0,011
	Age	0,000	-0,005	0,996
	Gender	0,126	1,534	0,127
4	SP use	-0,222	-2,603	0,010
	Age	0,000	-0,004	0,997
	Gender	0,134	1,624	0,107
	SP use X group	0,167	0,832	0,041

1. Predictor: SP use

2. Predictors: SP use, age

3. Predictors: SP use, age, gender

4. Predictors: SP use, age, gender, SP use X group

4. Conclusion

Several studies (Baron, 1998; Evans, 1989; Evans & Over, 1996; Kahneman, 2003; Stanovich & West, 2000; Barr et al., 2015) provided evidence that the tendency to rely on intuitive rather than analytic thinking is related to a modern form of cognitive miserliness whereby information is sought from an external source, for example, the Smartphone. revealed that smartphone users who are intuitive thinkers — more prone to relying on gut feelings and instincts when making decisions — frequently use their device's search engine rather than their own brainpower. What happens in the case of technology-mediated learning?

The aim of the study was to test whether the relationship between use of technology and analytical thinking was moderated by web-based e-learning environment, particularly the psycho-pedagogical model of UTIU.

The confirmed hypothesis was that participants who reported a relatively high level of SP and computers usage scored lower on each of the cognitive style measures employed.

We hypothesized that students belonging to UTIU with a high level of SP usage could score more than others on the cognitive style measures, due to the specific training and the psycho-pedagogical model of UTIU.

Results confirmed initial hypothesis. Hence, heavy SP users prefer to engage analytic thinking rather than intuitive and heuristic thinking. Moreover, Gender and Age were significant predictors of intuitive thinking. Particularly, male heavy SP users scored less than female on cognitive style measures, while younger students who are heavy SP users are more intuitive thinkers than others.

Group variable (UTIU vs. control group) was a significant moderator of the relationship between use of technology and analytical thinking. So, belonging to UTIU is a protective factor against cognitive impoverishment.

In conclusion, we confirmed the association between high levels of SP use and cognitive miserliness in a sample of Italian university, but we also found that the relationship between use of technology and analytical thinking was moderated by web-based e-learning environment, such as the UTIU model.

An important issue for future research is to explore the differences between other Telematic Universities in Italy and to test the hypothesis in younger students, such as high school students.

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Prevention of student dropout in higher distance education: Positive Technology

Marcela Paz González-Brignardello

Universidad Nacional de Educación a Distancia (UNED), Spain
mpgonzalez@psi.uned.es

Ángeles Sánchez-Elvira Paniagua

Universidad Nacional de Educación a Distancia (UNED), Spain
asanchez-elvira@psi.uned.es

Abstract

Student dropout prevention is one of the most important tasks in higher distance education. The care services and students support units have, at present, the possibility of make use of a wide variety of technological resources that could facilitate information and orientation to a higher number of students and these possibilities should be explored by institutions

The new field of Positive Technology combines current advances and possibilities of ICT technologies with the approach of Positive Psychology, a discipline that promotes wellbeing and the development of the strengths of individuals, organizations and societies.

In this paper we report on the development of a pilot program, based on the contributions of Positive Technology, whose main aim is to prevent and reduce students' Academic Procrastination through an online and self-applied and self-guided intervention program. Research on Procrastination has been highly related to students' dropout, in general, and has proved to be even more relevant in distance education (González-Brignardello & Sánchez-Elvira Paniagua, 2013). The program has been designed to change emotions, beliefs and self-images related to the conduct of Academic Procrastination, mainly with new students. The intervention is based mainly on visualization or mental imagery.

Aspects of persistence and abandonment of the program, one of the key questions in online applications, are analysed.

Keywords: student dropout, self-guided online intervention, Academic Procrastination, emotions, mental imagery.

1. Introduction

Student dropout presents a high prevalence, as shown by various internationally studies (e.g. Ulriksen, Madsen, & Holmegaard, 2010; Woodley & Simpson, 2014). In Spain, the estimation of prevalence is around 27% in higher education since the implementation of the EHEA (Ministerio de Educación, Cultura y Deporte, 2015). These data makes a priority that educational institutions implement mechanisms to reduce dropout rates facilitating the integration of the new students into the educational system, and encouraging their persistence in the institutions during the years of university education. In this way, the effectiveness of higher education, measured by success rates, will improve.

As expected, in the field of distance and virtual education, the prevalence of abandonment is even higher (Simpson, 2012, Sánchez-Elvira Paniagua 2016, Woodley & Simpson, 2014) and rates are around 50%, according these reports. With regards to the factors that influence this phenomenon, Lee & Choi (2011) extracted, from the revision of studies published during the years 1999 to 2009 (a period of great growth of distance education thanks to the advances of internet), a set of factors that influence student dropout in online courses. These factors were categorized as follows: (a) academic background, (b) Relevant experiences, (c) skills, (d) psychological attributes, (e) course design, (f) institutional support, (g) interactions, (h) work commitment, and (i) supportive environment. These nine categories were grouped into three main sections; (A) Student factors, (b) Course / Program factors, and (c) Environmental factors (p. 604). Of these major factors, the student factor includes the 55% of the total number of factors, the environmental factors includes the 25% and factors of course / program includes only the 20% (Lee & Choi, 2011). In other revision, Sánchez-Elvira Paniagua (2014) concludes that Institutional and Personal factors are the two sides of students' dropout.

Numerous studies have shown that among the characteristics of those students that more frequently fail and drop-out, we find difficulties to persevere related to a broad set of personality traits, behaviours, cognitions and emotions (among which we can found self-efficacy, motivation, time management and the ability to cope with adversity), that could be considered in terms of inefficient self-regulated learning characteristics and process (Pintrich & de Groot, 1990; Zimmerman, 2002). In contrast, those students who complete their studies are usually characterized by autonomous and self-regulated learning, intrinsic motivation, engagement, resilience, persistence, etc. with their own project of study (Sánchez-Elvira Paniagua, Fernández & Amor, 2006; Sánchez-Elvira Paniagua & González Brignardello, 2014).

Among all these personal characteristics, there is a behaviour that has been reported as highly prevalent among students and which is related to underperforming and abandonment. We refer to the delay or postponement of learning tasks, or the so-called Academic Procrastination (Ferrari, Johnson, & McCown, 1995). This dilatory behaviour is considered a stable personality trait, i.e., it is the expression of a tendency to exhibit a typical response in a variety of situations. Academic Procrastination is related to poor time management, deficit in study skills (Solomon & Rothblum, 1984), deficit of self-regulation (Klassen, Krawchuk, & Rajani, 2008; Steel, 2007), as well as perfectionism (Burns, Dittman, Nguyen, & Mitchelson, 2000), self-handicapping (Beck, Koons & Milgrim, 2000), fear of failure or success (Solomon & Rothblum, 1984), among others.

Due to the large number of variables related to Academic Procrastination, numerous and diverse models of intervention can be found in the literature (Ozer, Demir, & Ferrari, 2013; Schouwenburg, 2004). However, the studies report mixed results of the effectiveness of different interventions to overcome Academic Procrastination.

An interesting and promising perspective comes from the area of Information and Communication Technologies (ICT), as numerous prevention and psychological intervention programs currently incorporate resources based on ICT. In 2002, Norcross, Hedges, and Prochaska predicted there would be therapeutic interventions based on technology in one decade; nowadays there is a clear trend of continuous development in this field.

The implementation of technology interventions is, thus, greater and more creative in this moment. On one hand, we have a complementary use of technical resources to optimize traditional psychotherapeutic approaches and maximize range of treatments to more people (Bunge, Lopez, Mandil, Gomar, & Borgialli, 2009); and on the other hand, we have specific interventions based on technological innovations such as Virtual Reality techniques (e.g. Botella, Baños, Villa, Perpiñá, & García-Palacios, 2000). Within this set of developments, we can also find the implementation of automated or semi-automated assessment systems using online test, and the development of online sessions via videoconference and cyber-therapies, as well (Eells, Barrett, Wright, & Thase, 2014).

Some of the advantages of these psychological interventions are accessibility, convenience, cost-effectiveness, anonymity and privacy. Also, with online interventions it is possible to provide reinforcements and promote adherence to treatment, etc. (Eells et al., 2014). It should be noted that, once

these systems have been developed, the costs are low, both in maintenance and upgrade ones, in comparison to one to one interventions (Distéfano, O'Connor, Mongelo, & Lamas, 2015). In addition, the internet-based self-guided programs have lower cost and higher therapy efficiency.

With regard to the disadvantages against the online programs, we could point out that they lack of direct contact (although research data show even contradictory and inconclusive results about this); also, there might present some problems with security measures and safeguards of confidentiality; and, finally, the difficulty of handling a sudden critical situation, not uncommon in a therapy session.

But psychology has not only developed methods of intervention aimed at overcoming psychopathological processes or maladaptive ones. In the late 90s, we saw the birth of a new discipline that aims to study the optimal functioning of the human being (Seligman & Csikszentmihalyi, 2000). By means of scientific research, Positive Psychology, on one hand, tries to understand the characteristics of the personality that are related to the wellbeing and adaptation of people and the proper functioning of the institutions and societies and, on the other hand, it aims at developing programs that help to improve the lives of individuals. All this will result in the promotion of wellbeing, broadly defined, and specifically the prevention of psychopathological disorders (Seligman & Csikszentmihalyi, 2000). However, to understand how individuals' wellbeing is generated and how it increases, in a wide sense, we need to understand the role of emotions, thoughts, values and behaviours and how they relate to live in an adaptive and satisfactory way.

In addition, and in line with the use that society makes of technology in all areas, Positive Technology appears as a new framework that integrates the principles of Positive Psychology with the advances and possibilities of technology.

Coming to the student's wellbeing area of research, under a theoretical perspective it is assumed that students experience a lot of emotions related to academic life; however, studies report mostly about anxiety and its relationship to the study process and academic performance, with minimal research on other emotions (Pekrun, Goetz, Titz, & Perry, 2002). Nevertheless, this situation is remitting in last years, as new lines of research are showing how emotions also influence the process of self regulated learning (Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011). Even more, Mega, Ronconi, & De Beni (2014) founded that students' positive emotions positively affect their organization of academic study and summarization of study materials in a more personal way (p. 128).

Pekrun et al., 2002) proposed to use the term "academic emotions" to refer to the emotions of the area of learning, in line with other terms such as "academic motivation" or "academic self-efficacy." Academic emotions do not refer only to success and failure, but also to the learning or study process. Through five qualitative studies, these authors found different categories of discrete emotions appearing in several types of academic situations. The anxiety was mentioned more often, not only in relation to exams situations, but also to other academic situations, like studying at home or staying in class. Aside from anxiety, emotions that were most often reported were enjoyment of learning, hope, pride and relief, as well as anger, boredom, and shame (Pekrun et al., 2002, p. 93).

The psychological intervention called *exposure* is a specific technique that has been validated for anxiety disorders treatment, like phobia or posttraumatic stress. This technique has different modalities of presentation, for example, in real way (*in vivo exposure*) or exposure in imagination (*mental exposure*). In the *mental exposure* technique, the individuals focus on the fear scenes related to their main problem. The persons put into their minds the images, so this intervention is call "visualization" or "mental imagery" (e.g. Bullock, Newman-Taylor, & Stopa, 2016; Holmes, Geddes, Colom, & Goodwin, 2008).

In *exposure interventions*, patients are asked to recall the details of the feared event while focusing their attention on any occurring sensory feelings, thoughts, and emotions. In this way, exposure to such memories results in reduction of fear and avoidance. From a cognitive behavioural view, exposure objectives are habituation and extinction of phobic response to the feared stimulus. The presumed underlying mechanism is the loosening of the association between unconditioned and conditioned stimuli (e.g. Foa & Kozak, 1986; Foa, Dancu, Hembree, Jaycox, Meadows & Street, 1999).

From a psychoanalytic perspective, visualization imagination (mental imagery) is the reworking of memories, or rewriting the script (Arntz, Tiesema, & Kindt, 2007) providing, thus, of new information to memory system and storage, which will finally allow more adaptive responses to internal and external stimuli.

The main aim of this research was to implement a self-guided online intervention primarily based on mental visualization with the aim to change negative attitudes and emotions related to study that could be leading distance education students to procrastinate. The content of the visualization was related to bad memories related to learning episodes, or the study session itself. The participants were students who scored high in the Academic Procrastination scale.

2. Method

2.1 Participants

The participants were college freshmen in UNED distance higher education system and who were registered in the virtual community of induction of their Faculty. These students had been identified as risk students by giving high score (> P70) in the Short Academic Procrastination Scale. Participation was on a voluntary basis and one ECTS was offered. The entire procedure was conducted online. The participants signed an informed consent.

2.2 Self-reported Measures

Academic Procrastination Scale – short version, (González-Brignardello & Sánchez-Elvira, n.d.). Experimental Instrument developed for research purposes It is a 6-items scale to which one responds with the degree of agreement on a five-point Likert scale.

Positive and Negative Affect Schedule – PANAS (Watson, Clark & Tellegen, 1988), Spanish version (Sandín et al., 1999).

Engagement Scale, (Salanova, Schaufeli, Llorens, Peiró & Grau, 2000). Adapted version: 7- items scale, to which one responds with the degree of agreement on a seven points Likert scale.

Experimental Questionnaires Intra Session - experimental instrument (González-Brignardello, n.d.).

2.3 Procedure

A quasi-experimental design was used, without control group and repeated measures pre-post intervention.

951 students responded to the online screening test. 347 of them were above the 70th percentile, of which 61 were finally enrolled in the program. The program was implemented 3 weeks before the exams periods. Those students that were enrolled in the program had access to a website inside UNED e-learning platform (aLF). In this site, they could find the intervention program and all self-reported measures, as well. Only 10 students ended up the program.

Intervention was developed as a sequential program consisting of 4 phases:

- *Time available*: students had to identify the amount of free time on a daily basis making use of a self-calculation file. This activity was made only once because it consisted in delivery the file completed with student's own information.

- *Beliefs about Procrastination and identification of personal style* (multimedia presenter). This activity had lasted 5 minutes and, at the end, the student had to fill a form with conclusions about his/her procrastination style. This activity was made only once.
- *Visualization I* (exposure to 1 own image while procrastinating) (15 minutes of duration). This exercise was made only once a day, but it was repeated before each three study sessions.
- *Visualization II* (exposure to 2 own images: the first one while procrastinating and the second one to an image “totally different or opposite to the first one”) (15 minutes of duration). This exercise was made once, but if at the end of the session images continued appearing in a similar shape than at the beginning, then it was necessary to repeat the exercise.

The contents were developed in a multimedia format and interactive system. The access to each sequence of the program was progressively obtained through a secret password. The information for the next step was at the end of each exercise. The access to the next exercise was only possible with the password. The Intra-session measures were applied during the practice session through brief online forms inserted between the exercises.

Clear instructions for each visualization sessions were given before the starting point of each study session.

3. Results

Only 10 students completed the program. Table 1 show abandonment occurred during the study.

Table 1: data of abandonment

	Nº students
High Academic Procrastination	347
Students enrolled	61
Activity	
Free time	34
Procrastination Style	23
1st session	23
2nd session	13
Ended the program	10

Pre – Post analyses

Quantitative analyses

The Wilcoxon signed rank test was used to compare pre and post intervention measures.

- The *Academic Procrastination* was significantly diminished between pre and post measures ($M_{ed1}=22,50$ $IQR_1=4,75$; $M_{ed1}=14,00$ $IQR_2=10,25$; $Z=-2.103b$; $p=.035$).
- Students' *Engagement* improved significantly ($M_{ed1}=25,60$ $IQR_1=11,00$; $M_{ed2}=34,00$ $IQR_2=11,75$; $Z=-2,670c$; $p=.008$).
- In the same way, *Positive Affect* increased significantly ($M_{ed1}=36,00$ $IQR_1=7,00$; $M_{ed2}=40,00$ $IQR_2=12,50$; $Z=-2.383c$; $p=.017$). In contrast, *Negative Affect* did not present any significant difference.

Qualitative analyses

Analyses of emotional and cognitive changes. The qualitative analyses related to self-reports on students' visualization shown changes in shape, colour and size in 9 of 10 students. The most important results indicated important changes on feelings and cognitions between the first visualization session and the final one. More detailed changes on emotions are described below. The intensity of emotions was measured in 0-10 scale.

Student 1: anguish (8) ⇔ relief and satisfaction (8)

"I haven't patience for continuing" ⇔ "I have overcome"

Student 2: fear (8) ⇔ happy (9)

"I'm stupid and not worth for anything" ⇔ "I am strong and can handle anything"

Student 3: anguish and shame (6) ⇔ optimism (7)

"guilt" ⇔ "I'm studying without troubles and I'm happy"

Student 4: suffocation (8) ⇔ pride and satisfaction (10)

"guilt" ⇔ "achievement with perseverance and effort"

Student 5: fatigue (5) ⇔ satisfaction (8)

.... ⇔ "triumph"

Student 6: disappointment (7) ⇔ satisfaction (8)

"I do not try hard enough and always look for excuses" ⇔ "I'm able"

Student 7: overwhelmed (5) ⇔ satisfaction (8)

"I can not take all that I have to do and study" ⇔ "I can, I'm worth"

Student 8: nervousness (8) ⇔ happy and motivation (8)

"I know not organize" ⇔ "I can, I can get it"

Student 9: nervousness (9) ⇔ pride (9)

"Again equal. You do it again" ⇔ "you're great"

Student 10: sadness (3) ⇔ strength (8)

"I'm useless" ⇔ "if you want you can do"

We can see that in all students was produced a big change about the first sensation that made them self-image. The same occurred with first cognition.

4. Conclusions

Failure and dropout rates are high in university students, especially among distance education ones (Sánchez-Elvira Paniagua, 2014; Simpson, 2012). Although some institutional reasons can be underneath these high rates, there are also some personal characteristics to be considered (Lee & Choi, 2011; Sánchez-Elvira Paniagua, 2014). A relevant personality trait in academic settings is students' Procrastination, which has proved to deteriorate significantly students' s performance and wellbeing (González-Brignardello & Sánchez-Elvira Paniagua, 2014). However, distance education students can be trained to prevent and reduce their procrastination and to develop self-regulated learning strategies.

In the present study, an innovative approach to support students in online environments was developed through the implementation of an online and web-based self-guided intervention oriented to change those negative cognitions, emotions and motivational states, that procrastinators experiment while they are studying. The online program was based on the use of *mental imagery* to change students' previous negative visualizations about their experience while studying. Results showed that, after the program, students had developed more adaptive strategies, a significant increase of their engagement and positive affect, and a decrease of their self-referred academic procrastination.

In the present study, the online self-applied technique was derived from the Positive Psychology objectives (Seligman & Csikszentmihalyi, 2000) to whom the recent Positive Technology field is contributing (Riva, Baños, Botella, Wiederhold, Gaggioli, 2012); that is, ICT serving to enhance, in our case, students' skills, learning strategies and wellbeing, and to promote the emergence of personal resources (such as positive emotions, empowering beliefs, positive thoughts, self-efficacy, etc.).

Taking into account the big challenges and difficulties of delivering guidance, orientation and support to large number of students in online environments, these new approaches could be easily adapted to a massive scale and a low cost without losing the capacity of producing significant and stable changes. Also, mobile technologies will allow us the implementation of even more personalized and adaptive mechanisms of intervention. In this sense, in UNED, this type of applied projects and research are been integrated in the development of the e-SPA, the *online Applied Psychological Service* of the Faculty of Psychology, contributing to the achievement of their main objectives.

The small sample size of the present study is a clear limitation. Another aspect that requires further attention is the maintenance of changes over time, and the effects on academic performance and students' general wellbeing, as well. However, as a pilot and explorative research, these results allow us to continue with the aim of implementing more ambitious experiments and longitudinal studies in the near future.

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Beyond remote and virtual labs: mobile laboratories for physics and engineering in e-learning and traditional teaching

Livio Conti

Uninettuno University, C.so Vittorio Emanuele II, 00186, Rome, Italy
livio.conti@uninettunouniversity.net

Abstract

In the teaching of technical and scientific disciplines, the experimental practice in laboratory constitutes an invaluable tool. Unfortunately, often, the reduced budgets and the lack of instrumental and human resources limit the experimental activities in laboratories in many classes of any degree, from primary and high school up to university. Internet has stimulated the development of some networks of remote laboratories that share instruments available at the participants' sites. Nevertheless, these networks can have trouble in connecting, require human assistance, and offer a limited number of experiential activities. In this framework, we are trying a complementary solution, constituted by distributed low-cost labs, based on mobile terminals. Smartphones, tablets, etc., include some physical sensors used for functionalities own of the terminal, such as screen rotation, orientation of the device, geolocation, etc. In this framework, we have developed a lab for mobile platforms that allows having a real portable laboratory. Our software acquires measurements of physical quantities with the sensors - natively installed in each mobile terminal - exactly as the instruments in traditional laboratories. In addition, the developed software allows on-line statistical analysis of acquired data and the interactive connection with other remote devices in order to share data and results between far users. The mobile laboratory has been specifically conceived for teaching in e-learning courses of science, but can be used also in traditional teaching as well as in self-learning. The project has been developed by a community of university students, with an open source approach that maximizes further developments.

Keywords: Mobile laboratories, smartphones, laboratory experiments, e-learning, teaching science and technology

1. Introduction

Laboratory activities are extremely important in learning processes, mainly in STEM fields, because allow consolidating the knowledge acquired theoretically and students can verify directly - and in an independent way - the laws studied and the rules learned. Experimental activities within the learning processes enable cognitive reasoning (through symbolic-constructive and motor-perceptual mental processes) and foster knowledge acquisition, as the motor-perceptual level enables a quicker and effortless learning that goes beyond age, culture and background differences of the users. But, often, educational laboratories, as well as computer-aid tasks in classroom, fail because labs are not available everywhere, must be booked in advance, are not ready for suitable and immediate use, do not include all the instruments needed, etc. In addition, many times lacking the essential equipment and infrastructures, as well as technicians needed to arrange labs, manage the instrumentations and carry out the experiments. In many of these cases, the use of virtual, remote and distributed educational laboratories can help in overcoming the difficulties and

performing easily brilliant experiments. Already many applications of remote and virtual labs (ranging from remote-controlled real laboratories to video-simulations and IVR (Immersive Virtual Reality)) are available in artistic, medical and technical-scientific fields. Recently, the use of new advanced technologies in educational laboratories is encouraging the development of new models of learning. Thanks to the large availability of cheap mobile terminals (such as single-board computers, smartphones, tablets, etc.) and Internet access, it is possible to carry out sophisticated experimental activities for educational purposes not only in devoted traditional laboratories and in remote labs (through internet connection) but even at home and everywhere. This possibility opens unexplored and high-impact opportunities both for students (including homebound disabled students) and for teachers (both in traditional and in distance learning). With this perspective, the scepticism surrounding the use of smartphones in teaching can be overcome by the enthusiasm of students and pupil and the improvement of their results in learning path. The paper will present the laboratory infrastructure that we have developed based on mobile platforms such as smartphones, tablets, pads, etc. in order to allow carrying out educational experiences even at home. Our labs have been conceived with an “adaptive learning” approach (Kavcik, 2006; Bower, 2013) centred on the concept of virtual laboratory education (Alexiou et al., 2005). The interactivity in the laboratories (Garito, 2015; Dalgarno et al., 2009) plays an important role in the design of learning environments (Jacobson and Reimann, 2010; Trentin, 2015) and is essential for the assessment of the effectiveness of didactic strategies. The developed laboratories are targeted to STEM students that will experience an unconventional, stimulating learning process aimed at increasing their autonomy and getting them familiar with basic experimental observations and measurement instruments. Our mobile laboratories are available for students with no constraints in terms of time access, do not need of manned surveillance and are immune from significant risk of hardware damaging. All of these features allow repeating and deepening the experimental activities as much as the users need, increasing the rate of use of labs, and the effectiveness of the user experience. The approach of mobile labs is based both on the “learning by doing” method (Kass, 1994) and on the “inquiry-based learning” approach (Fisher et al., 2007; Tóth, 2012). Students are actively involved in the practical application of previously studied theories, avoiding the problem of unused information and promoting the integration of theoretical and practical issues of his/her knowledge. The opportunity of tackling errors in a risk-free environment is essential, as well as the possibility of consolidating one's own knowledge. Moreover, the project of mobile labs aims at verifying the effectiveness of mobile laboratories in heterogeneous populations of students. These studies can be performed thanks to the opportunity (distinctive of the users of our mobile labs) of involving conspicuous samples of students, belonging to diverse cultural, linguistic and social areas.

2. Virtual and remote educational laboratories in the learning processes

The modes of expression typical of virtual reality typical of a post-symbolic communication, as defined by Lanier (2010), adopted in virtual and remote laboratories for educational purposes, allow the removing spatial constraints, and language and culture barriers. The potential expressed by this type of communication can lead to a significant improvement of learning processes from two points of view: cognitive and didactic. The first advantage is the inclusion of a level – generally undervalued in learning processes - corresponding to add the motor-perceptual level to the classical symbolic-reconstructive one. On the other side, at the didactic level, the learning process (mainly in e-learning approach) can take advantage from the tools that new technologies offer for tutoring and developing cooperative learning networks (Garito, 2001). The use of online virtual laboratories in learning process shows good potential in

developing metacognitive skills and self-awareness (Wood, 1976; Cornoldi, 2006) even in scientific and technical disciplines, where often the psychological aspects (emotional, cognitive, motivational, etc.) involved in the learning process are ignored or considered as secondary, whereas the focus is mainly on the cognitive performance and the achievement of adequate levels of profit. In this context, also cultural and social differences can have a significant impact on the learning process, as well as, for example, the tendency to individualism or to collaboration can influence the preference in the dynamics of eLearning, toward a hierarchical or constructivist approach (Liu, Magjuka and Lee, 2010; Wang, 2007). Research on socio-cognitive processes has started to demonstrate that online laboratories act on attentive (Orvis, Fisher and Wasserman, 2009), inferential and mnemonic processes, by creating more stable mind maps and a better retention of experienced information, through the construction of memories and shared beliefs (Coman and Hirst, 2012). Moreover, several studies (Kramarski and Michalsky, 2009) have shown that laboratory activities could also act at a metacognitive level, on the mastery and the knowledge of learning strategies, acting significantly on motivation and on the academic experience of students in its psycho-pedagogical completeness.

Anyway, virtual and remote educational labs show several limitations from technical and pedagogical point of view as well as for management of the labs resources. The virtual labs are mainly constituted by software simulations of phenomena to be studied. Even though simulations can be useful in verifying the concepts learned, the range of validity of the studied theory, etc. The experiences executed in virtual labs cannot constitute a test of the physical world that we want to study. Therefore, virtual labs cannot give to the students the feeling of an independent check of the real physical phenomenon that they are studying. Virtual labs are safe, easy and cheap but cannot substitute any more a real measurement process. For these reasons, the advantages are clear as well as the limitations, mainly for STEM courses. On the other side the educational remote labs, that are based on real instruments installed in traditional laboratories and connected via internet to remote users, in principle allow executing measurements with true instruments but generally they lack of direct psycho-pedagogical impact in doing the measurements directly with real instruments. Moreover, in order to access to remote labs you need of a network of connections and of some operators that on site execute some operations together with the remote users. Finally, remote labs need of traditional instruments of measurements (generally expensive) and of a time schedule (for the access, connection, execution, etc.) that reduce the accessibility anytime from anywhere.

3. Educational laboratories on mobile platforms: single-board computers vs. smartphones

The most promising solution to overcome the difficulties of lack of laboratories equipment in traditional labs, or hardware availability or accessibility by remote in remote labs is to change the paradigm. We no more need to carry students into traditional labs, but we can carry laboratory directly in the hands of students. This is not a slogan, but a real possibility offered by new hardware and technologies. Laboratory on mobile platforms are today available due to two recent novelty in the mass market: 1) the introduction of general-purpose programmable devices (such as Arduino (Arduino 2016), Raspberry (Raspberry 2016), etc.) and 2) the impressive diffusion of smartphones, tablets and other mobile terminals. The Arduino, Raspberry and other similar platforms are cheap and popular single-board computer developed for promoting the teaching of basic computer science, but that have been applied for developing more generally scientific labs. By connecting some peripherals and/or sensors to the main board, it is possible to easily built instruments able to perform measurements of several physical quantities and to connect them

with other similar devices. The second technological “event” that is changing the prospective of the educational mobile labs is the possibility to develop labs on mobile terminals such as smartphones, tablets, pads, etc.

Due to technology development and commercial campaign, smartphones are becoming every year cheaper and powerful, gaining an extraordinary popularity among young people so to become a companion in everyday life. Smartphones are no more used to make just phone calls or to listen to music and to play, but beyond to recreation, people can use their mobile devices to read and to learn, and can do it anywhere and anytime. The learning with mobile device is no more just an intelligent way of using the waiting times - during transportation or breaks or at the end of job - but allows extending the possibilities and the range of e-learning applications.

The introduction of MEMS (micro-electro-mechanical systems) (MEMS, 2016) in smartphones (and more in general in portable highly mobile terminals/devices) opened the new era of mobile/personal laboratories (Vogt et al. 2011). MEMS is the technology of microscopic devices - including mechanical moving components, electronic transducers and microelectronics analog-to-digital conversion - that allows developing the miniaturized sensors installed in many small portable devices in order to monitor physical parameters of the environment, to know orientation, for geo-localization, etc. MEMS devices generally consist of a central unit for data processing and several microsensors that interact with the surroundings environment. These devices are very sophisticated not only for their extremely small dimensions, but also because, at these small scales, the building procedure of the device and their working system are based both on phenomena of classical physics and on quantum mechanics effects. In our project, we have preferred to develop educational mobile laboratory by using smartphone and tablet platforms (Schwarz et al., 2013; Kuhn et al. 2013) instead of using single-board computer and sensors on peripherals. Obviously, both choices are not mutually exclusive and show advantages and disadvantages from economical, functional, educational point of view, and should be considered as complementary in many applications.

Smartphones are small and lightweight equipment, and for many educational experiments, you do not need to buy any more devices, because many sensors are already included in smartphone and can perform many measurements of a large variety of physical quantities. By combining and analysing data (at a different and suitable order of precision and refinement), it is possible to develop different labs activities by tailoring the experiments to the purposes and the requirements of the target of pupils and students (high school, university, traditional or e-learning etc.). The number of laboratory experiences, the range of parameters that can be measured, the sampling frequency as well as the accuracy, sensitivity and other performances of the sensors depend on the adopted hardware and software platform. We have preferred to choice labs on smartphones mainly because smartphones, tablets, and pads are devices “ready to use”, i.e. the hardware (with all its constrains and limits) is ready and we can concentrate on developing software (apps) and the educational activities instead of be involved in building and assembling hardware. This is also a cheaper choice because it is possible to use the personal smartphone of the students. Obviously, with the built-in MEMS sensors included in a smartphone it is not possible to measure an unlimited number of parameters, but for the purposes of many high-school and university courses the observations that can be carried out with the MEMS sensors are enough to develop many experimental activities in basic STEM. On the other side, it must be highlighted that in principle by using the USB, audio, etc. ports, as well as the analog-to-digital conversion capability of a smartphone and its CPU power for data processing, it is possible

to extend the number of measurements available on a smartphone by connecting standard (or custom ones) peripherals that carry the appropriated sensors on board.

4. Educational laboratories based on smartphones

Generally, smartphones are accepted in classroom just as ancillary devices used in order to facilitate, or to improve, some technical tasks, such as a tool to search words translation, a calculator or a device to make easier and faster search on internet, etc. In this approach, the use of smartphones could interfere with some abilities that the students should acquire by them self. Smartphones are powerful devices and there is the risk that users could abuse of them in a classroom. Moreover, smartphones can constitute a “window” to “escape” from a borrowing lesson and really, they can compete with teachers in catching the students’ attention. Anyway, in the e-learning activities this problem could be less relevant. For these reasons, in many high school classrooms, smartphones are forbidden - or barely tolerated - because they would disturb the lessons and distract the students’ attention. Effectively, it could be true if the use of smartphone occurs in competition or against the “traditional” teaching. On the contrary, if smartphones are used as tools for teaching and learning, they can gain a valueless importance. First of all, the use of smartphone as a tool to make observations is itself a way to teach students on the possibilities offered by the new technologies, the potential risks of the abuse, and the limitation needed. Moreover, the use of smartphones is really innovative and useful for teaching and learning when the use of these devices goes beyond to mimic the functionalities performed by standard instruments such as calculator, classical paper dictionary, maps, thesaurus, etc. Smartphones become a true new ingredient of learning path when their use and performances are not a naive substitute of some other devices or tools, but when they are applied in order to make somethings that are not possible otherwise. In this case, the use of smartphone in teaching and learning is a key-point, not a surrogate of something else.

Of course, the laboratory that you can have in your pocket with a smartphone is not a surrogate of a true full-equipped laboratory, but this approach can allow extending the application of smartphone in teaching. By using a mobile laboratory, a lot of measurements and related observation and analyses can be carried out directly on the field, in places where and when none standard laboratory instrument can be easily or quickly carried out. In our opinion, this use of smartphone allows spreading the application of labs activities (beyond the theoretical learning) for an experimental approach to learning physics and other STEM high school classroom or degree courses.

The consciousness of the students to have in their pockets a device that (potentially) includes a small laboratory (that can be used in order to execute measurements not only in classroom, but also in “real life”, with the assistance of a tutor, but also in an autonomous way) can galvanize students, by increasing their feeling with the labs activities. The possibility to conjugate the private use of the smartphone and the use as learning tools can strongly motivate pupils and students. A key feature that is natively included in using smartphone is the possibility to use the standard connectivity of a smartphone in order to share observations and data collected by each students with his friends and colleagues. Sharing data can facilitate the cooperative work and the companion assistance between students in the same classroom, working on the same task. Carrying out measurements together and the comparison - on line and in real time - of the methods applied and the obtained results (with those of others students) are key-points of the cooperative learning that the use of educational laboratory on mobile device can strengthen.

Moreover, the smartphone-based laboratory can face a continuous updating driven by the continuous upgrading of the smartphones that year-by-year are equipped with more sophisticated and performing sensors. In each classroom, students use smartphones of different vendors that in general include different sensors with different features (such as sensitivity, performances, etc.). In standard laboratory, it is rarely possible to make measurements of the same phenomenon with many different instruments, therefore the use in educational labs activities of different smartphones for making the same observation constitute a unique possibility that allows comparing results and discussing different methods and techniques applied. This comparison is the root of the scientific method and a key ingredient of experimental activities in teaching. We believe that comparing measurements carried out with different devices in different environment can facilitate the learning process. The comparison is the main difficulty that researchers and teachers have to face with and manage to in order to explain and to connect observations. However, on the other hand, the real aim of a laboratory activity is: 1) to test the theoretically acquired knowledge with measurements on the field and 2) to show the scientific process that, starting from experimental observation, generates the theoretical laws, i.e. the abstraction path from the data taking to model development. In this framework, the possibility to have different instruments (i.e. using different smartphones) is a valueless tool for teaching.

5. The objective of the project

The project aims at using smartphone sensors in order:

- to develop a set of lab experiences, at different levels of complexity and tutoring assistance (starting from supervised activities executed at distance - through the Internet - up to experiences at home or everywhere);
- to develop some assessment tools for evaluating the impact of the labs activities on the learning process on a heterogeneous student population (with different levels of basic knowledge, starting skills and psychological characteristics).

Furthermore, the project aims at evaluating the impact of the labs within the adopted e-learning platform on the Uninettuno University. The labs activities have to be managed and supervised by tutors, through a "Socratic" dialogue (where the so-called "cognitive scaffolding" principles are put into place in the learning path (Fernandez, 2003 Meijer et al. 2006)), in order to constantly monitor (synchronously and asynchronously) the performance of the learning process (Garito, 2015). The developed laboratory activities must be: easy to understand, flexible, and customizable. The starting point for designing the environment of labs learning has been the cognitivist and constructivist theories of learning (Vygotsky, 1978; Bruner, 1956). The student must have an active role (Michael, 2006) along a path of progressive and procedural complexity and can easily interact with an environment built on theoretical and practical knowledge (Garito, 2001). Mobile laboratories also offer the possibility to develop and support open and flexible collaborative learning (Jara et al., 2009) where the active participation of the student is a main requirement. In the design of mobile laboratories, particular attention has been given to (Garito et al., 2006): a) Interactivity (that is a main requirement in the use of highly technological environments) by including many features (such as "option to stop/pause/reset", "smart scan", "settings", "calibration procedure", etc.) ; b) Intentionality, in order to reduce the complexity of the environment (In environments rich in information, the user needs a reduced model of the result to be achieved in order to avoid getting lost in hyperspace); c) Feedback (that is essential for all the intentional learning. The more a person knows, the

better s/he can use the feedback to collect and process more information.); d) Control: the learner must be supervised. The labs gives to students the possibility to act at different levels of interactivity and to rely on the leadership of professors/tutors who oversee the experiences and can communicate with students through online communication tools, synchronous (e.g.: chats, virtual classrooms) and asynchronous (e.g.: forums, wikis). This structure is at the basis of the architecture of the tutoring and evaluation system designed for mobile labs aimed at controlling the entire learning process by correcting inappropriate behaviour, evaluating student knowledge giving continuous feedbacks.

6. Description of the developed laboratory on smartphone

Developed educational laboratories on smartphone are planned for students of STEM courses and cover: physics, chemistry, computer science, elementary particles physics, telecommunications, astronomy, electronics, etc. The experimental activities that can be performed range from full measurements supervised by teachers/tutors to activities at home (HomeLabs). The laboratory is conceived in order to use both apps already available on the market (often free) and a new app specially developed for the purpose of our lab. The building of the labs has included the following steps:

- adaptation and contextualization of some laboratory activities that had been already built to the educational and experimental needs of mobile labs;
- development of new laboratory experiments useful to complete the whole set of resources available for the mobile labs project;
- development of a set of lab experiences to be carried out at home.

For our labs on smartphone, we have developed from scratch a new devoted application that includes several features such as:

- Measurements of single physical quantities;
- Measurements of multiple physical quantities together with video recording;
- Connection of the smartphone to other mobile devices during the execution of the labs activities in order to share the monitor, data and remote control of the sensors;
- Tools for data processing, data sharing, etc.
- Providing info and instructions on the set of laboratory activities that can be executed with the sensors available on each smartphone;
- Providing questionnaires to the users in order to verify his knowledge on the executed activities;

For each of parameter that can be measured, the developed app allows:

- To plot (on line and off line) the acquired data vs time;
- To execute on line spectral analysis in amplitude and phase;
- To set up the acquisition parameters and the graphical parameter of the graphical representation;
- To store acquire data.

None of the apps available on the market includes all the features of the application developed for our lab. By using our app, the users can perform many basic and advanced activities such as: acquiring data with the sensors built in the smartphone; data processing; saving data; share the smartphone monitor during data taking; share stored files; send data and graphs to teacher; etc. The data acquisition can be performed by setting the variable parameters of the app and/or the features of the MEMS sensors available on the smartphone such as: sampling frequency, accuracy, time window, etc. In particular, the physical

parameters that can be measured are: 3-axes acceleration, 3-axes angular acceleration, 3-axes magnetic field, light intensity, difference of potential, resistance, etc. Moreover, smartphone can be used as digital signal generator, multimeter, power supply, etc. In some cases, such as for luxmeter, the developed app includes a calibration procedure that allows calibrating the observations carried out by a single smartphone on the basis of other measurements executed by another device (such as another smartphone or a professional luxmeter). The user interface of developed app shows on the smartphone monitor the same knobs, sliders and buttons of the traditional instruments, allowing the user to perform the measurement activity as in a traditional lab with standard instruments. This can be of great help also for student with reduced mobility.

To run the app, it is not necessary any specific knowledge in programming or in data acquisition. On the other side, the source-code of the laboratory constitutes itself a laboratory of computer science and programming. In fact, the project is based on an open-source approach that means the users can customize the source code in order to improve the performances and tailoring the kernel and the user interface to their needs. In fact, the source code that is released free to students is a basic environment for making tests and exercises of programming. This open source approach allows developing and improving the laboratory. For example, many extensions are possible in order to increase the connectivity of the app, especially in order to manage wireless networks, via Bluetooth, for sharing the monitor and controlling the smartphone by remote from another device (such as tablets, smartphones, laptops, etc.).

The app of our laboratory has been developed for Android, iOS and Windows Mobile that allows covering almost the totality of the market of smartphone. This is a key point of our laboratory, because we can offer to all the students the same laboratory platform, independently from the vendor and the OS of their smartphones. This approach offers to the students participating to the project a special "gym" aimed at testing and applying on the field their knowledge in the most popular programming languages for mobile devices (such as Java, Objective-C, C#, Swift, etc.).

Finally, we highlight that our laboratory on smartphone implements a set of sensor nodes, according to the Internet-of-Things paradigm. Furthermore, within the laboratory, a simple smartphone can be used also as: an ADC board in order to acquire data from the available ports (e.g. audio, USB, etc.), or a programmable Digital Signal Processing (DSP) unit. This simple design methodology, jointly with the availability of low cost circuits (that can be used to implement expansions and preferable), opens new perspective to teaching methodologies that encompass also the innovative possibility for students to perform experimental activities even outside the university labs, whenever they want and with no limits in the number of repetitions.

The comparison of executed measurements is facilitated by using the same app for all the students in the classroom also with different smartphones. On the other side, the use of different apps can be interesting from pedagogical point of view, because can allow increasing the consciousness of the scientific need to compare the features of different devices/sensors (precision, sensitivity, range, frequency, temporal series, etc.). The comparison of data and methods constitutes also a great introduction to manage statistical errors that represents another important advantage included in this approach of labs with smartphones.

7. Tutoring, collaborative learning and assessment of the learning results in the smartphone-based educational laboratory

According with the "learning by doing" model, our app for labs on smartphone has been designed in order to allow consulting the available multimedia resources step-by-step during the execution of measurements. The student can effectively act when he feels to have acquired all the needed information on the topic. Moreover, different tutoring tools are always available for students such as: instructions (including correct answers); videos that shows the suggested procedure for the execution of the tasks assigned (in order to avoid the students' moving away from the designed path) and tools for remote tutoring and collaborative study. In fact, by using the functionality - available in the app of our mobile lab - that allows sharing the smartphone's monitor, a tutor can guide the students step-by-step during the experimental activities. The presence of a guide, the Socratic dialogue adopted as a style of communication, and the ability to integrate practice and learning constitute a powerful synergy that contributed to the creation of a pleasant, attractive, constantly updated and fine-tuned environment for the student. The characteristics of the laboratory is based on the experiential learning model (Pfeiffer and Jones, 1985; and Pfeiffer and Ballew, 1988) where the process is as important as the final result, allowing the student to reach, in controlled situations, the different stages of learning: deal with a problem, do experience, communicate with others, analyse the data of experience, make generalizations, and apply the results to other experiences. Finally, the possibility to share the smartphone's monitor with companions can help collaborative study between students of the same classroom.

One of the features of the project that appears qualifying and innovative from the point of view of research-action is also the evaluation phase, designed following a teacher/student relationship supported by the introduction of intelligent tutoring systems. The evaluation system applied to the mobile laboratory has been conceived according with the following three basic requirements (Garito, 1997): i) the assessments must be continuous, with periodic checks (in order to give ongoing feedbacks both to teacher and to learner and to ensure a rising in the quality and quantity of the concepts acquired); ii) the assessments should be, as much as possible, interdisciplinary (in order to point out both the practical implications of abstract concepts, and the applications of the theoretical models); iii) the assessments must include some compulsory barriers (in order to drive the student to make efforts aimed at completing his knowledge and maintaining a high quality standard of the educational process).

8. Conclusion

The use of smartphones allows developing low cost solutions for mobile educational laboratories. This is possible thanks to the recent diffusion of smartphones equipped with MEMS sensors that provide many instruments and tools (able to operate even simultaneously) such as: accelerometer, magnetometer, lux meter, gyroscope, signal generator, oscilloscope, spectrum analyser, digital signal generator, multimeter and power supply. With the smartphone-based laboratories, both temporal and spatial limits imposed by the access to physical standard laboratories – both in presence and by remote - are overcome. Moreover, students are not faced with risk of using complex or delicate laboratory instruments. The key-point of using educational laboratory on smartphone is that to execute many experimental activities for learning-in-situation you don't need of sophisticated instruments (with high accuracy, sensitivity or precision) neither complex equipment with advanced performances. In many occasions, it is possible to carry good results also with not so extreme equipment, but just with the MEMS sensors available on a smartphone. A mobile

laboratory cannot substitute a true lab and the vice versa. Simply many experiments can be carried out with smartphone in an easier and quickly way. The numerous apps available on the market (many of them free of charge) constitute a useful support for teaching, by providing in an easier way materials or solutions to common questions. For example, in electronics, there are several applications to calculate resistors or to help in managing colour code of resistors. The classical approach to use the same device and/or app for the entire class can be overcome, by using a common app with the private devices of each student and/or several different apps able to perform the same measurement. By using smartphones, the class can become a lab of computer science just switching from paper and books to smartphone and apps, easily decongesting the schedule of computer labs. We have developed a laboratory based on smartphone consisting of an application available for the most diffused OS such as: Android, iOS and Windows Phone. The laboratory - conceived mainly for STEM courses - is based on an open source approach developed by students for students. The code of the application can be freely improved and constitutes itself a computer science and ICT laboratory. These laboratory allow executing experimental activities everywhere, not just and not only in traditional laboratory so changing the paradigm that students must work necessarily in physical laboratory or can execute experiments only by remote. Now is the laboratory that goes to students instead of vice versa. On the other hand, the possibility to execute experiments not necessary at school or at the university, by at home and everywhere, represents a further step of the learning process, aimed at increasing both the student's autonomy and her/his learning rate.

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The role of the image in the online education: from the representation of reality models and concepts to the drawing of a new space without place and time

Rosario Marrocco

Università Telematica Internazionale Uninettuno, ITALIA

Sapienza Università di Roma

rosario.marrocco@uninettunouniversity.net

Rosario.Marrocco@uniroma1.it

Abstract

In the new models of e-learning education and online teaching and learning processes are transposed into an interface that becomes an image able to represent models and concepts of reality and, at the same time, it is able to drawing a new space that identifies the virtual education space or a new space without place and time where the new virtual relationship takes place based on a synchronous and achronic communication.

Keywords: Image, representation, virtual image, virtual space, online education e-learning, distance learning

1. Introduction

In the context of online education the classroom space, that is the physical place where you carry out relations based on information transmission, is dematerialized and comes together in a virtual extension that constitutes and identifies the new area for education "long distance". It is a virtual space all gathered and expressed within that image that, in addition to its value interface that lets you view and interact with systems and digitized information, contains the whole teaching and learning process, representing and communicating models of reality, concepts and related methods of acquisition.

This image includes and draws a new space without dimension, often it is superimposed on text and static and dynamic graphics structures that, alternating themselves, represent and transmit models, theories and concepts of the various disciplines. In online education all the classic parameters related to physical space disappear in that image that converts any real space in virtual space. They disappear by the very nature of distance learning, where all the physical principles related to real space cancelled. Disappears the dimension in its parameters of size and quantity; we always perceived and introjected dimension into visual and functional experience, of a spatial reality relative of the area of a school, an academy or university classroom. The new virtual classroom is characterized as an infinitely large space, able of accommodating an infinite number of students and users, and within this space the chairs, the seats, the doors and windows fade, lose their meaning functional and reappear only and exclusively as their idols.

Even the shape of the space disappears; that form that has always denoted and characterized the real relationship between teacher and student. It disappears because the image redraws this relationship, becoming a mediator and expression and mainstay of the new distance training methodology at the same time.

Also the time of education, intended as the residence time in a space to attend the course of a lecture, is transformed into the principle of deferred, it expands in a space-time-no more limits and end.

Clearly, then, the fundamental role of the image in the dissemination and acquisition of knowledge in the new distance learning models. As is evident the various fields of study (sociological, psychological, technological, ...) that should be involved in the analysis of the image in online education. However, in according to a specific research interest, through the analysis of the relation between image and space, this paper focuses on the study of the image as a drawing and representation of a new space characterized by physical and temporal virtuality.

2. The relation between image and space

In distance education the image is the whole didactic process becoming the only reference through which it is possible to perceive the complex and organized system of communication, divulgation and learning of knowledge. We see and hear through that image where everything is concentrated and that draws and represents education and everything that relates to it, including the space in which it takes place. This space, as said, is no longer physical and real, but and virtual and extended in the network, therefore, no longer form nor limits, without more size nor time. It becomes an elastic space, placeless and timeless, a liquid space, the result of "liquid modernity" (Bauman, 2002). In fact, in addition to being a technological space "where the line between the real and the representations becomes increasingly precarious and indistinct" (Scarpetta, 1985), it is also an anthropological space, open and global, that introduces a multi-cultural universes and allowing access to an extraterritorial space through a virtual extraterritoriality, whose effect "is achieved by synchronizing on a global level the shifts of attention and objects of such movements" (Bauman, 2003).

The overcoming of the physical space allows unlimited, fast and continuous access to events and information through an image that becomes an open window which frames and collects not one but a sequence of spaces that are perceived and at the same time also imagined, in which they carry out various represented and disclosed activities simultaneously and in which several people, away in time and space, converse together beyond cultural borders, social and territorial cohesion. Whereas the image-window as an interface, then this is not only the interface between a single entity located in a single space and a multitude of subjects arranged in a multitude of spaces, but is also, whereas the formation as a product, "the tool that allows us to interact with the object, it is the place of the dialogue between the user and the product and acts as mediator between the multimedia product and its user» (Marini, Bertoli & Rizzi, 2001, p. 467).

The image that defines and represents the new virtual space, is considered as the window framing the space of distance learning, is characterized by the fact that from a single point of view, which coincides with a subject who is able observe the space with a certain objectivity on the one hand, and perceive subjectively it and on the other (thus with a variable amount of imagination), there is a considerable control over an infinite series of spaces which in turn manage and represent a continuous flow of information. Sophisticated and modern visions and Renaissance spatiality (fig. 1), abstract and technology, where «the mechanical operations no longer need the equipment or sensitive contact, proceed to work on the code, the encrypted information; sounds and images that come to us, no longer refer to a source or a material support, but, with the digital introduction, in an abstract message, numeric» (Scarpetta, 1985, p. 61). So, all

these new represented and displayed spaces are partly real and partly imagined simultaneously; that is to say that there is an overlap between the image of a certain reality and what instead is imagined, that is, between what is seen and that is really what it perceives and instead it is possible to imagine. All this obviously involves a great chance of abstraction, in part humanly possessed a subconscious level and partly because it can also occur before abstract and numerical worlds and spaces. On the other hand if there is a wonder of the virtual space that is rightly given by compose a new aesthetic that embraces this sort of «*Kosmos upside down*» (Bodei, 1995, p. 112), where dimension and time, in a sort of vice-versa, do not determine but are determined, once past the physical space structure and its geometrical concept that teaches us that «three dimensions suffice to define the shape of any solid and the relative position of objects at any given time, » and that to the three spatial dimensions must be added the dimension of time «if you have to take into account changes of form and placement» (Arnheim, 1954, p. 187).

At a time when the reality is superimposed to the imagination, the image of reality becomes representation of what we are imagining, that representation of the imagination. Therefore, the distinction between the image indicated by Dorfler, «intended mostly as a result of a perceptual given» and objective, and imagination, «which is creative activity extraperceptiva» (1959, p. 19) seems to be held back if we think that, in all probability, every observer-user initiates a simultaneous process of perception and reception of the image and imagination, when he perceives the objective data and, at the same time, he starts a perfect and fantastic interpretation of outer space from which the data are started and the internal space to which the data arrive and are processed and stored.

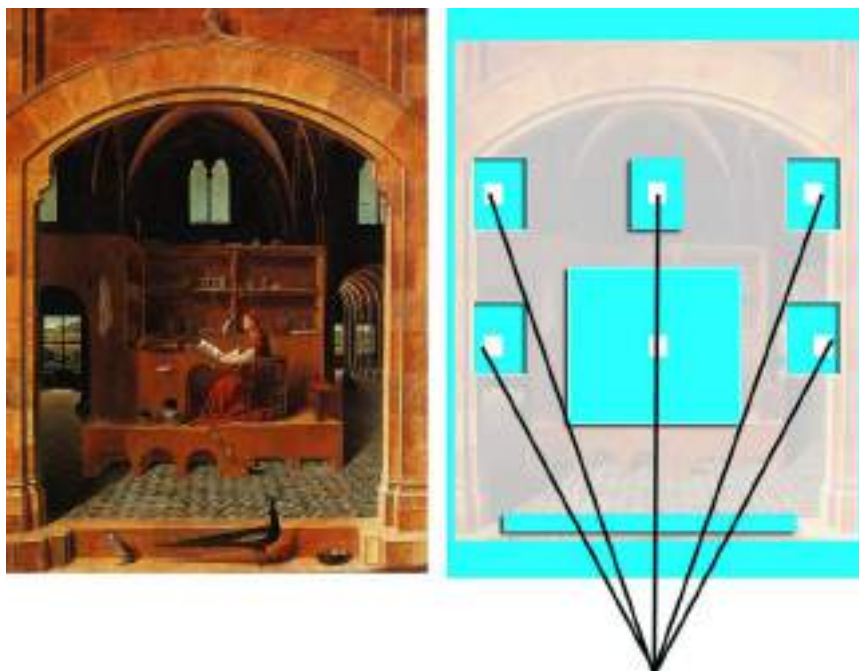


Figure 1: Antonello da Messina, *San Girolamo nello studio*, 1474. Londra, National Gallery

3. The relationship between image and time

In the process that dissolves the space, as a tangible and perceived matter, reassembling virtually within an image, the place of encounter and relationships changes (not loses), and it becomes all of those events and all those temporal actions related to the same place. For example, in terms of distance the displacement

needed to reach the same place canceling, because that place no longer exists, the time required to reach it adjusts, since the place, now devoid of a physical distance and features the single distance virtual, it can be reached without being moved, and instantly is represented by the image. Still, it changes and cancels the ordinary time of stay in a given place partly, corresponding to the place-classroom generally, because this time can be extended or reduced, fragmented and multiplied, thanks to deferred. Failing that *originality* of the place-classroom that connoted as the *place of education*, unique and therefore has a kind of *aura*, fails the temporal relationship that we have with it consequently. The image incorporates the traditional time, what we are used to count and choke, giving back another time, synthetic and immediate, and within this «deferred or registered sink the "direct," everything happens as if live was no longer anything but an accident of the simulacrum» (Scarpetta, 1985, p. 61).

It must be said, therefore, that the real space not only changes, and precisely in which the education takes place but also everything that in temporal terms there connects to it, and such a connection, for example in the case of the displacement, no longer takes place through a system of images in sequence determined by our physical movement it takes to get to a place wherever it is, and that marks many individual spaces in sequence that we follow and perceive to reach the final space, rather than through a single image that is, simultaneously, both the trailing space both individual spaces needed to reach it. It is an extraordinary synthesis process, in which our ability to perceive the real space is transformed in our intention and ability to imagine. And that, more generally, that for each connection type, or for each our connection to the virtual space and for every action that takes place in it and that always takes place through a synthesis process.

The main characteristics related to the virtual space of the education making it all the more obvious, simultaneity and contextual events and information become the traditional place-classroom: any place can become a local school, a classroom site. Any place can be a place where you meet students and teacher. The so-called virtual classrooms, realized and educated, conform and represent in the image mainly by the need to communicate the information and interact with a number of users simultaneously, by reproducing, on a planetary scale and through a process that, on the anthropological and social levels, it would be most democratic, what is happening or could happen in the context of real classroom.

4. Conclusion

On a strictly technical level it is worth always come back on attention to image design, the problem now faced and widely discussed since the twenty-first century. If we consider education as a product it is clear that the perception of the quality of the product itself «is strongly influenced by the type and quality of the interface that we have to design taking into account the technical, social, economic, cultural and ergonomic. It must strive to be transparent, almost imperceptible and allow the user to concentrate on the content. In the interface design must take account of a large amount of factors, some of which are strongly influenced by the context, other more general nature such as, for example, the necessity to make the elements interacts perceptual (sight and hearing, but also touch, taste and smell in the near future) and operational (hands, limbs, position of the pupil of the human being) on computing devices (monitor, keyboard, mouse, motion capture devices, etc.) "(Marini, Bertoli & Rizzi, 2001 , p.467).

Beyond the technical aspects, despite the wide and interesting literature on online education and e-learning (see, for example, the works of Ferri, 2005; Crispiani & Rossi, 2006), it is still necessary to invest in research on the training facility taking into account the actual virtual space in which it unfolds and disseminates.

In fact, the problem that mostly seems to emerge, mainly due to large scale by the recent adoption of distance learning, is related to how closely the entire educational process, also in terms of programs and content, the image that should first endorse and supports it, so represent, communicate and disclose. That is to say that the online educational system still seems to be generated according to and through a conventional communication process that occurs in spaces and traditional places, that is, real and physical, and this is highlighted with the problem that the distance training is sometimes simply transposed from a physical environment to a virtual environment. In other hands, the generated space and represented by the image, allowing different modes of communication, management and exchange of data and information, whether theories or concepts, models of reality or mere indications of procedures, to a training process not simply "placed" in virtual environments rather generated by them. It is true that technological-digital development, which occurred mainly in the new millennium, unlike the industrial sector took place between the nineteenth and twentieth centuries, not always followed and met the transformations and the social and cultural needs, as was the case in industrialization rather caused those transformations and needs, often resulting in a disconnect between the technological progress and the cultural context.

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Social inclusion and higher education for minorities (refugees, migrants)

The Impact of Distance Education for Students with Disabilities in Higher Education

Tiberio Feliz-Murias¹, María-Carmen Ricoy²

Universidad Nacional de Educación a Distancia¹; Universidad de Vigo, Spain²

The Impact of Distance Education for Students with Disabilities in Higher Education

Tiberio Feliz-Murias

Universidad Nacional de Educación a Distancia, Spain
tfeliz@edu.uned.es

María-Carmen Ricoy

Universidad de Vigo, Spain
cricoy@uvigo.es

Abstract

The students with disabilities are an important proportion of citizen in European Union. EU is carrying out the Disability Strategy 2010-2020 with 8 specific areas and objectives. The students with disabilities have less and worse attainment in higher education. In this context, we can observe how the distance education is providing a good way for inclusion and some of these universities are largest providers of higher education for people with disabilities in their countries, for instance, the Open University in the UK or the UNED in Spain. We analyse the reasons and we suggest some actions to improve this inclusion.

Keywords: Distance Education, inclusion for Students with Disabilities, Higher Education.

1. The Context: Students with Disabilities and Higher Education

The United Nations Convention on the Rights of Persons with Disabilities (UN-CRPD, 2006) is a clear symptom of the improvement of the context conditions and the recognition of the situation of students with disabilities. It has to empower them to access at every sector in our society including the higher education. Governments and authorities have to ensure an inclusive education system at all levels, including higher education and lifelong learning. Then institutions and universities have to provide suitable means, infrastructures, services, and personnel for all students, including those with disabilities, to make easier their access, to ensure their permanence and to increase your chances of success.

EU recognises in the Disability Strategy 2010-2020 that the size of the problem (op. cit., p. 3):

One in six people in the European Union (EU) has a disability that ranges from mild to severe making around 80 million who are often prevented from taking part fully in society and the economy because of environmental and attitudinal barriers. For people with disabilities the rate of poverty is 70 % higher than the average partly due to limited access to employment.

EU establishes in the Disability Strategy 2010-2020 eight main areas were identified for action and each one provides a main objective (2010, collected from the original text, p. 5 and others):

- *Accessibility: Ensure accessibility to goods, services including public services and assistive devices for people with disabilities.*
- *Participation: Achieve full participation of people with disabilities in society (...).*
- *Equality: Eradicate discrimination on grounds of disability in the EU.*
- *Employment: Enable many more people with disabilities to earn their living on the open labour market.*

- Education and training: *Promote inclusive education and lifelong learning for pupils and students with disabilities.*
- Social protection: *Promote decent living conditions for people with disabilities.*
- Health: *Foster equal access to health services and related facilities for people with disabilities.*
- External Action: *Promote the rights of people with disabilities within the EU external action.*

The education is one main line of attention for all levels, including higher education and lifelong learning.

There are different models of disabilities: charity, medical, administrative, and social ones. In each model, the service functions and the responsibility distribution are different. The service provision model based on the social model emphasizes "individual and social responsibility as opposed to professional help and medical responsibility" (Seale, 2013, p. 23). She also collected examples of researches about the scepticism the diagnosis and real impairments of students with disabilities, the questioning of the disabilities as dyslexia, and the prejudices about their real abilities. She also identified some students' statements as:

- Being disabled is not being special.
- Disability is not a public matter.
- Doing disclose does not even result in action.
- Inconsistency and variations in provision of support.
- Implications for technology use and access.

Eurostat distinguishes between people with "Difficulty in basic activities" and people with "Limitation in work caused by a health condition or difficulty in a basic activity". In 2011, for a global UE population of 317,520,049, 14.00% had some kind of "Difficulty in basic activities" and 10.95% had any kind of "Limitation in work caused by a health condition or difficulty in a basic activity". That means that the criteria to identify the limitations are stricter than the difficulty ones.

DePoy and Gilson (2014) analysed the branding and design of the disability concept, with special attendance to politically correct labelling and structures and products related to it. They analysed disabilities studies and detected some suppressive factors that impact on disability concept as the vanity: most American people who need hearing aids do not use them by this reason. They also talked about the need to redesign it and to fight skepticism (as written).

Several studies and articles highlight the impact of distance education on people with disabilities. For instance, studying the impact of distance education on adult learning, the IDEAL Project (from October 2013 to September 2015) has collected some student's statements about how Distance education offers educational opportunities for disabled students or students with other health issues

Seale (op. cit.) talked about the voices and silences. She detected the absence of stakeholders and the presence of dominant voices of researchers and campaigners. Drawing the Freire's concept of "culture of silence" (1972), she states that "we need to give voice to disabled students socio-educational experiences of technology in a more meaningful way" (op. cit., p. 17). She also detected some assumptions that are accepted but not either discussed: training and universal design are the solutions to fight poor accessibility practices.

In this context, there are two movements supporting the need to enlarge the concept of digital capital (Seale, Georgeson, Mamas, and Swain, 2015) to the inclusion of students with disabilities and developing

the concept of universal design (Burgstahler, 2012) to every type and level of learning. All around the world, the problems are similar: access and retention. As example, see Espinosa, Gómez and Cañedo (2012).

2. Distance Education and Students with Disabilities in Higher Education

Some data about the students with disabilities in Europe (source of data, online: Eurostat, 2011).

- Most early leavers (age group 18-24) are people with disability (table 1).

Table 1. Early leavers (age group 18-24)

	Percentage
Difficulty in basic activities	25.1
No difficulty in basic activities	12.4
Limitation in work caused by a health condition or difficulty in a basic activity	31.5
No limitation in work caused by a health condition or difficulty in basic activities	12.3

- People with disability have lower tertiary educational attainment (age group 30-34) (table 2).

Table 2. Tertiary educational attainment (age group 30-34)

	Percentage
Difficulty in basic activities	23.9
No difficulty in basic activities	35.8
Limitation in work caused by a health condition or difficulty in a basic activity	22.1
No limitation in work caused by a health condition or difficulty in basic activities	35.9

- Young people neither in employment nor in education and training are more much in People with disability (table 3).

Table 3. Young people neither in employment nor in education and training

	Percentage
Difficulty in basic activities	23.9
No difficulty in basic activities	12.3
Limitation in work caused by a health condition or difficulty in a basic activity	32.4
No limitation in work caused by a health condition or difficulty in basic activities	12.2

- Participation in education and training is lower in people with disability (table 4).

Table 4. Participation in education and training

	Participate	Total	Percentage
Difficulty in basic activities	4,306,569	44,459,479	9.69
No difficulty in basic activities	56,383,447	269,937,687	20.89
Limitation in work caused by a health condition or difficulty in a basic activity	3,095,961	34,777,862	8.90
No limitation in work caused by a health condition or difficulty in basic activities	56,466,872	271,432,856	20.80
Total	61,063,467	317,520,049	19.23

These data highlight that people with disability are not participating at the same level than general citizens. At his level, we could identify all kind of causes: individual, social, economic, physical, communicational, etc. But the actual framework is not sufficient to achieve the goals of the Disability Strategy 2010-2020.

Erickson and Larwin (2016) studied the potential impact of online/distance education for students with disabilities in higher education starting from a meta-analysis of papers and discovered that their attainment is better in short degrees (for instance, associates) and in private schools for bachelors.

In the higher education context, there are some interesting data. For instance, some distance universities are the largest providers of higher education for people with disabilities in their countries, for instance, the Open University in the UK or the UNED in Spain.

Universities have created specific services to promote, receive, orient, and support students with disabilities. The OU of UK has a Disability Resources Team²³⁹ that supports all the strategy for inclusion. In the case of UNED, UNIDIS²⁴⁰, the centre to support people with disabilities at university, was created in 2008 and support the orientation, adaptation, and provision of tools and means for communication, learning, and movement, with special regard to assessment processes.

3. Problems of Students with Disabilities in Higher Education

Applying an interview, Seale *et al.* (2015) discovered that students with disabilities in higher education knew and used technologies but sometimes these resources were not totally effective or disabled students were not drawing on all available resources.

Ocampo (2012) analyses the inclusion of students with disabilities in higher education and provides data on how students express more acceptance that academics and university government authorities for inclusion.

The barriers that persons with disabilities identify could help us to understand why they have difficulties with face-to-face campuses (table 5).

²³⁹ <http://www2.open.ac.uk/study/support/disability>

²⁴⁰ www.uned.es/unidis

Table 5. Barriers of persons with disabilities (source of data, online: Eurostat, 2012)

	Frequency	Percentage
Social contact	1,444,200	1.98%
Using the internet	3,384,300	4.63%
Perceived discrimination	14,490,200	19.84%
Paying for the essential things in life	16,555,900	22.67%
Education and training	18,685,200	25.59%
Transport	23,116,700	31.65%
Accessing buildings	27,002,700	36.97%
Employment	28,173,200	38.58%
Mobility	38,624,500	52.89%
Leisure	44,478,400	60.90%
Total	73,030,600	

In addition to Education and training, all of these other problems could be related with a face-to-face campus. We could analyse them:

- Social contact: face-to-face interaction provides frequent opportunities of physical contact.
- Using the internet: face-to-face means are not so frequently based on the Internet and those that are not so compulsory and less controlled in their accessibility.
- Perceived discrimination: more frequently explicit in face-to-face situations.
- Paying for the essential things in life: face-to-face activities add some expenses to daily ones because of transports and meals out of home, for instance.
- Transport: to go from home to campus, and come back every day.
- Accessing buildings: Face-to-face campuses are not always accessible.
- Employment: it is very difficult to combine with face-to-face training.
- Mobility: rooms and buildings are not always accessible for people with disabilities.
- Leisure: it is also difficult to combine with face-to-face training.

4. Reasons of using Distance Education for Students with Disabilities in Higher Education

The main reasons found are related to the obstacles that we avoid and to the means that we provide. Distance education avoids:

- Physical obstacles: students need less or no transport because they need go less frequently to campus. Our campuses are usually smaller and are easier to be accessible.
- Distance communication: as the face-to-face interaction decreases, distance education provides less physical contact.
- Privacy: distance education facilitates much more personal privacy and fewer opportunities for discrimination.

Distance education provides:

- Much more flexibility to combine learning and other needs and activities.
- Communication technology accessibility for communication, facilitating a better connection with managers, teachers, and other students.
- Mediated learning that offers many more possibilities to forecast the learning means and process, and to adapt them when it is needed.
- As a consequence, the distance universities have created specific services in very early period of their development.
- These services have also designed a strong methodology to receive, diagnostic, and orient students with disabilities (Andreu, Pereira & Rodríguez, 2010; Sama & Sevillano Asensio, 2012).

5. Improvement Proposals

In the framework of the UNICA network, Limbach-Reich (2015, p. 1) explains some interesting guidelines to consider inclusion in the universities:

All adjustments and services for persons with disabilities are to equalise their chances, and should not affect the level of academic requirements for entry nor the academic standards to be met. Disabilities may be visible or hidden, affecting mobility, hearing or sight, chronic illness, dyslexia, or mental health conditions. The recommendations for UNICA universities on minimum standards for disabled persons tackle nine standards concerning; taking into account the needs of disabled students in strategic plans; elaboration of an official document on equal rights, policies and procedures concerning persons with disabilities; establishing of a disability specialist service; criteria of eligibility for services and accommodations; standards in the assessment of all students, disabled or not; same choice of study programmes; protection of information concerning the disability or health of an individual; promoting disability awareness among students and staff and disability training for staff (teaching and administrative).

Good designs are the best way for successfulness of any student, included those students with disabilities. Some good design principles have to be clear (Moore, 2011): good structure, clear objectives, small units, planned participation, completeness (not only contents), repetition, synthesis, stimulation and variety, open-ended, and feedback and evaluation.

Specific suggestions have been made to improve the accessibility for specific disabilities and grouped in four categories: visual disabilities, hearing disabilities, physical disabilities, and cognitive disabilities (Moore, 2011).

The universal accessibility is provided by accessible designs and assistive technologies (Seale, 2013). Some researchers offer a vision of accessible technologies as opposite of assistive ones and promote the approach of the technology for people, and not the technology for disability (Foley and Ferri, 2012, p. 196):

By offering a vision of accessible technology, as opposed to assistive technology, our aim is promote thinking about technology for people rather than for disability. In other words, we should be talking about technology as a global, accessible and inclusive concept, not one that requires a qualifier based on who it is for.

At least, in some cases, only human support could solve accessibility, for instance, in practical activities or unexpected events. Accessibility means that everybody is accessing to any content by any technology in any environment (Seale, op. cit.).

Five categories of students' support have to be specially attended (Moore, 2011):

- Admission and guidance
- Administrative assistance
- Study skills
- Crisis intervention
- Social interaction with peers

From a guidance and organisation approach, we could suggest some strategies as:

- To strengthen empowerment and visibility.
- To reinforce and delocalise support, helps, services, and means.
- To apply internal lines for training and knowledge about disabilities.
- To get more flexible designs and structures, with special attention to timing.
- To promote positive discrimination.
- To focus preferentially the abilities before the limitations.
- To promote special projects supporting for inclusion in higher education.
- To consider inclusion as a compulsory dimension in all actions.
- To improve legal framework and rules.
- To normalise the life of people with disabilities, that means to promote the invisibility of specificity.

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Euro-Mediterranean cooperation

Euro-Israeli Cooperation for On-line Education in Nanotechnologies

Slavka Tzanova¹, Danilo Demarchi², Jack Barokas³

Technical University of Sofia, Bulgaria¹; Politecnico di Torino, Italy²; Tel Aviv University, Israel³

OpenMed: Opening up Education in Arab-Mediterranean countries

Fabio Nascimbeni¹, Cristina Stefanelli², Katherine Wimpenny³, Sarah Kate Merry⁴, Gemma Tombs⁵
*Universidad Internacional de la Rioja (UNIR), Spain¹; Mediterranean Universities Union (UNIMED),
Italy²; Coventry University, UK^{3/4/5}*

Euro-Israeli Cooperation for On-line Education in Nanotechnologies

Slavka Tzanova

Department of Microelectronics
Technical University of Sofia, Bulgaria
slavka@ecad.tu-sofia.bg

Danilo Demarchi

Department of Electronics
Politecnico di Torino, Italy
danilo.demarchi@polito.it

Jack Barokas

Digital Media Services
Tel Aviv University, Israel
JackB@tauex.tau.ac.il

Abstract

In this paper, we present the results of the on-going Tempus project “Education in Nanotechnologies” 543861-TEMPUS-1-2013-BG-TEMPUS-JPCR in development and delivery of e-learning courses in nanotechnologies.

There are few individual research teams, laboratories or companies that can claim to be able to respond to the technological challenges in nano-sciences. To meet these needs in this project 3 European and 6 Israeli universities and 2 companies and research centres share infrastructure, technological and human resources to develop certified modules, based on the European Credit Transfer System (ECTS) to be used in the corresponding partners’ training programmes in nanotechnologies. Although the higher education in Israel does not follow the ECTS, the objective of the Tempus Curricular Reform is 'Modernisation of curricula in academic disciplines identified as priorities by the Partner Countries, using the ECTS, the three cycle system and the recognition of degrees'. So, in this project we work towards modernisation of engineering and sciences’ curricula in nanotechnologies and test the introduction of ECTS within 6 Israeli universities and recognition of credits in the EU universities.

Each course is designed by the best laboratory/department in the field, which dispose with the necessary infrastructure and facilities. They develop e-learning courses and record lectures and practical work in clean rooms in nanotechnologies delivered as open educational resources.

The universities share their infrastructure, technological and human resources, they recognise the common certified modules but each university keeps its autonomy regarding the national diploma delivery. The implementation of the joint courses has just start as a part of the regular educational practices at each university.

Keywords: Euro-Mediterranean cooperation; e-learning; nanotechnologies; open educational resources; Tempus programme

1. Introduction

"There's plenty of room at the bottom," declared physicist Richard Feynman back in 1959, in after-dinner remarks that became known as the founding "mission statement" of nanotechnology. And indeed, as the scale at which scientists work becomes smaller and smaller, a growing number of students are crowding into nanoscience degree programs.

To meet the challenges of the future, nanotechnology education needs to keep up with developments in the scientific sector. EduNano – an e-learning initiative funded under the European Union's TEMPUS framework – is an important step in that direction. By modernizing curricula and promoting the mobility of both students and teachers, EduNano harnesses the power of distance learning to democratize the nanotechnology knowledge base, and to provide a variety of learning opportunities for different target audiences.

EduNano's offerings – geared toward students, teachers and industrial professionals – express the multi-disciplinary nature of nanoscience research. Created through a partnership of eleven academic institutions from Israel, France, Italy and Bulgaria, and relying on the wide-ranging knowledge of these institutions' academic and technical staff, EduNano covers everything from introductory topics to the latest techniques.

2. Why was this project designed?

This project aims at transferring knowledge between EU higher education institutions and institutions in Israel and between Israeli institutions to modernise university curricula in nanotechnologies. The project focus is on common MSc degree level courses development for the new skills needed for the new jobs in the multidisciplinary nanoelectronics and a new job organisation. The problems and the needs are best identified in²⁴¹: "In knowledge-intensive and growing sectors such as nanotechnology, there will be even greater demand for scientists skilled in more than just one area of research. The shortage of European scientists may hamper growth in these sectors and result in the relocation of knowledge-intensive activities." and "The studies in this area (nanoelectronics) point to the urgent need to further develop scientific education and training with a particular stress on interdisciplinarity."²⁴²

"Technological change also influences the organisation of work, which affects the demand for different levels of skills. Work organisation is now characterised by decentralised decision-taking, just-in-time operation, job rotation, teamwork and multitasking. The OECD²⁴³ has paraphrased this as 'high-performance work practices', emphasising that these new requirements lead to higher skill needs." And the conclusions of DG EMPL project²⁴⁴: "For some job functions special courses are needed. It is necessary to strike a balance between what is offered in the educational system and what is needed in the sector."

The Israeli government, jointly with the Israeli National Academy of Sciences, has identified the nanotechnology as a national priority for the country and has set national goals for advancing nanotechnology in Israel to achieve critical mass and world class infrastructure. A formal initiative was appointed in the frame of Israel National Nanotechnology Initiative (INNI) to lead and guide the collective

²⁴¹ New Skills for New Jobs, matching labour market and skills needs (2009)

²⁴² Eurofound, European Monitoring Centre on Change (2008)

²⁴³ OECD (1999)

²⁴⁴ Investing in the Future of Jobs and Skills Scenarios (2009)

efforts and promote the research & development with emphasis on strong collaborations between academia and industry. The key to development of nanotechnology-based industry in Israel is promotion of academia–industry collaboration. That is why a new and expended syllabus of studies at the universities was established with emphasis on gaining knowledge on broader range of areas that can complement and strengthen the nanotechnology now and in the future and lead to the continues growth and expansion of the nanotechnology in Israel.

There are few individual research teams, laboratories or companies that can reasonably claim to be able to respond to the technological challenges. Even the big companies in the sector work with a common use of R&D resources (as Motorola & ST Microelectronics etc). No one university can afford the necessary infrastructure, clean rooms, technology and experts in all fields of the multidisciplinary nanotechnology.

3. Objectives

This project's focus is on common courses development for the new skills needed for the new jobs in the multidisciplinary nanotechnologies. It is transferring knowledge between EU higher education institutions and institutions in Israel and between Israeli institutions to modernise university curricula in nanotechnologies.

Its specific objectives are:

- To analyse the educational needs in nanotechnologies through problem and job analysis, and to define the necessary knowledge, skills and competencies of engineers in the sector in terms of learning outcomes.

This objective addresses the need of definition of new skills for new jobs in nanotechnologies and the needs of improvement of transparency of qualifications.

- To design syllabi and course content and assessment for regular and continuing education courses in nanotechnologies to meet the user needs and to determine the credits for each course unit, based on ECTS.

This objective targets the interdisciplinary sector of nanotechnologies and the needs of closer cooperation in the university sector using the infrastructure, technology and expertise of partners' universities.

- To select innovative content for the defined learning outcomes and video-record lectures and practical work in the high-tech laboratories of partner institutions.

This objective addresses the needs of skills and competences for 'high-performance work practices' in the new work organisation.

- To adapt/develop new e-learning courses with modular structure for the innovated curricula of partner universities and to establish a platform and procedures for knowledge sharing inside Israeli academy, industry and students.

This objective addresses the need of sharing an expensive infrastructure, clean rooms maintenance, technology and even experts in all fields for effective education in the multidisciplinary science of nanotechnology.

- To perform a pilot test and to start the implementation of the joint modules/courses delivery.

This objective addresses the necessity of striking a balance between what is offered in the educational system and what is needed in the sector.

4. Target users

Within the presented project we target the following groups of users:

- Students in nanotechnologies in physics, chemistry, electronics, biology.

They need high-quality educational materials, and continually brought up-to-date courses, because of the essence of nanotechnologies - the most rapidly advancing sector now a day.

- Their teachers.

They need infrastructure, modern equipment and facilities for teaching nanotechnologies, they need techniques for course delivery allowing easy changes and upgrade because of the fast developing science of the subject matter, i.e. ICT-based materials.

- University management.

It is convinced of the necessity of international dimensions in higher education, particularly with regards to curricular development, interinstitutional cooperation, virtual mobility of students and academic staff, and integrated programmes of study, training and research.

From institutional point of view the targets are the higher education institutions providing education in different nanotechnologies. As no one university can afford the extremely expensive infrastructures, equipment and maintenance of clean rooms for nanotechnology, collaboration and sharing of facilities and teachers' expertise is of high institutional interest for the universities.

5. Project partners

The project consortium includes highly qualified university teachers and researchers in the field of nanotechnologies, and experts in educational technology as well.

The project is based on a multilateral partnership between higher education institutions in the EU and Israel. It involves six higher education institutions from different geographical regions of Israel including all Nano centres in the country; two industrial partners, and three higher education institutions with expertise and experience in nanotechnologies and curriculum development from the EU Member States.

Conceived as a framework for interuniversity cooperation, the EduNano consortium includes six Israeli institutions – Bar-Ilan University, Ben Gurion University of the Negev, the Hebrew University of Jerusalem (HUJI), Tel Aviv University (TAU), the Technion, and the Weizmann Institute of Science – as well as Italy's Politecnico di Torino, the Grenoble Institute of Technology in France, and Bulgaria's Technical University of Sofia, which serves as the program's overall coordinator.

Universities are not the only parties participating in the EduNano initiative. Elbit Systems – an Israeli electronics firm – is actively involved, as is the Samuel Neaman Institute for Advanced Studies in Science and Technology (SNI).

"EduNano has brought academic and industrial experts together to brainstorm, share their knowledge, and promote a new, interactive conversation for the betterment of society," says Dr. Ron Blonder, Senior Scientist at the Weizmann Institute's Department of Science Teaching who is involved in establishing the initiative's pedagogical approach. "Through TEMPUS, the EU is expressing its conviction that education is a

sound investment – one that will enable tomorrow’s researchers, engineers and technicians to move nanotechnology forward.”

6. Project methodology

The background of this project was the experience of the partners’ institutions from France, Bulgaria and Italy in developing performance support systems²⁴⁵ for education and training in nanoelectronics from the Leonardo da Vinci projects NanoTrain and NanoSkills and the Erasmus curriculum development project NanoEl. The rationale was to transfer all these experiences and successfully implemented innovations to the partner country - Israel and to develop new eLearning materials in the multidisciplinary sector of nanotechnologies. The content of the courses developed in the previous projects was selected, adapted and upgraded with new content (because the new technologies require multidisciplinary knowledge and skills, e.g. in quantum mechanics, biotechnologies etc., and the nanosystems are just emerging) for the needs of Israeli universities, VET teachers and SMEs.

Nanotechnologies cover different scientific areas not only nanoelectronics. So, in this project new courses were developed to enrich the nanotechnology curriculum: in physics, engineering, biotechnology. The topics and contents were selected according to the current needs of industry and on technological forecasts.

The engineering education involves the use and application of skills for finding solutions, making decisions, and thinking effectively, i.e. problem-solving skills²⁴⁶. So, instructional strategies and tactics for higher-level skills were used in the course design. In this project discovery inductive strategy is implemented (when it is possible from pedagogical point of view) in an interactive Web-based instruction (related most to problem-solving).

Specific tasks were designed for competences training²⁴⁷, e.g. group work and tasks to manage a team or plan a new work organisation for implementation of new technology.

Each university participating in the project developed courses in its best fields of expertise and is benefiting now from courses developed by other universities in their areas of specialization. For each Nano centre to develop high quality courses for its own students is not cost effective. This pooling of resources enables the building of a repository of high quality fully online courses for the benefit of all participating Nano centres and universities.

By the end of the project we will establish a business model with the support of Israel National Nanotechnology Initiative (www.nanoisrael.org) to fund and maintain the project by the partners, so it will remain functional after the end of the funding of the project.

7. Work in progress

Through domain/job analysis the necessary knowledge, skills and competences in nanotechnologies were defined in terms of learning outcomes. A survey on the necessary competencies was developed by SNI and evaluated by the partners first, on-line, and then peer-reviewed during the second project meeting. The survey was distributed to 200 Nano-companies and researchers in order to meet the industry employment

²⁴⁵ Martínez-Mediano, C. et al. (2010)

²⁴⁶ Tzanova S. (2005)

²⁴⁷ Tzanova S. Et al. (2010)

needs and the needs of the researchers/teachers to help provide students with the most relevant skills and competencies in this field. According to the need analysis and towards the learning outcomes defined, 20 courses for the new skills in nanotechnology training are under development (see the list of the courses in section “Development of programmes and courses”).

To facilitate the mobility of students between institutions in Israel and Europe, to each course credits had to be provided, compatible with European Accreditation Transfer System (ECTS) requirements. To achieve these goals HUJI organized two meetings of institutional representatives including Bologna Process consultant and module coordinators. The first meeting introduced the Bologna process principles by the consultant. By the end of this meeting a general module plan was introduced. In the second meeting lead also by the consultant, each participant introduced his module structure and its logic was discussed. In addition more detailed discussions about grading system, diploma supplement and quality assurance were performed.

Syllabi of the 20 courses were designed and credits for each course were determined. The courses were developed with three different foci. First are full-semester academic courses, which will allow different universities access to the same class. These courses had to be approved by each academic program individually, and they cover introductory topics, such as physics of nano-systems, basic biology for physics students, basic photonics for non-engineering students, etc.

The second class of courses are full academic courses focusing on technology. These courses are similar to courses already existing in most universities, but they complemented and enhanced by documented demos, which will allow improved learning for students. These courses should be extremely valuable to people from the industry.

The third type of courses are of a small scope, covering a particular topic. They are used as introductory courses for graduate student training, or for people from the industry. Those courses will be most valuable in enhancing the training of users in new technologies.

To achieve the third project objective, the TAU Computing Division organised two training workshops on the video-recording technique and course development in EduNano Moodle environment. The contents for the defined learning outcomes were designed and the video-recording of lectures and practical work in the Nano laboratories of partner institutions was done.

The project Web site is: <http://edunano.eu/>. The EduNano platform address is: <http://edunano-lms.tau.ac.il/>

The access as a guest:

username: demouser

password: user1-Demo

We are on the stage of the implementation. The pilot test is being conducted with different groups of learners from the universities, high schools and SMEs. Specific evaluation methods are used and corresponding tools designed for assessment of knowledge (e.g. multidisciplinary tests); of skills (e.g. tasks for finding solutions for new problems, or, how to find procedures to solve new problems); of competences (e.g. tasks to manage a team or plan a new work organisation for implementation of new technology).

Because of the differences of national laws in each country, we considered that at this stage planning accreditation of joint or multiple BSc or MSc degrees is not realistic. Each course was designed for specific learning outcomes, with credits for each course unit to be assigned after assessment, and adopted by the partner institutions delivering the corresponding curriculum. These credits were used for students' mobility

in Europe and when the credit system will be adopted in Israel - in the regular credit transfer system of the country.

The successful students from the 6 Israeli universities had 1 week mobility in Grenoble and Torino for two practical courses in clean rooms. The practice was evaluated very high by the students, and the most appreciated was the multi-disciplinarity of the training content. "The whole experience was a great experience, and it was really mind opening to new approaches and ideas, and that was great!" "Overall it was very insightful for me to see a more engineering approach to molecular electronics. It opened my mind to new possibilities and ideas."

After successful assessment the students obtained a certificate with the corresponding credits and the local grade of the host institution system with corresponding grade of the student's home institution system.

Questionnaires and interviews are being used to measure the students and teachers attitudes, satisfaction, to reveal problems if any and to improve the courses and the collaborative course delivery.

So, the universities share their infrastructure, technological and human resources, they recognise the corresponding to their curriculum courses/credits but each university keeps his autonomy regarding the national diploma delivery. To facilitate the implementation of the results during the project lifetime, if necessary, the new courses were added to the list of electives to avoid complicated procedures of a whole curriculum change.

Quality assurance (QA) plan was developed by the external evaluator from Open University Netherlands. Quality assessment is based on a careful procedure of self-evaluation by the institutions involved in the project followed by external evaluation by peers. The formative evaluation was done during all project meetings: peer review of syllabi, contents, video-recording procedures and multimedia materials production. Based on evaluations the project steering committee of the project made the necessary decisions and planned activities for their implementation.

8. Innovation

In this project we adapt the approach of the big enterprises in the sector to share the research and development facilities and expertise despite the competition (or just to be competitive).

The innovative solutions provided by this project are:

Sharing of resources, which a single university can not afford, for improving the education in high technologies for the new jobs in nano- bionanotechnology in Israel and EU countries,

Virtual mobility: In this project the mobility is mostly virtual thanks' to the e-learning courses and only for the practical modules short student mobility of one week will be necessary. In traditional scheme of common degree delivery and even within Erasmus mobility programme the students need to stay 4 semesters abroad and to follow the courses delivered.

The successful implementation of this project should lead to the foundation of a broader repository of online courses for Israeli academia in a large diversity of disciplines.

The added value for the students will be in the highest quality of the specialised courses developed by the best departments in the field, the opportunity to study more courses from the home institution and most important – the opportunity to train practical skills and competences in the laboratories with advanced equipment and facilities.

9. Expected impact

We expect an impact of this curriculum development project on:

- the approach: in sharing facilities and expertise of 6 Israeli and 3 European universities in the new science of nanootechnology to provide the best education for the new jobs in the sector;
- the target groups: the contribution for the students will be in the highest quality of the specialised courses developed by the best departments in the field, the opportunity to study more courses from the home institution and most important – the opportunity to train practical skills and competences in the laboratories with advanced equipment and facilities;
- the educational system: each university “keeping” its students and at the same time the students and the teachers profit from the collaborative curriculum; improvement of university engineering education through innovation of educational curricula with the newest scientific and technological content and clearer relationship between learning processes in the university and at the real workplace.

10. Conclusion

In this manuscript we presented a work in progress within the Tempus project “Education in Nanotechnologies”. As embodied in the needs analysis survey of the EduNano project, the motivation driving high-quality education in the nanosciences is the necessity to train a skilled work-force at all levels, which will be expected to assume key roles in the evolving technologies²⁴⁸. The highly interdisciplinary nature of the nanosciences places pressure on the educators to provide relevant instruction in widely-ranging fields. Suitable technical education requires a hands-on learning environment which entails well-equipped laboratories housing often expensive equipment. To achieve this, funding will need to be allocated for many programs similar to EduNano project.

We would like to conclude with the words of Dr. Efrat Bodner, administrative manager of the Institute of Nanotechnology and Advanced Materials at Bar-Ilan University: “The TEMPUS program moves beyond the traditional model of collaboration between universities. Instead, it fosters international communication between communities of teachers and students. It promotes high-level learning and collaboration that takes place dynamically, right in the classroom.”

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²⁴⁸ Cohen S. et al. (2016)

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OpenMed: Opening up Education in Arab-Mediterranean countries

Fabio Nascimbeni

Universidad Internacional de la Rioja (UNIR), Spain
fabio.nascimbeni@unir.net

Cristina Stefanelli

Mediterranean Universities Union (UNIMED), Italy
stefanelli@uni-med.net

Katherine Wimpenny

Coventry University, UK
hsx260@coventry.ac.uk

Sarah Kate Merry

Coventry University, UK
ac1853@coventry.ac.uk

Gemma Tombs

Coventry University, UK
aa8943@coventry.ac.uk

Abstract

This paper shares the intercultural learning to date from the OpenMed project, an Erasmus+ funded Euro-Mediterranean collaboration, aiming to facilitate the adoption of Open Educational Practices (OEP), with a particular emphasis on the use and production of Open Educational Resources (OER) at universities in Egypt, Jordan, Morocco, and Palestine. Within the project, universities from across the two shores of the Mediterranean, representing different levels of maturity in the implementation of OEPs, are working together to foster new forms of international partnership and exchange across disciplines and faculties. The first phase of the project has involved the gathering and analyzing of international case studies representing initiatives in OEP with a focus on the South-Mediterranean (S-M) region, to generate a Compendium of reliable, evidence-based knowledge. This will inform the subsequent phases of the project and ultimately aim to facilitate the adoption of OEP at the partners in the S-M region, other universities in each of their respective countries and, more broadly, at other universities in the Arab World. Key findings from this first phase of the project have highlighted a spectrum of processes, procedures and technological choices in the range of case study examples developed. What is evident is a desire and willingness to embrace 'openness' and networking, yet the starting point around definitions of openness differ, as do practices around open licensing and acknowledgement of the pedagogy underpinning the open education initiatives.

Keywords: Open Education, OER, OEP, Euro-Mediterranean collaboration, Higher Education

1. Introduction: the importance of Open Education for international academic cooperation

Internationalization within universities, which for many decades has typically been under the responsibility of offices dealing with students' mobility and international agreements, is radically evolving, touching upon the reorganization of higher education itself (Quiang, 2003; Fischer, 2014). Knight (2008) uses the term *crossborder education*, highlighting the fact that internationalization of higher education is no longer characterized only by the movement of students and staff, but also by the movement of programmes, knowledge, ideas, projects, values, curricula, and services across national boundaries. This new understanding of internationalization is influenced – among other factors – by the increasingly pervasive use of ICT across disciplines and across functions of universities (New Media Consortium, 2016), and by the rise of Open Education phenomenon (Weller, 2014; Grodecka and Śliwowski, 2014, European Commission, 2013).

“A burgeoning open education movement is becoming established around an agenda of institutional transformation, calling for unrestricted access to educational materials and the diminishing of geographic and economic barriers to participation” (Knox, 2013, p. 1).

Due to their inner collaboration-centred nature, Open Educational Resources (OER), Open Educational Practices (OEP), and Massive Open Online Courses (MOOCs) can contribute to upgrade academic collaboration towards what Sutton calls *transformational partnerships*, that are collaborations able to “develop common goals and projects over time in which resources are combined and partnerships are expansive, ever-growing, and relationship-oriented” (Sutton, 2010, p. 2). In these partnerships, which represent a step forward with respect to the still necessary traditional academic collaborations based on physical mobility of staff and students and on joint research projects, participants share resources, develop collaborative curricula, engage students and staff, and undertake joint research, and do so with a *global and open perspective*.

Previous studies within the eMundus project²⁴⁹ has identified five practical ways through which Open Education can impact on the core activities of a transformational partnership. First, resource sharing, where OER makes content sharing among universities easier in terms of intellectual property rights (IPR), searchability, language, and cultural adaptation. Second, collaborative curriculum development, thanks to the fact that OEP and Open Design facilitate networked curriculum developments from the very first steps of course development. Third, student and staff engagement, with open virtual mobility contributing to “structural” exchanges over time, also for potentially excluded students and staff. Fourth, joint promotion and marketing, through participation in MOOC platforms and in OER repositories. Finally, by adopting Open Science approaches, research collaboration is made more efficient, transparent, and sustainable.

In more general terms, Open Education approaches can contribute to making international collaboration smoother, more sustainable and more attentive to the needs of the involved stakeholders, by increasing trust, early sharing of ideas and joint planning and collaboration beyond cultural and linguistic borders. Still, international collaboration experiences grounded in Open Education are rare and fragmented. In trying to

²⁴⁹ See eMundus “Exploring successful international collaboration enhanced by open education”: www.emundus-project.eu.

identify the barriers to international uptake of Open Education, Pawlowski (2013) mentions contextual, social, technical and legal barriers, and points to the fact that the most important aspects for successful OER international uptake are adaptation and contextualization, that means how OER can be adapted to a new (global) context, i.e. a different geographical region with different curricula and different requirements by learners and teachers. In this case, the challenge is to transform the tendency towards exporting educational offers as a one-way transfer towards a cooperation framework where OER and Open Education approaches are seen as a possibility to create mutual synergies and long-term collaborations (Pawloski et al., 2014).

2. The OpenMed project: opening up Higher Education in the South Mediterranean region

How do OER and Open Education approaches co-exist in Higher Education strategies, and instructional materials in the South Mediterranean (S-M) countries? How are universities rethinking their mission, cost structure, international partnerships and learning experiences?

OpenMed “Opening up education in South Mediterranean countries”²⁵⁰ explores the adoption of strategies and channels that embrace the principles of openness and reusability within the context of S-M universities.

The overarching goal of OpenMed is to raise awareness and facilitate the adoption of OER and OEP in S-M countries, with a particular focus on HE in Egypt, Jordan, Morocco and Palestine. OpenMed fosters the role of universities as knowledge providers not only to their on-campus students but also beyond the walls of institutions, especially towards disadvantaged groups (e.g. low-income peoples, disabled students, people living in rural areas, learners at risk of low achievement, and refugees).

The specific objectives of the project are to:

- Raise awareness among S-M universities in OEP and OER;
- Support the definition of OER Agendas within S-M universities, defining mid-term roadmaps according to the local, cultural and institutional needs and strategies;
- Build capacity among university teachers on how to use and repurpose OER in a pedagogically-rich context;
- Pilot start-up OEP and offer to students flexible and up to date open contents and learning paths, with a linkage to the international community and the needs of the job market.

OpenMed envisions a multilevel and organic intervention, which articulates three key dimensions: i) Content and practices: understood as educational resources and learning experiences which are openly and freely available, promoting their continuing re-usability, replication, updating, and sharing; ii) Platforms: hardware and software designed to simplify the interoperability of the resources, facilitating semantic

²⁵⁰ OpenMed is an international cooperation project cofunded by the Erasmus+ Capacity Building in Higher Education programme of the European Union during the period 15 October 2015 - 14 October 2018. URL: www.openmedproject.eu. The OpenMed consortium is composed by: UNIMED, Mediterranean Universities Union, Italy (coordinator), Politecnico di Torino, Italy; Universidad Internacional de La Rioja, Spain; University of Seville, Spain; Coventry University, UK; Cairo University, Egypt; Alexandria University, Egypt; Cadi Ayyad University, Morocco; Université Ibn Zohr, Morocco; Birzeit University, Palestine; An-Najah National University, Palestine; Association of Arab Universities, Jordan; German Jordanian University, Jordan; Princess Sumaya University for Technology, Jordan, and EDEN, the European Distance and E-Learning Network (associate partner).

structures (improving its findability) and the use of open standards and open source software that decreased its costs and trigger its adoption; iii) Cultural aspects: promoting awareness of OEP and OER, explaining the value of openness, describing the educational and also the inter-institutional benefits, and not only identifying best practices, but implementing the incentives required to foster these practices in a variety of teaching-learning environments.

3. Understanding Open Education in the South Mediterranean region

The first phase of OpenMed involved a review of OEP, which have been brought together into a Compendium of case studies and interviews with experts about OEP and OER. The purpose of the Compendium is to inform the subsequent work of the project, and to help facilitate the adoption of OEP by the partners in the S-M region, other universities in each of their respective countries and, more broadly, at other HE organizations in the Arab World. In addition, the Compendium was designed to provide inspiration and insight into the current practices around OER and OEP, in the S-M region and beyond, and also to promote reflection and discussion about current practices and priorities for change for OpenMed.

A descriptive case study methodology (Creswell, 2013, p. 97) was selected to explore examples of OEP and OER within higher education institutions (HEIs) in the S-M partner regions, and in other areas of the world, through detailed, in-depth data collection, involving multiple sources of information. First, participating HEIs were asked to complete an online survey to outline the level of participation and key opportunities and challenges for the adoption of OEP within their respective institutions. These surveys also provide a baseline measure against which the success of the OpenMed project will ultimately be measured.

In order to identify the Case Studies, all OpenMed partners were invited to nominate relevant initiatives, from their institution or elsewhere, to be considered for inclusion in a collection of OE case studies for the Compendium. Partners were asked to justify why and how they thought a case study of the nominated initiative could help to advance the adoption of OEP in the S-M region. The criteria for the selection of case studies were the potential to transfer the initiative to other contexts within the S-M region, and the extent to which the initiative offered valuable insights into OEP such as pedagogical innovations, the funding model, strategic planning, incentives for engagement of educators, use of technologies and open licences. The case study nominations were reviewed by the Coventry University (CU) research team and by two identified experts in OEP in the S-M region. Twelve cases were selected²⁵¹ and each partner was asked to complete one detailed case study on a nominated initiative, using a template designed by the CU team. Each of the case studies was reviewed by a different partner institution. All partners were invited to review the country reports and the drafts of the Compendium, and an external review was conducted by Javiera Atenas of University College London.

Further, a number of experts in OE were also asked to comment on relevant initiatives and share recommendations with the aim of facilitating and encouraging the adoption of OEP in the S-M region. Recorded interviews addressed the following three questions: 1) Please introduce yourself: Who are you and what is your involvement in OE? 2) Could you please identify an OE initiative or idea you find

²⁵¹ Following analysis it was decided that the content of 'Open Education by the Supreme Council of Universities in Egypt' by Cairo University would be best included as part of the detail about Open Education in the Country Report of Egypt, rather than as a case study about a particular OEP practice or initiative.

interesting and explain why (you might focus on any specific elements of interest)? And, 3) What would be your top tips or recommendations to educators and HE decision makers in the S-M region (you can also decide to focus on a specific country) for facilitating the adoption of OEP? (You might offer tips relating to the use and/or creation of OER, but also any other dimension of open education you consider relevant.) The experts, identified by the OpenMed partners, were from the S-M region, the EU, and from the wider international OE community and included *Tel Amiel*, UNESCO Chair in OER at UNICAMP and Researcher at NIED/UNICAMP, Brazil; *Maha Bali*, Associate Professor of Practice at the Center for Learning & Teaching at the American University in Cairo (AUC), Egypt; *Daniel Burgos*, Pro-Vice-chancellor for Research & Technology and UNESCO Chair on eLearning at the International University of La Rioja (UNIR), Spain; *Cristóbal Cobo*, Director of the Center for Research, Ceibal Foundation, Uruguay, Associate Researcher at the Oxford Internet Institute, University of Oxford, UK; *Jean-Claude Guédon*, Professor at the Department of Comparative Literature, with focus on Internet Culture, Digital Humanities and Open Access Movement, University of Montreal, Canada; *Rory McGreal*, UNESCO/Commonwealth of Learning Chair in OER, Professor in the Centre for Distance Education at Athabasca University, Canada, Director, of the Technology Enhanced Knowledge Research Institute, Co-Editor of International Review of Research in Open and Distance Learning and Founder of the OER Knowledge Cloud; *Teresa McKinnon*, Principal Teaching Fellow, Certified Member of the Association for Learning Technology, SFHEA, University of Warwick, UK; *Paul Stacey*, Associate Director of Global Learning, Senior Project Manager with Creative Commons, US; *Peter Suber*, Director of the Harvard Office for Scholarly Communication, Director of the Harvard Open Access Project, Senior Researcher at the Berkman Klein Center for Internet & Society, and Senior Researcher at the Scholarly Publishing and Academic Resources Coalition; *Shireen Yacoub*, Chief Operating Officer Edraak, Queen Rania Foundation for Education and Development, Jordan. All the recordings of the interviews are available at <http://www.openmedproject.eu>.

Case studies provided in Arabic or French were translated into English. Thematic analysis²⁵² was used to analyze the case study and interview data, led by the CU research team. The analytic process involved a progression from description, where the data were organized to show patterns in content and then summarized, to interpretation, where themes were developed, illustrating the significance of the patterns and their broader meanings and implications. The analysis process also considered the socio-cultural contexts which support the individual accounts that were provided. Excerpts from the interviews were included as part of the discussion and recommendations section.

4. The OpenMed Case Studies

The range of case study initiatives collected and analyzed revealed a diverse and rapidly-growing interest in OER and OEP in the S-M region and beyond, with exciting influences upon teaching and learning practices profiling the use of MOOCs, learning platforms/ repositories, and open access publishing initiatives. The studies highlight the benefits of opening up education so that Arab learners, researchers, teaching staff, and all those involved in education can engage in mutually enriching educational experiences, not only at a local and national level, but as globally connected learners and contributors. A synopsis of the 11 case studies included is provided below:

²⁵² Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

Discover Palestine <http://moodle.najah.edu/course/view.php?id=1806> is a Massive Open Online Course (MOOC), provided by An-Najah National University in Palestine. Discover Palestine is an English language MOOC about Palestinian history, archaeology, culture, and heritage. The case study outlines the content of the MOOC and the processes undertaken in order to design, develop, and implement the course. It also provides a brief reflection of the challenges and opportunities encountered throughout the development of the initiative.

Edraak <https://www.edraak.org/en/> is also a MOOC initiative, provided by the Queen Rania Foundation (QRF) in Jordan. It is built on the EdX open online learning platform. There are currently 31 courses on Edraak, which have been taken by more than 435,000 learners. 80% of the courses are developed by Edraak in Arabic, and 20% are EdX courses from international institutions such as Harvard and MIT, translated into Arabic by Edraak. The case study details the history of the initiative, its structure and funding, and outlines how the courses are selected, offered and managed.

Jorum <http://www.jorum.ac.uk> is a large online repository for discovering and sharing OER for higher education, further education, and skills training, funded by Jisc in the UK. Jorum currently holds over 16,000 educational resources, licensed under Creative Commons, and ranging from single documents to complex packages (e.g. full courses). The case study outlines four successful aspects of the Jorum initiative: multiple stakeholder involvement; engagement strategy; acquisition framework; and openness to change.

Nafham <http://www.nafham.com/> is a free educational website which was started by a group of individuals and is funded by advertising. It hosts and produces video content based on the school curriculum in Egypt and Syria, from kindergarten to 12th grade. Nafham also promotes ‘crowd-teaching’, encouraging students, parents or teachers to submit a video explaining a subject. The case study outlines the background and the structure of Nafham, with a particular focus on the value of crowd teaching to everyone involved.

OER Commons Arabic <https://arabic.oercommons.org/EN/> is a repository of learning objects, developed by the Institute for the Study of Knowledge Management in Education (ISKME) in California, and funded by Qatar Foundation International. It holds a range of educational resources at primary, secondary and post-secondary level which come from institutions such as Khan Academy and MIT Blossoms. It also hosts a user community which provides support for students, educators, designers and for the general public. The case study describes the structure and design of the initiative, and the ways in which teachers and instructional designers can evaluate and use the resources provided.

OER Strategy of the University of South Africa (UNISA)

<http://www.unisa.ac.za/contents/unisaopen/docs/OER-Strategy-March-2014.pdf> is an institutional policy for the adoption of OER. UNISA is an open distance learning (ODL) university, with over 90% of its students as part-time. The publication of a governmental White Paper for Post-School Education and Training in 2014 led to the development of an OER strategy within UNISA. The case study outlines the comprehensive planning which took place before the development of the policy, and the importance of top-level support for such a policy.

Open Humanities Press <http://www.openhumanitiespress.org/> is an open access publishing initiative which seeks to create high quality publications without depending on commercial publishers. It is a not-for-profit

company which is predominantly funded by the sale of hard copies. The case study outlines the underlying philosophy of OHP and the principles under which it operates, and focuses particularly on the importance of the free exchange of scholarly knowledge.

Open Review Project <http://openedgroup.org/review> is an ongoing evidence-based review of OER use, predominantly in North America, and is supported by the Open Education Group. Although not an OER initiative in itself, the Open Review Project evaluates empirical studies on the efficacy/perception of OER in HE. The case study outlines the methods used by the Review Project, and summarizes some of the conclusions drawn so far from the research which has been reviewed.

Plateforme Pédagogique – Centre E-learning UIZ <http://foadm1.uiz.ac.ma/> provides open online education via two Moodle e-learning platforms in a variety of different disciplines. There are 100 courses, with over 21,000 students. The case study focuses on the value of teachers and lecturers in computing and related subjects, outlining the courses provided and the guidance provided for publishing course materials online.

REDES <http://revista-redes.rediris.es/> is an open access online journal, publishing research in the field of social network analysis. It is the only social network analysis journal published in Spanish, and all texts are subject to a CC licence 4.0. REDES was born out of an online community of researchers on an email list, and is run by volunteers. The case study explores the history of the community which led to the development of REDES, the organization of the journal, and focuses on the importance of openness and collaboration to the initiative.

UC@MOOC <http://mooc.uca.ma> is a platform which provides online access to learning materials for students at Cadi Ayyad University (UCA) in Morocco. It was established in order to resolve the problem of over-large classes, and contains a variety of course materials in the form of podcasts, videos and other resources. The case study outlines the background to the initiative, and provides some statistical details of the courses hosted on the platform. There is also some discussion of the importance of using a variety of pedagogies in order to support the high numbers of students.

5. Main themes emerging from the case studies

Five main themes were highlighted from analysis of the case studies:

1. Top-Down and Bottom-Up Implementation
2. Supporting Staff in Using and Integrating Open Practices and Open Resources
3. Collaborative Creation in Communities of Practice
4. Enhancing the quality of student learning
5. Licensing of OER content.

Each is considered in turn, along with excerpts, where relevant, from the recorded interview data conducted with experts.

1. Top-Down and Bottom-Up Implementation

High-level policies, such as the UNISA OER Strategy, may not be possible in contexts where online learning is not accredited by national higher education bodies. Nonetheless, (university) leadership and support is required in developing policies and strategies, with emphasis on the provision of high-quality OER, to strengthen institutional OEP delivery. Developing multi-stakeholder governance is suggested, such as that

seen in project [Jorum](#), which has enabled their national repository, access to which was initially limited to UK registered teachers, to become an open platform providing worldwide users with the possibility to find, share and discuss thousands of learning materials. Making inroads in OEP requires both top-down and bottom-up approaches, with the recognition that initiating such practices can be achieved through taking small steps, seeking support from OER champions, and finding local, like-minded individuals.

“[The] focus is towards working with governmental agencies and other groups to help build open educational practices that identify local challenges and try to cater training to these contexts. So we are trying to build smaller scale policies and take these challenges into consideration and try to promote some ambassadors around OER in different parts of the country and in different agencies. So less than wide ranging and large, state or government or a municipal framework for OER, what we are trying to do is to look at small agencies and help them change multiple aspects of their practice, so that we don’t have the large challenges of implementing a really great educational policy that looks really good on text but won’t have the subsidies or the energy or the time or the people to actually get implemented in a large scale.” Tel Amiel

In addition, being clear about the justification for the provision of high-quality OEP and OER in HEIs is required.

“If you want to have impact and generate scale you really need to think clearly about the strategic purpose, so what is the social goal, or the economic goal, or the innovation goal that the open education initiative is trying to achieve? And being really clear about that upfront, and the reason why you are pursuing it.” Paul Stacey

Given the massification of HE, for example in Morocco where the population is distributed in rural areas, it is of interest to note how UIZ buildings are geographically distributed across 52% of the country, in Ouazarzate, Laayoune, Guelmim, and Dakhla. From their distributed branches [UIZ](#)’s commitment to reaching learners living in rural areas is evident, alongside their developing practices in open and distance methods of education. Investment in infrastructure will ease process development and ways to transition materials and programmes, and the work of [UC@MOOC](#) offers a useful example of this. Implementing and building strategies to support OEP means getting organized according to local need:

“It might be useful in the first instance to create a common database of all the topics they want to cover, and then they could take and organize, according to their needs, a subset from that general database, and create the kinds of tools, the kinds of textbooks and the kind of teaching tools that correspond to the needs of their educational laws, demands, systems, issues, so that you can take advantage of economies of scale on the one hand and yet respond to specific local needs on the other.” Jean-Claude Guédon

As highlighted by [Edraak](#), getting courses accredited and recognized is a step-wise process currently underway for promoting OEP as a reputable form of learning. It will be interesting to see the impact of awarding credit hours on the pilot course accreditation scheme that German Jordan University has arranged with Edraak, to offer one of its general elective courses to be run via the Edraak platform. Building on and using what is already out there, as in [OER Commons Arabic](#), is a fundamental aspect of the

open education movement, yet, as the next point goes on to consider, upskilling staff to get onboard is also required.

2. Supporting Staff in Using and Integrating Open Practices and Open Resources

The case studies presented in the Compendium demonstrated the importance of raising awareness, changing attitudes, and training staff in the use of OER and OEP. For example, [Plateforme Pédagogique](#) is encouraging teaching staff to put their courses online and using OER to train staff across national borders in how to use OER. However, as the case studies in the Compendium acknowledge, OE is not merely about developing learning resources for open access with appropriate licensing, but finding ways to integrate OER with official academic learning resources.

“We can have meaningful, useful, high-quality materials over the Internet and in repositories, free of charge, free to re-use, and that is all fine, and we have all the academic programmes with their official learning resources, including academic texts, and that is all fine, but nowadays when the student comes into the classroom it is quite naive to think he can only learn from the teacher, he can only learn from the professor, or even from his peers because actually he has maybe one third or less of his life inside the classroom, but what happens with all the other time? Learning happens everywhere, anytime and nowadays even more with all the social networks and resources available on YouTube etc. and of course from other open additional resources such as MOOCs. So we need to think how we can use these contents in a meaningful way to support student learning - we need a means of coming back and forth with the content from the academic programmes to the open educational resources so that they can establish a fruitful collaboration, and so we will get the best of both, and as such a very useful and meaningful support to improve student performance and to improve their interaction, their deep learning and also their analysis of the data and the information.” Daniel Burgos

Thus supporting staff in OEP is not merely about shifting focus in developing ways for students to access online learning resources; rather, it is the importance of not viewing official classroom learning materials as separate entities. What is required is problem-solving ways to integrate and weave the two together. Further, OE should also involve wider discussion about the benefits of open research, open publishing and other considerations for opening up our education ecosystems.

“I really encourage you to dive into the open educational practice but also to think that openness has to go far beyond offering contents publicly available. Because ‘Openness’ opens questions for other possibilities, there are open questions about how to evaluate, open questions about where do we teach, and how can we better combine knowledge from different disciplines and from different backgrounds.” Cristóbal Cobo

A key recommendation is that any department or institution interested in using OER and OEP must prioritize staff development. Time must be made available for staff to learn about the benefits of OER in their contexts, and case studies such as the [Open Review Project](#) can help with this. Staff need incentives to get on board. Developing communities of practice to support OEP is also recommended, as the next theme goes on to explore.

3. Collaborative Creation in Communities of Practice

As the Compendium is focused upon openness in education, any list of recommendations must highlight the advantages of sharing and collaboration within the institution, within local and national contexts, and internationally. We recommend that a collaborative approach to the creation of OER is adopted. If teachers are not already working with technicians to create and administer OER, then they must do so. Similarly, technicians must reach out to teachers in their institution with interest in creating OER and adopting OEP. In Discover Palestine, for example, the project team included geography, history, and culture experts, instructional designers and multimedia specialists: however, the creators of Discover Palestine reflected that their team would have benefited from including others with expertise in creating MOOCs.

“When educators want to become open educational practitioners they have quite a tricky journey to navigate as they move their practice towards the digital, creating the content, navigating digital spaces, and understanding the affordances of those spaces. Familiarization can be time consuming, and there are many barriers along the way. What we really need are ways of connecting with other educators to learn from one another and ways of recognizing the efforts that have been made in the professional development that happens. The power of connecting educators around their specific needs within and across communities gives opportunities for professional development which hasn’t yet been fully recognized or realized. Steps are needed to recognize the effort and focus required to work effectively in a digital world, especially one that is changing so rapidly.... We need to help educators to connect, and to curate the learning resources that are out there, and to learn from each other about the principles of re-mixing and re-purposing and the sustainability of teaching.”

Teresa McKinnon

If the level of expertise is not available in the institution, or if people in the institution are reluctant to adopt OER, then OER advocates should collaborate outside of the institution. As can be seen with Revisita REDES the development of an e-mail list was instrumental to the constitution of an effective community of practice. Such an open community, with active members forming a core-periphery structure, can lead to the development of strong relationships and a strong sense of community, bringing together experts in the fields alongside newcomers and novices. The OER Commons Arabic portal provides an example of a rich platform for teachers to contact and connect with other teachers of the same or of different disciplines, thus facilitating opportunities for collaboration, open discussions, and reciprocal learning.

As evident in Open Humanities Press, globalization and sustainability can occur when working in collaboration with a wide network of scholars, librarians, technology specialists and publishers. Such collaborations can lead to exciting, new and creative works and offer positive benefits at an individual level as well:

“Open education as a practice starts with myself as I think about my practice and my teaching. I think about it aloud on Twitter and on my blog. You know if I'm thinking of what i'm going to do next semester I'll write something on my blog and I'll solicit feedback from other people. I'll go and look at what other people around the world are doing from their blogs, from articles online, and then I change my project ideas and assignment ideas based on feedback that I get from people. A lot of the best ideas I have are ideas that came from someone else.” Maha Bali

Developing learning resources, context related, profiling the scholarship occurring in the S-M region is not only about the value of content transmission, but can also serve to inspire and evoke sharing, collaboration and social commitment, all features befitting a global knowledge-sharing society.

4. Enhancing the quality of student learning

As evidenced from the [Open Review Project](#), learning outcomes achieved through the use of OER may be equivalent to those achieved by means of traditional (i.e. commercial) textbooks. Therefore, important opportunities for saving money are achievable through developing non-commercial OER while still using high quality content. The implications of this are particularly relevant to institutions, students and families within less affluent contexts, where accessing commercial content can be difficult and expensive.

“When I was a teacher I always gave away my course materials to my students... you don’t write course content to keep to yourself, you write it to share.... After a time I had a lot of experience in my own courses and new teachers who didn’t have a lot of experience on the same topics would use my hand-outs as a quick way to get started ... I think all teachers should share with everybody, and that means students will benefit, other teachers will benefit and if you care about this it means that you will benefit too, as your name and your knowledge and your reputation for knowledge will also spread, there’s no drawbacks whatsoever. ... I don’t think teachers in the MENA region need any special encouragement for this, I think all teachers already share this inclination, they already see the value of doing it, I would just remind them, remember your vocation as a teacher, you only help people if you share your knowledge, not if you keep it to yourself” Peter Suber

OER can support anytime, anywhere learning, offering new communication possibilities between teachers and students, as exemplified in [UC@MOOC](#) where the administration of digital content in the form of course materials, tutorials, and labs offers students a better level of integration and support despite the challenging teacher-student ratio. Enhancing the learning relationship by offering means by which students can access support, as often as they require it, at the times it best suits their needs, has resulted in reduced attrition rates, and boosted student satisfaction ratings. Further, OER should engage students as co-creators. The example of crowd-teaching and promoting student-parent-teacher collaborations as exemplified in [Nafham](#) (with incentives for quality resources submitted), provides a useful co-creation model, transferable into HE domains, especially in terms of students developing educational resources for other learners. As parents and teachers involved in Nafham acknowledged, when offered the opportunity to submit teaching resources for other learners, new talents and engagement in learning emerged amongst the pupils.

Issues of quality need to be carefully considered and managed. [OER Commons Arabic](#) provides an interesting example of ways to build in quality mechanisms for OER with the use of a rubric on their portal that enables teachers accessing the resources to rate their contents on their usability and valued added features. For example, the rubric covers how well subject matter is explained, the technological interactivity of resources, the opportunities for deep learning, etc. Further, the portal provides a means for learners to adapt the OER in terms of font, colour and contrast etc., to enable accessibility for people with disabilities. OER need to be accessible to meet a wide range of learner needs.

[Edraak](#) similarly provide an example of how they have considered issues of access to OER to ensure a

quality learning experience, for example through the consideration of bandwidth versions and printable outputs of learning resources.

“We have taken into consideration challenges related to technology and access, so we usually create low bandwidth versions of video lectures and we sometimes offer transcripts that are printable. As more K-12 and university level courses are hosted in Edraak there is a growing opportunity to enhance learners’ support and curriculum design through the use of online learner data. As such we are opening up our data and launching ‘research.edraak’ to enable research communities and educational researchers to tap into our learner data and use our data analysis tools in order to inform curricular design an learner support.” Shireen Yacoub

Extending practices and building on the work of others, for example [Revisita Redes](#) and [Open Humanities Press](#), is recommended to maximize the importance of high quality, critical scholarship.

5. Licensing of OER content

In this final theme, the use of licenses across the case studies using OER varied. For some, each individual resource was licensed, whilst others did not seem to have a licensing strategy in place. We recommend that those providing OER should review their licensing approach and work with their institutions, where possible, to formulate guidelines for OER creators, in order to best license their OER. It is of course also essential that the licenses of others are respected and adhered to.

“We collaborate with Arab instructors and subject matter experts to create high quality educational content in Arabic in an effort to enrich Arabic content online and to eliminate the language barrier for Arab learners. We have recently adopted the Creative Commons Licence as a default licence for Edraak courses and we’re actively encouraging our partners to do so.” Shireen Yacoub

6. Conclusions and next steps

The findings from the case studies presented in terms of the five key themes have led to a number of recommendations. They are proposed here in order to provide a reference of work for OER and OEP of work to be done, for example, in relation to considering institutional contributions to the regional agenda and the definition of institutional roadmaps.

Top-Down and Bottom-Up Implementation

- Clarity about the justification for the provision of high-quality OEP and OER in HEIs is required
- Investment in infrastructure will ease ways to transition materials and programmes
- Institutions should organize themselves according to local need
- Piloting course accreditation schemes through institutions may be a useful means of promoting OEP as a
- reputable form of learning, where national educational authorities do not recognize online education.
- Building on and using what is already out there is an important premise of OEP/OER
- Resources are required to support the upskilling of staff

Supporting Staff in Using and Integrating Open Practices and Open Resources

Staff need to be supported to find ways to integrate OER with their official academic learning resources

Staff need to appreciate that openness has to go far beyond making content publicly available

Staff development needs should be prioritized

Incentives are required to engage staff

The effort required for staff to work effectively in a digital world needs to be better acknowledged

Collaborative Creation in Communities of Practice

A collaborative approach to the creation of OER needs to be adopted

If the level of expertise is not available in the institution, or if people in the institution are reluctant to adopt OER, OER advocates should collaborate outside of the institution

The potential of Open Education to have greater impact can be realized when a consortium of institutions collaborate together rather than something happening within just one institution

Learning resources, context related, can help to raise the profile of scholarship occurring in the S-M region to inspire and evoke further sharing, collaboration and social commitment

Enhancing the quality of student learning

Important opportunities for saving money are achievable through developing non-commercial OER while still using high quality content

OER can offer new communication models between teachers and students

OEP should engage students as co-creators

Issues of quality need to be carefully considered and managed

OER need to be accessible to meet learner needs including students with learning disabilities

Understanding how computer-mediated communication works, including how we connect with each other and build trust within networks, is required for effective online intercultural exchange

Licensing of OER content

Those providing OER should review their licensing approach and work with their institutions, where possible, to formulate guidelines for OER creators.

Building on these recommendations, the OpenMed project will mobilise all relevant stakeholders in the participating S-M countries to define a long-term regional strategy for opening up education in South-Mediterranean countries. This will be done through an open consultation, and a number of events in Egypt, Jordan, Morocco and Palestine. The regional strategy will serve as a guideline for the definition of institutional roadmaps, i.e. short-term action plans for the implementation of OEP at local/institutional level.

The initiative will also include a training of trainers component: an OER blended training course will be delivered to university educators to build capacity to make use of OER, and to start up OEPs, relevant to the educational ecosystem.

Supporting dialogue among stakeholders, and building capacity of educators, will ensure that Open Education is taken into account in relation to long term and strategic perspectives, contributing to include online, flexible and open education in the strategies of a number of universities as well as of a number of governments in the South-Mediterranean region. Negotiation and development of such infrastructure

would also increase the volume of virtual mobilities in Europe and in S-M Countries, opening up new, flexible, learning pathways, and exposing students to international approaches and dialogues, with large-scale benefits in terms of social externalities and learner citizenship.

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MOOC Platforms and Portals

MOOCs – why (not)? Opportunities and barriers for European universities and organisations

Christian Friedl¹, Anita Maček², Oana Driha³, Darco Jansen⁴, Sarah Bridgman⁵

^{1/2}*FH Joanneum Gesellschaft, Austria;* ³*Universidad de Alicante, Spain;* ⁴*EADTU, The Netherlands;*

⁵*The Open University, United Kingdom*

Europe embraces MOOCs - A prospective analysis on the way ahead

Antonio Teixeira¹, Darco Jansen²

Universidade Aberta, Portugal¹; EADTU, The Netherlands²

MOOCs – why (not)? Opportunities and barriers for European universities and organisations

Christian Friedl

FH JOANNEUM GESELLSCHAFT, Austria
christian.friedl@fh-joanneum.at

Anita Maček

FH JOANNEUM GESELLSCHAFT, Austria
anita.macek@fh-joanneum.at

Oana Driha

UNIVERSIDAD DE ALICANTE, Spain
oana.driha@ua.es

Darco Jansen

EADTU, Netherlands
darco.jansen@eadtu.eu

Sarah Bridgman

THE OPEN UNIVERSITY, UK
sarah.bridgman@open.ac.uk

Abstract

This paper discusses the preliminary outcomes of a European-wide research endeavour to identify opportunities and barriers for European universities and organisations to increase the uptake of Massive Open Online Courses (MOOCs). It seeks to determine which support measures could unlock the full potential of MOOCs in Europe in relation to improving workplace training and the development of skills necessary of today's labour market.

MOOCs are now a feature of the European educational system, with European growth rates overtaking those within the United States. Nevertheless, most initiatives remain isolated, both geographically and by their sectors. MOOCs lack impact on the university system as a whole, and have yet to make their mark on the business community.

The aim of the EU-funded *BizMOOC* research project is to explore the challenges of maximising the potential of MOOCs across the European education and business landscape. In 2016, the project conducted qualitative interviews with 110 institutions (both universities and business organisations), as well as an online survey to address the learner's perspective. This paper discusses the findings from the first phase of this research.

Keywords: MOOCs, e-learning, business, workplace training, higher education, skill development

1. Introduction

Stimulated by the prospect of global recognition and huge numbers of international learners, European higher education finally got onboard the MOOC train in 2012 (EC, 2013, pp. 64–66). In response to the largely US-dominated market, European MOOC platforms (iversity/DE, Futurelearn/UK, Miriada X/ESP, FUN/FR) began to emerge. Since March 2013, MOOC growth rates have increased exponentially in Europe – from 81 MOOCs in July 2013 to 376 by November 2013 – and even outpaced the non-European growth rate. What’s more, the number of MOOCs available is still increasing. By the end of 2015, approximately 4,200 courses were offered by 500+ universities to 35 million students.

Although MOOCs have gone through a ‘fast cycle of hype and disappointment’ (Banerjee & Duflo, 2014, p.514), growth rates in Europe have maintained a steady level. Jansen & Goes (2016) report that four independent surveys indicate that over 45% of higher educational institutions (HEIs) intend to offer MOOCs. This is in contrast to the US where the number of HEIs that either offer a MOOC or plan to do so has remained stable at 12-13% for the last three years (Allen & Seaman, 2016).

Despite this, the European MOOC revolution is “nationally isolated” and is fuelled from the efforts of individual universities, scientists or companies, rather than a common European-wide strategy (Gaebel, 2013). The distribution of MOOCs is not equal throughout the continent, and can be found concentrated around certain countries. With some exceptions, the main players in the European MOOC game derive from Western Europe (Dillenbourg, 2013), with Eastern European HEIs only just joining in. Muñoz *et al.* (2016) show that the uptake of MOOCs by HEIs ranged from 25% in Germany to about 60% in France. Jansen & Goes (2016) show uptake ranged from 45% in Turkey to 90% in Italy and Portugal. They indicated also an increased uptake of MOOCs in the Czech Republic²⁵³ and Lithuania²⁵⁴.

2. Needs and gaps for MOOCs in Europe

Even though MOOCs are a relatively recent phenomenon, they are starting to be used outside of the Higher Education context; for example, in the recruiting process, the training of new employees, Human Resource Development provision, marketing, and even brand awareness (Grossman, 2013; Iversity, 2015; Radford et.al., 2015; Sreeleakha and Manikandan, 2015).

One of the aims of the *BizMOOC* project is to identify the main opportunities and barriers to maximising the potential of MOOCs within the business community at the European Union level. During the first phase of the project, an in-depth study was carried out to identify **reasons why** some business organisations and HEIs **are not yet** part of the MOOC movement.

In an era of ubiquitous technology which dominates a great part of our daily life, the low or zero penetration of the MOOC movement in some European countries is surprising. Furthermore, despite high interest in MOOCs, there are still many organisations that are not aware of this mechanism for learning. Albeit, the “percentage of companies that feel comfortable incorporating MOOCs into their learning platforms rose to 43 percent from 30 percent last year” (Schwartz, Bohdal-Spiegelhoff, Gretczko & Sloan, 2016, 6).

²⁵³ http://eadtu.eu/images/publicaties/Czech_Republic-Comparing_Institutional_MOOC_strategies.pdf

²⁵⁴ http://home.eadtu.eu/images/Results/Lithuania_Country_report_of_MOOCs.pdf

3. Methodology

To address the aims of the project, a semi-structured interview instrument was developed. This style of qualitative interview was selected due to its flexibility, which allows for an open dialogue beyond the parameters set by the interview schedule. Table 1 summarises the overall research design.

Building on prior literature in the field of qualitative business research, a three-part interview guide was designed which focused on:

1. A short introduction to the MOOC concept and the interviewee's perception of this, including:
 - a. familiarity with the concept
 - b. added values associated to MOOCs
 - c. expectations
 - d. benefits.
2. More specific aspects of online courses and MOOCs, including:
 - a. identification of the main activities of the organisation/HEI connected to online training and MOOCs
 - b. identification of the availability and interest of the organisation/HEI in using MOOCs.
3. Needs (and/or interest) for collaboration with other organisations/HEIs on MOOCs, including:
 - a. identification of the main reasons for the organisation (not) to collaborate with others on MOOCs
 - b. identification of the topics and services on which the organisation/HEI is willing to collaborate with others.

In order to address appropriately the needs of the target groups, the guidelines were tailored to either business organisation or HEIs. This resulted in five lead questions and 17 follow-up questions for universities, and eight lead questions and 12 follow-up questions for organisations. In the HEI interview guideline, a fourth aspect covering "regional and national infrastructure on open education availability" was added to identify barriers and opportunities at a policy level.

The business organisation interviews were carried out with representatives of national and multinational companies, small and medium enterprises (SMEs), and even micro SMEs (with less than 10 employees). Interviews were also carried out with research institutes and industrial associations, among others. The geographical spread of all these organisations allowed for different perceptions and approaches of the MOOC concept. Overall, 55 interviews with business organisations were conducted. The analysis presented in this paper is based on the findings of 42 interviews. The representatives from the organisations were in charge of Human Resource Development or eLearning division within their companies.

The HEI interviews were carried out with representatives of different HEIs with no or limited previous experience in MOOCs. Interviewee institutions were located across 20 countries within the European Union. In order to select the most suitable HEIs for inclusion, a long list was created among the consortium of the *BizMOOC* project. The selection of the final institutions for interview was based on the following criteria:

- The HEI has not offered a MOOC to date.
- The HEI contributes to an equally distributed geographical perspective (between Eastern and Western Europe), but with a clear focus on Eastern European countries which are less experienced in this movement.
- The HEI contributes to a diverse range of institutions; for example, traditional, technical, medical, applied sciences, etc.

- A representative from the HEI is of an appropriate level of seniority and has some connection with eLearning.

Overall, 40 interviews with HEIs were conducted. Fifteen additional interviews, which have not been evaluated as yet, will be used to verify the results.

Table 1: Summary of the research design

	Research Design
Method	Qualitative, semi-structured interviews
Data generation tool	Telephone / Skype / Personal interviews
Structure	Qualitative interview guideline with open questions; one for HEI (5 lead and 17 follow-up questions) and one for organisations (8 lead and 12 follow-up questions)
Sample	42 business organisations and 40 HEIs 44 in Western Europe and 38 in Eastern Europe 54% from Western Europe and 46% from Eastern Europe (and Cyprus) ²⁵⁵
Timeframe	01/04/2016 – 15/09/2016
Analysis method	Qualitative content analysis and quantitative analysis (mixed analysis) by Bryman (2007)
	Source: own elaboration

For the purpose of analysis, five categories were created based on the outcomes of the interviews:

1. Awareness and perception of MOOCs.
2. Involvement in online and MOOC activities.
3. MOOC expectations, reasons, benefits and barriers.
4. Opportunities for and interest in collaboration with others.
5. Existing infrastructure for promoting MOOCs at a regional and national level.

For the purpose of this paper, the preliminary results of the first, third and fourth categories are presented.

3.1 Limitations

Data from the interviews with organisations and HEIs are still undergoing analysis. As such, this paper offers findings derived from a preliminary set of results. Further planned activities within the *BizMOOC* project include the preparation and publication of guidelines and recommendations to maximise the potential of MOOCs for different target groups; the production of three MOOCs based on these guidelines; and an evaluation and subsequent revision of the guidelines. These activities will draw on the full data set and it is anticipated that they will include other suggestions and recommendations not explored within this paper.

4. Results

4.1. Awareness

²⁵⁵ Eastern Europe includes all European countries (developed or developing economies according to the International Monetary Fund) which entered the European Union since the enlargement of 2004 onwards as well as countries which are not yet a member of the union.

The research instrument sought to establish how familiar the interviewees are with the MOOC concept. Of all the business organisations interviewed, 70% stated they are already familiar with MOOCs (Table 2a); however, only 34.78% of them are offering and/or producing MOOCs at present.

Table 2a: Familiarity with MOOCs (business organisations)

	YES	NO	Offer/produce MOOCs
Familiar with MOOCs	23	19	8
% over total interviewed	54.76%	45.24%	34.78%
Western European countries	14	12	7
% of western European countries	60.87%	63.16%	87.50%
Eastern European countries	9	7	1
% of eastern European countries	36.13%	36.84%	12.50%

Source: own elaboration based on in-depth interviews

A total of 95.45% of the HEIs interviewed and located in Eastern European countries and Cyprus are familiar with the MOOC concept (Table 2b); however, only 25.71% of them are offering and/or producing some form of non-traditional learning activity (similar to MOOCs).

Table 2b: Familiarity with MOOCs (HEIs)

	YES	NO	Offer/produce MOOCs
Familiar with MOOCs	35	5	9
% over total interviewed	87,5%	12.5%	22.50%
Western European countries	14	4	2
% of western European countries	40.00%	80.00%	22.22%
Eastern European countries	21	1	7
% of eastern European countries	60.00%	20.00%	77.78%

4.1.1 Definition

The *BizMOOC* project offered a definition of MOOCs and asked interview participants whether they agreed:

MOOCs are courses designed for large numbers of participants that can be accessed by anyone anywhere as long as they have an Internet connection; they are open to everyone without entry qualifications, and offer a full/complete course experience online for free.

This definition was developed by different European MOOC projects (OpenupEd, 2014) and validated using a survey by Jansen & Schuwer (2015).

Of the number of organisations interviewed, 88% agreed with the definition compared with 90%²⁵⁶ of the HEIs interviewed. Several interviewees who are already familiar with the concept provided additional insight into defining MOOCs:

- The characteristic **“for free”** is no longer mandatory as there are costs associated to MOOCs and other MOOC-type courses (for example, certificates available for a fee).²⁵⁷
- The characteristic **“open to anyone regardless of previous experience or academic qualifications”** does not seem to be applied in practice with existing MOOCs. This is because ‘some MOOCs would make it difficult for learners with a non-traditional background to engage or even feel welcome’. The definition in this sense covers mainly the *openness* of the access. Furthermore, in many cases, introductory courses, or even a diagnostic test to identify the level of the potential participants, might be necessary to enable learners to choose a suitable MOOC. This aspect was one of the main concerns of the interviewees regarding the definition²⁵⁸.
- There are doubts that a MOOC offers **“a full/complete course experience”** as it depends, among others, on the rate of completion of this type of course²⁵⁹.
- Most MOOCs have a start and end date²⁶⁰.
- MOOC certificates and their recognition should be included within the definition²⁶¹.
- MOOCs do not appear to be tailored for a large/massive audience, but rather to specific learners²⁶².
- Intellectual Property Rights and personal data protection are sensitive issues for organisations offering and for learners enrolled in this kind of courses due to its **“for free and online”** characteristic.

4.2. Expectations

The findings from the analysis of expectations of MOOCs from both the business organisation and HEI data suggest MOOCs could:

- **Be the way of training** employees on very specific and concrete topics.
- **Educate and orientate new employees** of an organisation.
- **Complement the existing experience of employees** with underlying theory and knowledge.
- **Support personal educational interests** that are not provided by the organisation.

²⁵⁶ People who were not familiar with MOOCs were provided with an additional explanation about MOOCs.

²⁵⁷ Note that most courses are still offered for free but additional services are offered to MOOC participants as part of freemium business models.

²⁵⁸ There is a difference between entry requirements (certain age, completed secondary school and/or have a certain language/ math skill) and prior knowledge. Most MOOC providers don't pose any entry requirements so anyone can start the MOOC. However, to be successful some prior knowledge is recommended.

²⁵⁹ The authors of this paper suggest to approach this the other way round: Because anyone can follow a MOOC (without entry requirements), many will fail, because they lack the prior knowledge, motivation or other objectives before enrolling. Therefore, we do not agree that completion rates could determine a full course experience.

²⁶⁰ However, the criteria as part of the MOOC definition (OpenupEd, 2014) includes the possibility to have start and finish dates whenever the participant wants. OpenupEd was the first one that already included these self-paced MOOCs. It took until 2015 for the main MOOC providers to widely starting to offer them as well (although most of them are offered within a specific time-frame): <https://www.class-central.com/report/mooc-trends-2015-rise-self-paced-courses/>

²⁶¹ Recognition and certificates are indeed part of the criteria of a full/complete course experience. See page 2 of http://www.openuped.eu/images/docs/Definition_Massive_Open_Online_Courses.pdf

²⁶² There is a difference between tailoring a online course to a specific target group, which limit the number of participants, and designing a course for massive audience. I.e. that the efforts of all services (including of academic staff on tutoring, tests, etc.) does not increase significantly as the number of participants increases. However, recently the big MOOC providers are tailoring their course offering to business (employees) - introducing other abbreviations like SPOC (Small Private Online Courses).

- Be a **low-cost version of high-class courses**. Learners cannot always afford to attend valuable training due to the high price or to extra costs (as a consequence of the location of the training/course). MOOCs may provide a solution even though it may incur some cost (i.e. for obtaining the corresponding certificate).
 - Be **reused and enhanced** with practical activities. Learners might use MOOCs for acquiring fast and free-of-cost knowledge; for example, to write a report on a specific topic. The report could be graded “on-site” and the student could receive credit through a formal programme of learning.
 - Provide learners with the means to work on a topic with which they are **unfamiliar**.
 - Be useful for **personal and professional development, lifelong learning, adult learning, learning new languages etc.** This suggests one of the main strengths of MOOCs is for **continuous professional development (CPD)** or **professional networking** purposes (i.e. for colleagues to keep abreast of new developments in their field, or to look at topics that they are interested in, but have not had time to investigate in depth). By this, it can
 - Provide **easier to access new knowledge** and **new research findings** on a global level.
 - Provide a taste of a new subject area for those wishing to explore a change in career.
 - Be suitable for **disabled persons** and for people located in the **rural and extra urban areas**.
- MOOCs could also be suitable for those with a **busy schedule** because of the autonomy of these courses.
- Be suitable for **employees and specialists** in order to update knowledge on specific topics necessary for completing their daily tasks.
 - Be a good option to **acquire knowledge and certificates from other HEIs**.
 - Be a great **tool for improving skills**, not just in the chosen MOOC area, but for developing **soft skills, digital skills or competencies** which will improve employability as well as the learning methods employed by learners.

This suggests MOOCs are not just a way of ensuring employees’ training for free, but they are also a complementary tool for higher education, vocational education and lifelong learning. In terms of the added value of MOOCs, representatives of the business organisations stated the characteristic “openness” is the most relevant, followed by the characteristics: “free”, “massive”, “state-of-the-art”, “scalable”, “without entry requirements”, “interactive” and “collaborative”.

Representatives of the HEIs on the other hand suggested that the added value of MOOCs was in relation to “internationalisation” - not just as a learning experience in a global context, but also in terms of networking with specialists in the field or practitioners in specific areas at a global level. The “open” ethos is a clear advantage for the student community as well (independent of their enrolment on any official degree). Moreover, MOOCs are highly valued as a marketing tool and seem to be highly rated by the interviewed HEIs in terms of quality and the capacity for improving specific abilities, skills and competences.

4.3. Reasons not to be involved in MOOCs

While potential opportunities have emerged from the data, the research instrument also sought to identify barriers to the use of MOOCs. The data was therefore analysed to ascertain **reasons why organisations are not involved in offering/producing MOOCs** (Table 3), and the **challenges faced by HEIs when offering/producing online training**.

Table 3: Reasons organisations are not involved in offering/producing MOOCs

Cons

Low awareness
 Lack of experience
 Not a priority for now
 Lack of capacity to offer/produce MOOCs
 Acknowledged certificates needed
 Intellectual Property Rights
 Legal limitations/legal differences
 Risk of revealing company secrets
 Not covering the requirements of the company
 Social media, videos, interactive content etc. restricted by the company firewalls or code of conduct

Sources: own elaboration based on in-depth interviews

Other barriers organisations are facing with when offering/producing a MOOC were also highlighted. It was found that many organisations use training to improve the performance for their employees. However, the use of MOOCs for employee training might not be suitable in this context. Moreover, it appeared there is a strong stigma of eLearning due to negative prior experiences. Low cost, or even free, courses are considered as being of poor quality by many people. Changing this perception is not an easy task.

Some organisations reported the lack of digital skills of some staff, together with Internet access difficulty in some regions, are also serious barriers for MOOCs as a training and education tool. Self-directed learning pathway policy, and the idea that MOOCs serve mainly “trendy” topics instead of core business competences, are not helping to increase the number of institutions involved in offering/producing MOOCs. Confidentiality issues are also considered as a barrier by many of the interviewees.

HEIs are also facing barriers and challenges when offering/producing or even re-using²⁶³ online training. Data from the interviews suggest the main challenge is the high cost of producing online courses, as well as the costs related to the MOOC platform used (Table 4). In this respect, the “free” characteristic, normally associated to the MOOC concept, is a major challenge to HEIs due to the perceived lack of profitability. It was suggested that there needs to be evidence of sustainable income in order to support the production infrastructure, and the staff involved.

²⁶³ Chapter 2.2.5 is dedicated to collaboration among organisations in MOOCs

Table 4: Main challenges faced in online training

Main challenges and concerns	
Motivate the participants to be active and do their work	Legal limitations for imposing fees for education (traditional or online)
MOOCs or online courses <i>cannot be for free</i>	Different approaches of traditional and online education/training
Mind shift towards different ways of teaching/learning necessary in both learners and employers	Need of enhancing e-study content and management of online tutors
To find and create a <i>suitable, flexible production model</i>	Give actual and <i>good</i> examples and demonstrations of <i>workable solutions</i>
To reach the target group	Collaboration with <i>business</i> , which is <i>in a continuous movement</i>
To maintain <i>partnerships, links and relationships</i>	Making sure links with industry are woven into the curriculum
The <i>cost of producing the multimedia materials, to set up and host the MOOC platform</i>	Lack of knowledge necessary in digital skills
The time limitation	

Source: own elaboration based on in-depth interviews

At least one aspect is somehow contradictory in the challenges highlighted by the interviewees: online courses and MOOCs cannot be for free as the interviewees assumed there would be high production costs (which is only true if MOOCs are not scaled up to a massive amount of users²⁶⁴), but in some countries (e.g., Hungary) education is for free and fees are not charged, even for online education²⁶⁵. This suggests legal frameworks could also end up being a challenge in the case of MOOCs as they are offered to “everyone, everywhere” without geographic restrictions.

4.4. Opportunities for collaboration

It could be suggested that not every organisation or HEI needs to produce their own MOOC. More than 75% of the HEIs from our sample are interested in collaborating with the business community to offer/produce MOOCs. Of these HEIs, more than 20 (67%) are located in Eastern European countries. Suggestions of types of organisation with which to collaborate include: IT companies, multinationals which outsource certain training activities, call centres, support services, medical companies, cultural heritage presentation, preservation and advertising, banks, trainings and consultancy companies, employment offices, NGOs, sport clubs/organisations, and other HEIs.

The primary reason for this kind of collaboration is the perceived high costs associated with offering/producing MOOCs. Additional reasons include around quality, experience, knowledge-exchange to tackle the challenges, and authentic learning. The need to adapt course content to real life contexts strengthens the need to collaborate with the business community in order to bring insight into the current and future demands of labour market.

²⁶⁴ MOOC platform providers are in business, because they offer scalable services that are too costly for one organisation, but when shared nationally or even globally reduces the costs significantly.

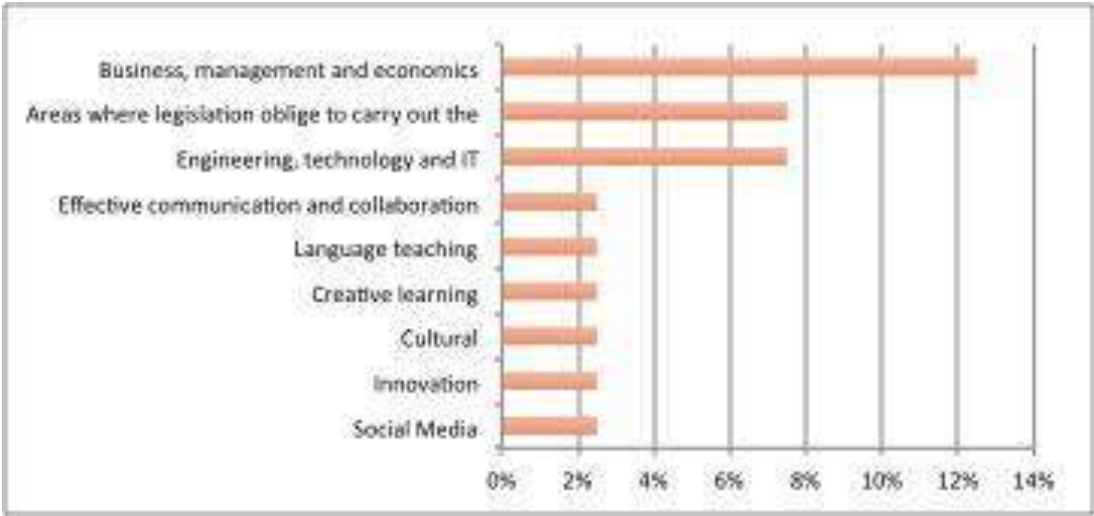
²⁶⁵ The same counts for many European countries but mainly for regular bachelor and master students until mostly a certain age. Therefor the market potential in Europe is much higher for LLL/CPD. However, young people (and students) use these MOOCs as complementary to regular on campus education.

4.5. Skill alignment

In addition to the aims described, the *BizMOOC* project will produce and offer three MOOCs, each of which will address European key business and lifelong learning competencies. The subjects will cover learning how to learn, entrepreneurship, and creativity and innovation. It was therefore important to ascertain from the interview participants which skills they believe are key to their area of business, and society in general, in the next few years.

The HEIs interviewed are involved in offering/producing training in areas of engineering, technology, IT, in areas where the legislation imposes employees training (e.g. medicine and health, safety, fire fighting etc.), and in business-, management- and economics-related areas (Figure 1).

Figure 1: Areas where interviewed HEIs are offering/producing online training



Source: own elaboration based on in-depth interviews

The most relevant areas of online training undertaken by the employees of the organisations participating in the research are IT skills and management skills development. Table 5 indicates the most relevant areas of their eLearning provision.

Table 5: Areas of online training undertaken by business employees

eLearning areas	
Mobile learning	Leadership
Digital competences	Entrepreneurship
Graphical design	Management
IT	Accounting
Mathematics and informatics education	Insurance
Compulsory labour training	Anti-money laundering and transparency
Vocational training	Foreign languages

Source: own elaboration based on in-depth interviews

5. Maximising the potential of MOOCs

Although only preliminary results of the research are presented in this paper, it is possible, along with prior literature in this field, to deduce actions that can be taken to maximise the potential of MOOCs:

- Raise awareness of the potential of MOOCs within the professional community.
- Assess the quality of the learning experience of a MOOC (i.e. does it provide practical, hands-on learning experiences grounded in real life).
- Collaborate to produce MOOCs of a high quality; that is, collaborations between entrepreneurs, MOOC platforms, educational providers and industry can align course content with the needs of the economy.
- Create a system for better recognition of online course achievements. Improved certification schemes would help online learners by documenting their newly acquired skills.
- MOOC providers help overcome the challenge of cost by supplementing existing study programmes by offering MOOCs on niche or emerging topics which cannot be covered otherwise.
- Create partnerships between different institutions in which MOOCs would be produced by universities and sponsored by industry or government bodies.
- Policy makers consider offering MOOC providers specific mechanisms that can help them to reduce the cost and raise the quality of the MOOCs they produce.

6. Conclusion

Results from the *BizMOOC* research to date show that both business organisations and HEIs are considering MOOCs as a new and free way of training/teaching their employees/students. Naturally, both groups experience challenges and barriers to doing so. From the findings presented in this paper, it is possible to conclude that proactive collaboration between different institutions and organisations could help to unlock the full potential of MOOCs in Europe. However, in order to achieve this, there is a need to raise the awareness of the potential of MOOCs within the professional community.

Cost is an important factor when considering to offer and/or produce MOOCs. To help address this challenge, this paper has presented some potential business models: MOOC providers could supplement existing study programmes with MOOCs; MOOCs are sponsored by industry or government bodies; and policy makers offer MOOC providers specific mechanisms that can help them reduce the cost and raise the quality of the MOOCs they produce.

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Europe embraces MOOCs - A prospective analysis on the way ahead

Antonio Teixeira

Universidade Aberta, Portugal

antonio.moreira.teixeira.pt@gmail.com

Darco Jansen

EADTU, The Netherlands

darco.jansen@eadtu.eu

Abstract

In this contribution we demonstrate that the uptake of MOOCs in Europe is not only maturing but is doing so at a much higher level when compared to the US. The analysis is based on four independent European studies and is compared to similar successive studies conducted in the U.S. It is concluded that the European HEIs are much more involved in MOOCs and also that their reasons to invest in this new format differs in some aspects as well. We argue that these differences between the U.S. and Europe might be related to the differences between higher educational systems, political environments and educational values.

In addition this paper presents and analyses the outcomes of the survey of the HOME project conducted end 2015 in Europe and Canada. The similarities and differences between several European countries are discussed as well. These latest survey results demonstrate that many European higher education institutions are willing to collaborate on scalable services in MOOC provision, and that a regional collaboration is much more likely than outsourcing those services to corporates parties. Consequently different (regional) strategies are highlighted to leverage the full potential of online learning and open education for Europe. The implication of the new survey end 2016 is discussed.

Keywords: MOOCs, European uptake, institutional strategy, comparison, collaboration

1. Introduction

Much of the literature and the academic discussion about institutional strategic planning of Massive Open Online Courses (MOOC) has been centred on the U.S. context. Literature on MOOCs in Europe is still developing and only recently some empirical studies were conducted. However, these studies are not very well comparable, and it is hard to learn about differences between regions and types of educational institutions. Given the very different institutional, political and cultural contexts, it is interesting to analyse how in these two different regions Higher Education institutions (HEIs) are responding to the challenges of the MOOC phenomena and are integrating it in their own strategic planning.

In this paper the results of US survey amongst higher education institutions (HEIs) is used as comparison (Allen & Seaman 2014, 2015, 2016). These studies are referred as US2013, US2014 and US2015 related to the year the survey was conducted. Some characteristics of those US surveys are summarized in table 1.

Table 1 *Survey Characteristics of the three US studies*

<i>Survey</i>	<i>Sample methodology</i>	<i>Total sample</i>	<i>Institutions Responded</i>	<i>Institutions answering MOOC questions</i>
<i>US2013</i>	Self-selected sample	4.726 in U.S.	2.831	Only institutions that had MOOC offering or plans: 405 institutions (14.3%)
<i>US2014</i>	Self-selected sample	4.891 in U.S.	2.807	Only institutions that had MOOC offering or plans: 382 institutions (13.6%)
<i>US2015</i>	Self-selected sample	All degree-granting HEIs open to public		No MOOC questions anymore (only question on status of MOOC offering)

In Europe the European Universities Association (EUA) conducted a survey related to e-learning and included some questions on MOOCs (Gaebel, Kupriyanova, Morais, & Colucci, 2014). In 2015 JRC-IPTS conducted a survey on open education in Europe conducted in 2015 (Muñoz, Punie, Inamorato dos Santos, Mitic, & Morais, 2016). In addition a project funded by the European Commission, entitled as Higher Education Online: MOOCs the European way (HOME, 2014) conducted two successive surveys to contribute to a better understanding of the strategic reasons why a higher education institution is or isn't involved in MOOCs, and compared these reasons with the results of similar studies. The results of both HOME surveys are published in respectively Jansen & Schuwer (2015a), Jansen, Schuwer, Teixeira, & Aydin (2015b) and Jansen & Goes-Daniels (2016). These four independent studies are referred to EUA2013, IPTS2015, EU2014 and S2015 respectively. The characteristics of those EU related surveys are summarized in table 1.

Table 2 *Survey Characteristics of four EU Studies*

<i>Survey</i>	<i>Sample methodology</i>	<i>Total sample</i>	<i>Institutions Responded</i>	<i>Institutions answering MOOC questions</i>
<i>EUA2013</i>	Self-selected sample (EUA members)	800 in Bologna Area	249	All 249
<i>IPTS2015</i>	Self-selected sample	Only selected HEIs France, Germany, Poland, Spain and the UK	178	Neff 118
<i>EU2014</i>	Open	Potentially all HEIs in European system	67	All 67
<i>S2015</i>	Open	All HEIs, mainly Europe and French Canada	150	All 150

Both the IPTS2015 and S2015 reported their results of different countries next to overall. Muñoz et al. (2016) limited their survey to five European countries (Germany, Poland, UK, Spain and France). The Jansen & Goes-Daniels (2016) survey was open to all HEIs but the response of the following countries were

high enough for some initial comparison: Turkey, French Canada, Czech Republic, Lithuania , Finland, Israel and Ireland.

2. Status of MOOC offering

Figure 1 summarised the results of all seven surveys using exactly the same question. My institution

- will not be adding a MOOC
- has not yet decided about a MOOC
- is planning to add MOOC offering(s)
- has MOOC offering(s)

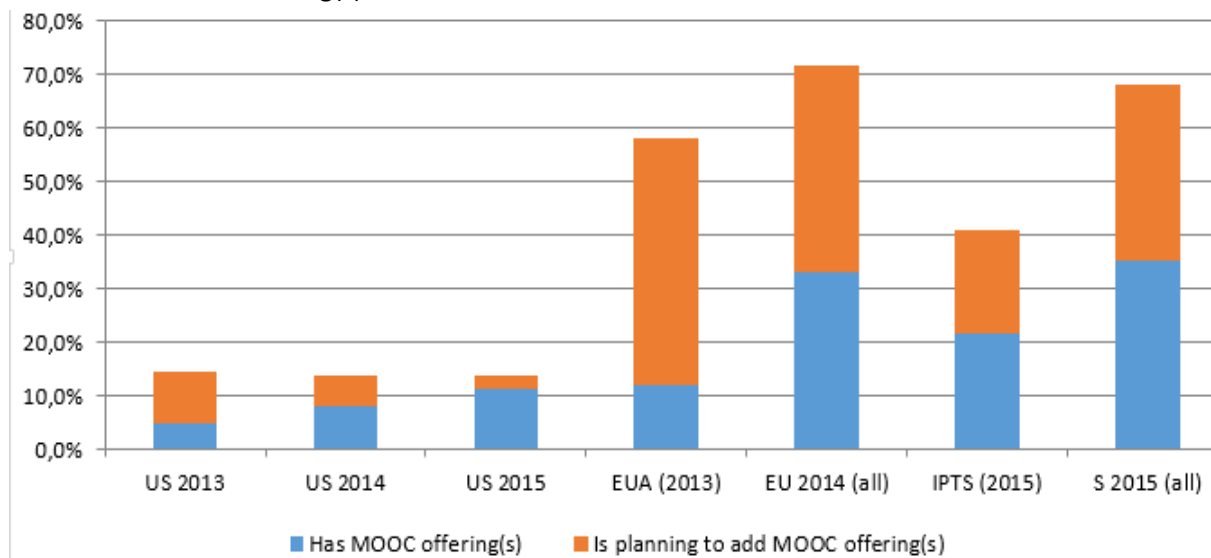


Figure 1: Institutional profile in their MOOC offering compared between that of US surveys (US 2013, US 2014 and US 2015), the EU surveys (EUA 2013, EU 2014), Muñoz et al. (IPTS 2015) and this survey (S 2015)

While in the U.S. the number of HEIs that have a MOOC or is planning to add MOOC offering is stable at 12-13% for the last three years, European HEIs seem much more involved with in general over 45% of HEIs (planning to) offer MOOCs. The four European studies in general demonstrate that the uptake of MOOCs in Europe is maturing at a much higher level compared to the US. In general these studies demonstrate that the "interest in MOOCs has far from peaked in Europe" (Gaebel et al. 2014, p54).

This has possible consequences for European platforms/consortia as many HEIs cannot offer MOOCs on one of the big platform providers (Coursera, edX, etc.) as they have an exclusive policy. For example, OpenupEd might offer a possible alternative applying a more inclusive approach to those HEIs.

2.1 Differences between European Countries

Muñoz et al. (2016) limited their survey to five European countries. In their study the number of HEIs offering or planning to offer MOOCs ranges from 23% in Germany, 32% in Poland, 46% in the UK, 48% in Spain and over 62% in France. Their results are shown in figure 2. Recently, during an international MOOC

colloquium²⁶⁶, Sara Porter reviewed the HEIs MOOC offering of the UK. She confirmed the survey results of Muñoz et al. (2016) that over 30% of HEIs in the UK is offering a MOOC. About half of them is offering that through FutureLearn, Coursera or edX.

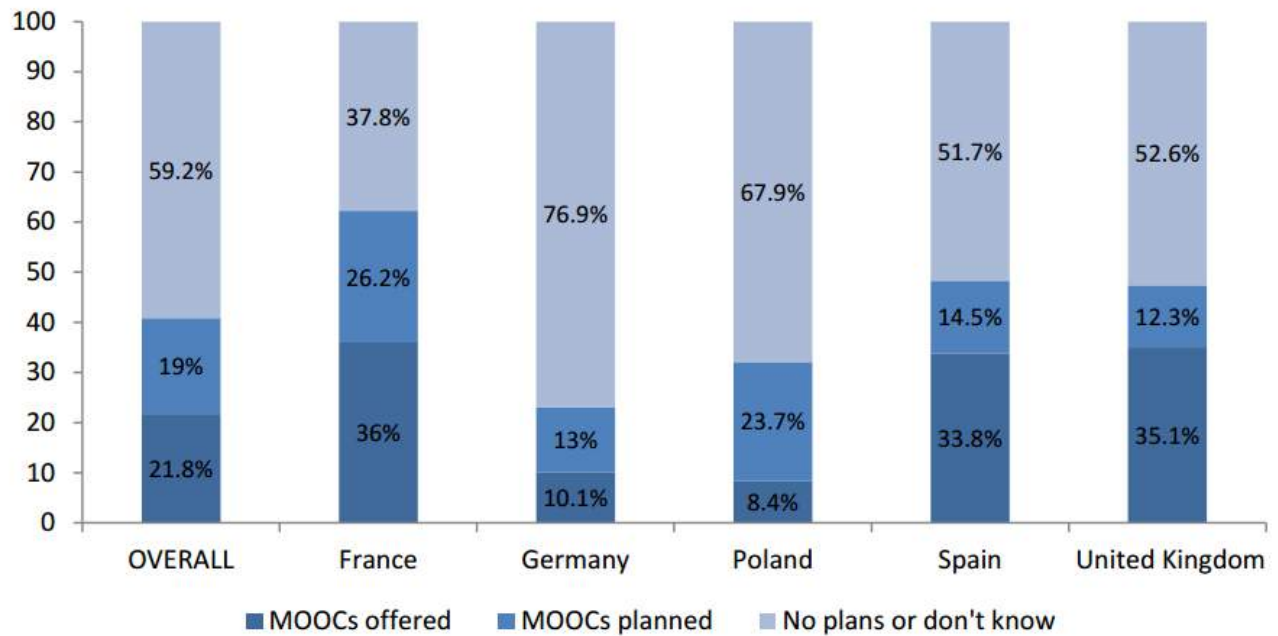


Figure 2: Institutional profile in their MOOC offering for five countries used in JRC-IPTS by Muñoz, et al. (2016).

²⁶⁶ http://www.federica.eu/blog/wp-content/uploads/2016/08/Capri_Conference_2016.pdf

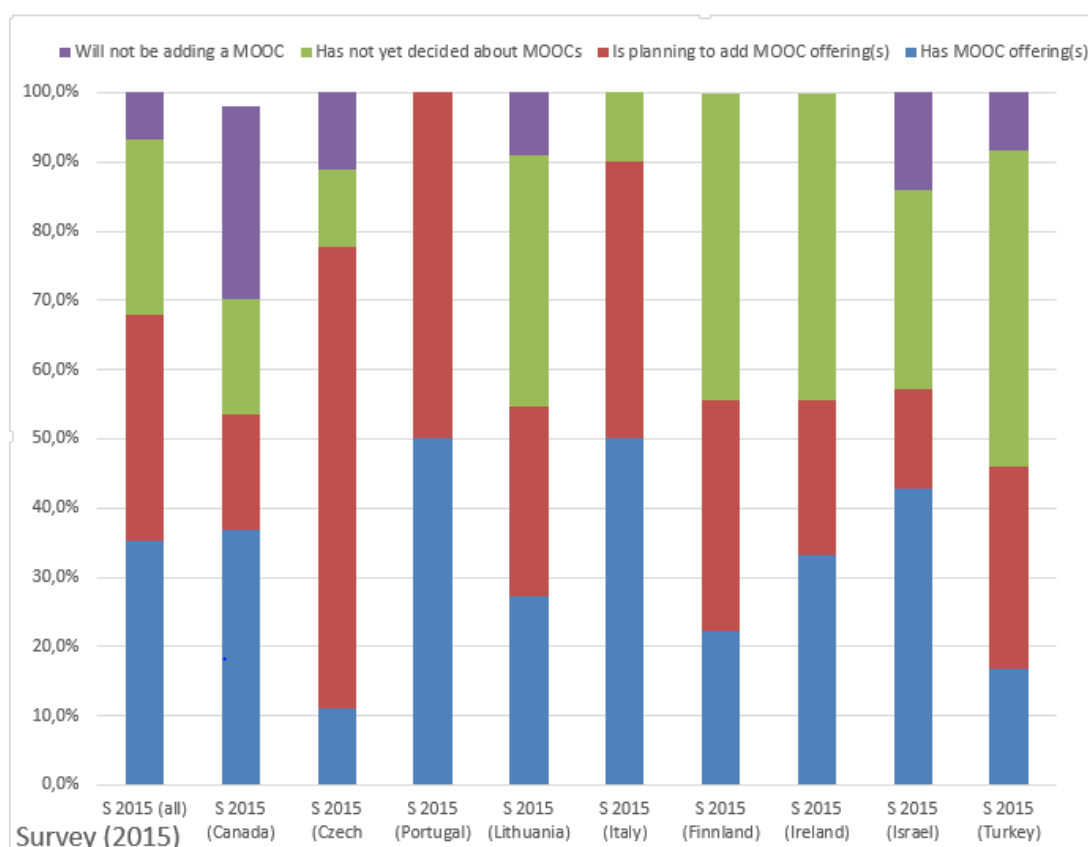


Figure 3: Institutional profile in their MOOC offering for countries compared of the 2015 survey of Jansen & Goes-Daniels (2016)

Figure 3 shows the results of the comparison of nine countries (with the largest response) of the survey conducted by Jansen & Goes-Daniels (2016). Here it shows that HEIs in most countries have a MOOC or are planning to have a MOOC. Note that for a long period the main players in the European MOOC game derive from Western Europe (Dillenbourg, 2013), with Eastern European HEIs only just joining in. These recent surveys show that the uptake in Eastern Europe is catching up. I.e., these surveys indicate an expected increased uptake of MOOCs in Poland, the Czech Republic and in Lithuania at levels equal to Western Europe.

However, that HEIs indicate that they are going to add MOOCs offerings seems somewhat dependent on various factors such as available finances and regional support services, including MOOC platforms. For example, Czech institutions so far blunder in how to grasp the business model based on 'free' and they would welcome cooperation with foreign partners and need help with development of the first courses. The awareness of general public in Czech republic of open online education is rising the last two years only. The potential of MOOCs as well as other forms of e-learning seems by far not exhausted in Europe.

On the other hand national policies might influence the uptake of MOOCs. For example in Finland the popularity of creating MOOCs might be limited as open and inexpensive online courses are already offered by the open institutions of Finland, and as such cover much of the need that is covered by MOOCs in the US and in some other European countries.

3. Institutional objectives with MOOCs

3.1 Are MOOCs meeting the institution's objective?

Figure 4 shows the results of the question *how well MOOCs are meeting institution's objectives*. This question is exactly used in the 2013 US surveys (Allen & Seaman, 2014). It shows that in the US people think it is too early to tell if MOOCs are meeting institutional objectives. The institutions in Eu2014 and S2015 survey show however that there is a positive attitude about this question.

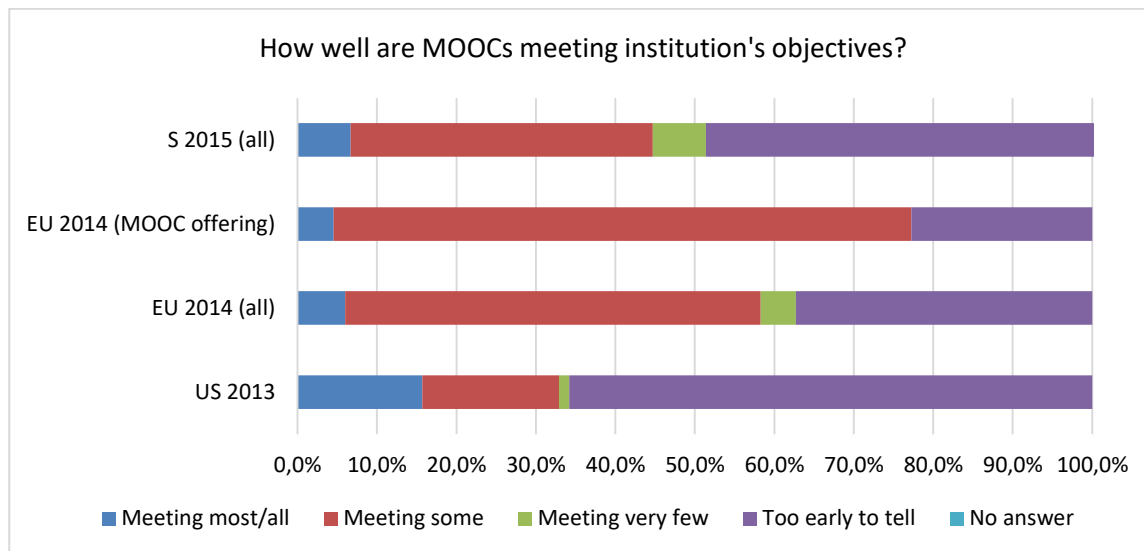


Figure 4: Replies to the question "How well are MOOCs meeting institution's objectives?" compared between that of US survey (US 2013), the EU survey (EU 2014) and latest survey (S2015)

Figure 5 shows the differences between the nine countries of the S2015 survey by Jansen & Goes-Daniels (2016). Turkey and Lithuania are slightly more positive about this question than the overall group. In general 45-55% the respondents feel that it is too early to tell.

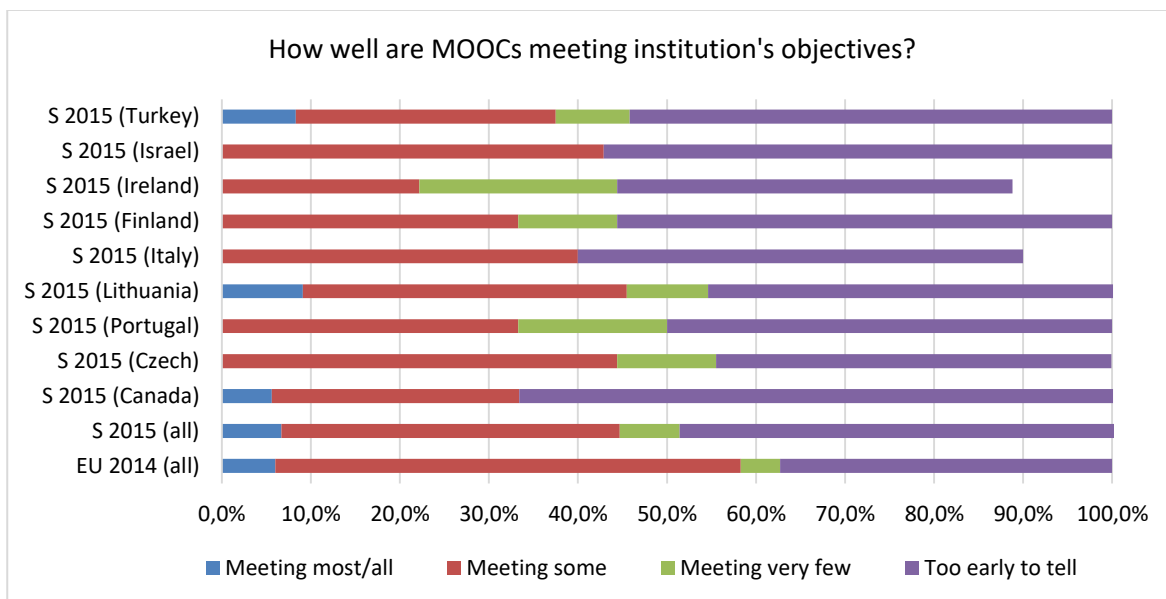


Figure 5: Replies to the question “How well are MOOCs meeting institution's objectives?” from nine countries compared with the EU survey (EU 2014) and the overall survey (S2015)

3.2 Are MOOCs sustainable?

Figure 6 lists the results of the question if *MOOCs are a sustainable method for offering courses*. While in the US the opinion is mostly neutral or disagree, more than half of the institutions of the EU agrees.

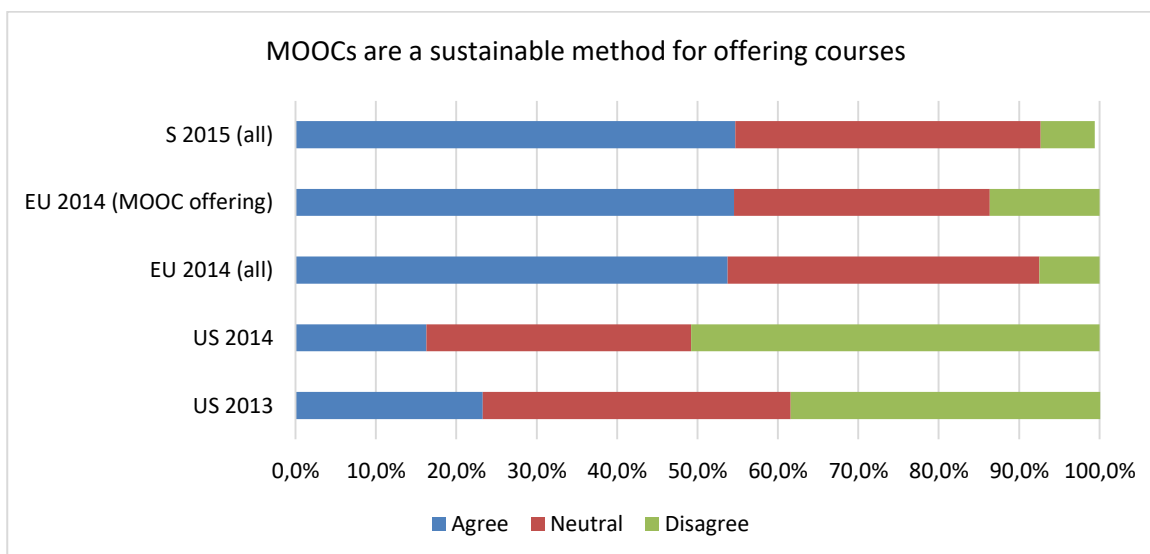


Figure 6: Replies to the question “MOOCs are a sustainable method for offering courses” compared between that of US surveys (US 2013, US 2014), the EU survey (EU 2014) and the latest survey (S2015)

Figure 7 shows that Israel is the most positive about the statement that MOOCs are a sustainable method for offering courses and Ireland thinks very neutral about this. Canada is also less positive than the overall group. The reasons for this differences between (continental) Europe and others might be related to differences in the educational system. Although speculative there is reason to believe that the case for

MOOCs in Europe is linked to the long tradition of promoting life-long learning and access to higher education. With the notable exception of the United Kingdom it needs to be noted that in Europe higher education is still largely framed from a policy perspective as a public good, as distinct from private or personal commodity. As in continental European HEIs are strongly state funding - most institutions have equal resources, the market-based US model has mixed private-public funding and provision with large differences between HEIs. This tradition along with major differences in the business model for higher education, the availability of European Commission funding for MOOCs, and the mechanism of the European Credit Transfer System (ECTS) may help to explain such differences.

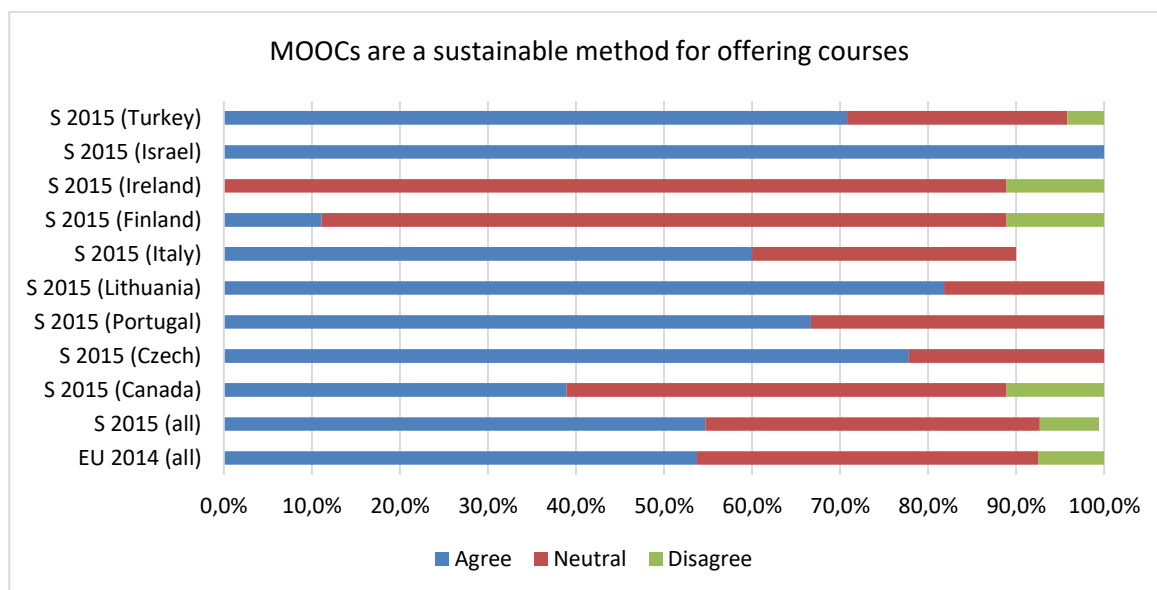


Figure 7: Replies to the question "MOOCs are a sustainable method for offering courses" from the nine countries compared with the EU survey (EU 2014) and the overall survey (S2015)

3.3 Importance of online pedagogy for Europe

Figure 8 shows the response on the question if MOOCs are important for institutions to learn about online pedagogy. The respondents in both EU2014 and S2015 are most positive about the use of MOOCs to learn about online pedagogy. In the US the respondents think more neutral about this issue. Figure 9 shows that Portugal and Czech Republic are the most positive about this question and that Ireland and Canada think less positive than the overall group.

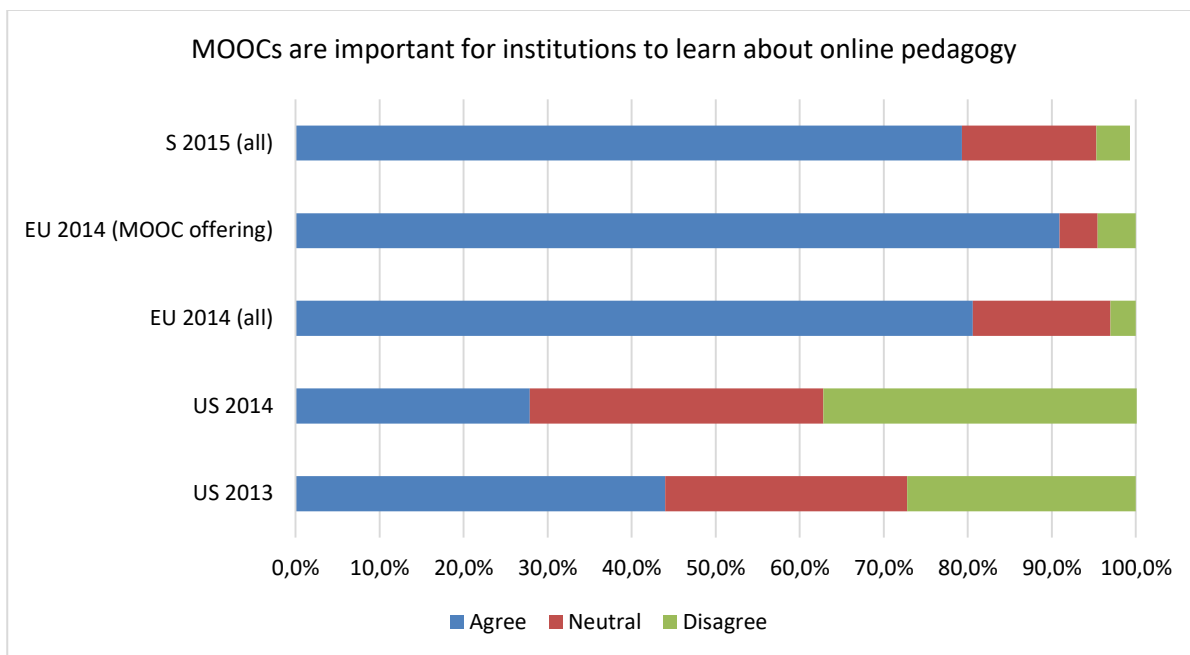


Figure 8: Replies to the question “MOOCs are important for institutions to learn about online pedagogy” compared between that of US surveys (US 2013, US 2014), the EU survey (EU 2014) and this survey (S2015).

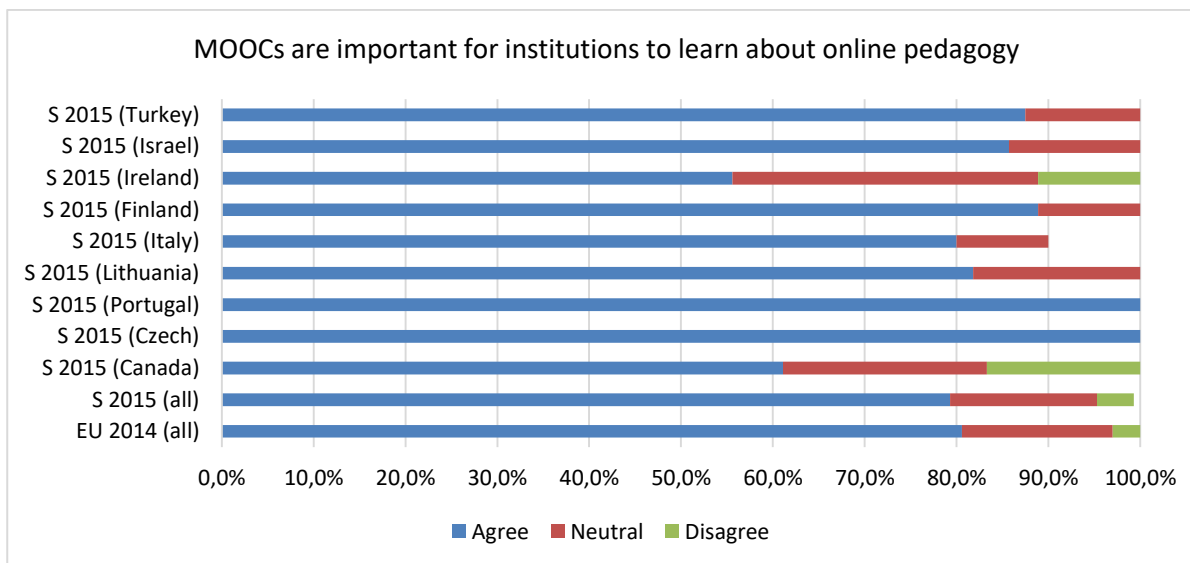


Figure 9: Replies to the question “MOOCs are important for institutions to learn about online pedagogy” for nine countries compared with the EU survey (EU 2014) and this survey (S2015).

3.4 Increase Visibility but also flexible learning opportunities to reach news students

Figure 10 shows the response to the primary objectives to offer a MOOC, indicated by institutions. This questions was raised in US2013 and US2014 survey and in Europe by EU2014 and S2015 surveys. In all surveys, the objectives related to finance (explore cost reduction, generate income) and scalability dimensions of MOOCs are not regarded as primary objectives. In general the objective ‘increase

institutional visibility’ is mostly seen as the most important objective, followed by ‘flexible learning opportunities’.

Note that the objective “Drive student recruitment” is seen as important in the US but not so in EU surveys. This in contrast to ‘reach new student’ that is seen as relative important except in the US. Also in Europe the objective flexible learning objectives scores somewhat higher compared to the US.

However, some differences between countries are observed as ‘flexible learning opportunities’ are seen as very important in Czech republic, ‘increase institution visibility’ is relatively most important in Canada and Lithuania. Reach new students is the most important in Finland. Results suggest that regional and institutional culture plays an important role in shaping or determining the primary objective.

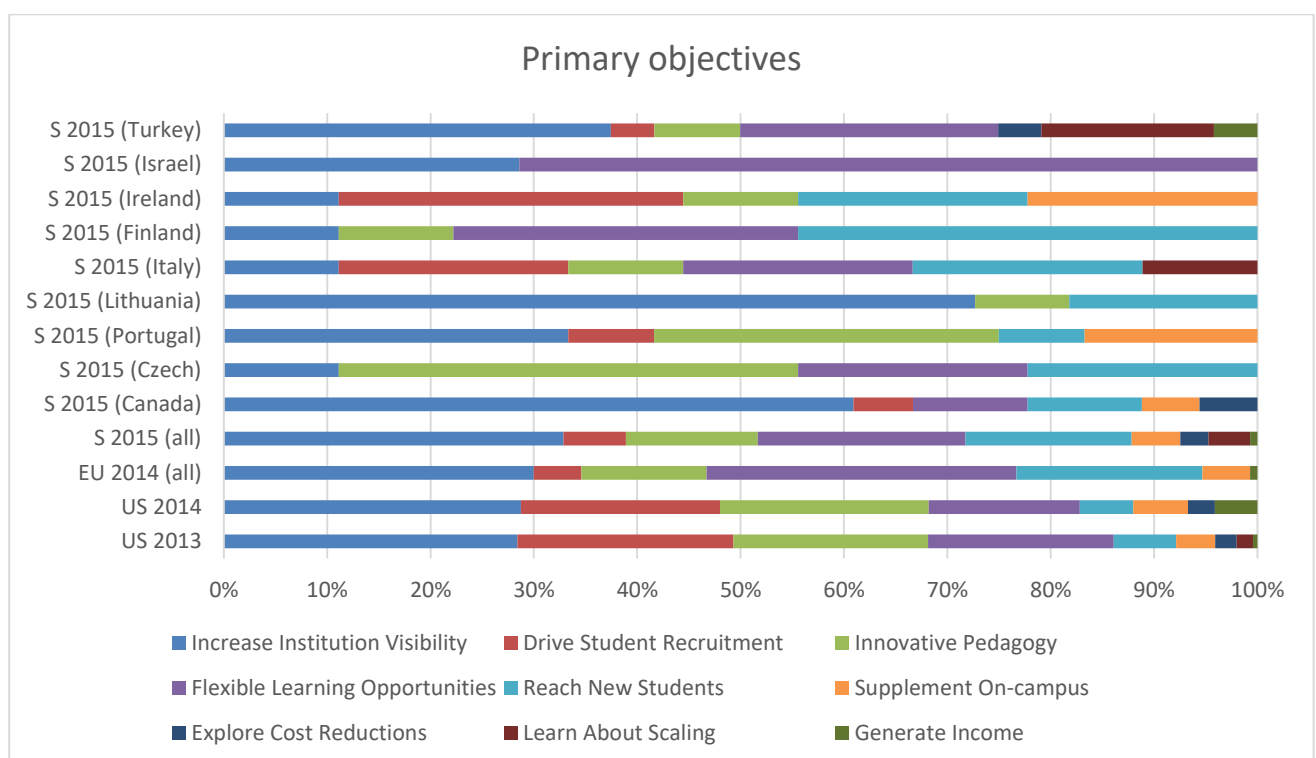


Figure 10: Primary objectives to offer a MOOC compared between that of the US surveys (US 2013 and US 2014), the EU surveys (EU 2014, (S2015)

3.5 Social dimension of educational system Europe,

As indicated above the social dimension of the European educational system might be important. In the S2015 survey HEIs are also asked about the relative importance of different objectives (figure 10 shows only the primary objective). One cluster is about the objectives related to the demand of learners and society. The response is shown in figure 11.

Jansen&Goes-Daniels (2016) confirms that for having a MOOC financial reasons are not that important in Europe. But the relevance of reputation/visibility, innovation and demands of learners and society are though more important. Figure 11 again indicates again some difference between Ireland and France

Canada between the rest of Europe related to the social dimension. More (qualitative) research is needed to pinpoint this exactly.

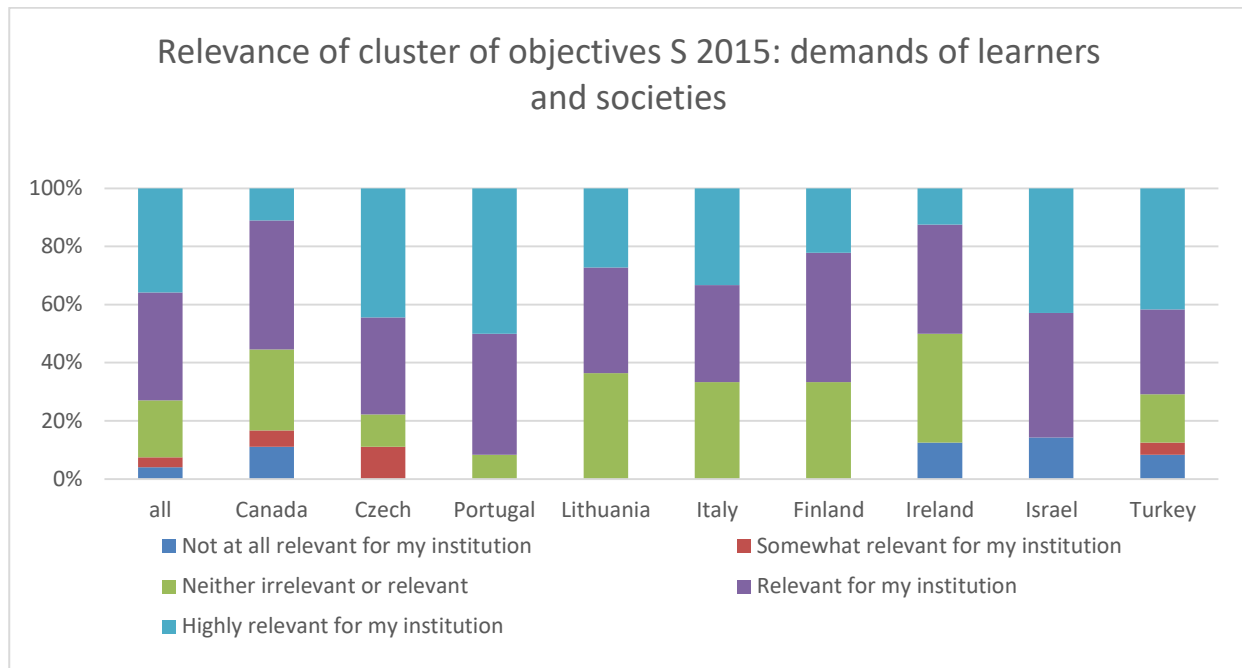


Figure 11: Relevance of demands of learners and societies for nine countries compared with all (S2015).

4. Conclusion

“Arguably, by analogy with the invention of the steam engine, there is a lot of huff, puff, singletrack thinking associated with MOOCs as many traditional universities rush to follow early adopters to secure some form of advantage. In many cases the drivers for adopting MOOCs are not well aligned with institutional missions and there is a sense in which the initial head of steam is motivated by fear of missing out” (Brown, 2014, P.2).

However, this paper shows that differences are emerging and that noticeable the uptake of MOOCs in Europe is not only maturing but is doing so at a much higher level when compared to the US. It is concluded that the European HEIs are much more involved in MOOCs and also that their reasons to invest in this new format differs in some aspects as well. We argued that these differences between U.S. and Europe might be related to the differences between higher educational systems, political environments and educational values.

These latest survey results demonstrate that many European higher education institutions are willing to collaborate on scalable services in MOOC provision, and that a regional collaboration is much more likely than outsourcing those services to corporates parties. Consequently different (regional) strategies are highlighted to leverage the full potential of online learning and open education for Europe.

The European survey is repeated again end 2016. Above results indicate that the survey should be extended to determine the (unique) European dimension of MOOCs. This might be related to questions on

- how to support the MOOC development and uptake for those HEIs that cannot join the big (commercial) MOOC players because of their exclusive policies,
- how to stimulate the re-use of existing MOOCs,
- the identification of opportunities and barriers for recognizing MOOC-based learning
- preferable scenarios (both institutional and cross-institutional) to exploit MOOCs
- questions onto the potential use of MOOCs to migrants and those (potentially) left behind, including about available MOOCs that might be of interest for refugees in topics

Although the future of MOOCs remains uncertain, central and regional governments have an important role to play, especially if countries and local institutions wish to shape and actively contribute to new models of higher education for new times in today's globalised world. Regional activities to stimulate development and uptake of MOOCs seems needed. The challenge lies in a collective European response respecting the differences and diversity of institutions and each region.

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The role of Comparative Law in the integration of migrants

Prof. Piervincenzo Pacileo

Uninettuno Telematic International University (UTIU), Italy

p.pacileo@uninettunouniversity.net

Abstract

The topic of integration of immigrants is today one of the most debated issues in the environment civil-comparative and assume various connotations depending on the social-economic-geographic-cultural context of the legal systems to be examined.

The decisional process in subject is concentrated, firstly, to communitarian level; indeed, the definition and the execution of immigration policies fall within the competence of the European Union, although lacking in exclusive character, having to practice sharing with Member States, to ensure a link between legal migration policies and integration strategies in accordance with real needs and structural characteristics at the national level.

In this context, the family and the school, together with the productive sphere, constitute a privileged socializing context in which the action of public authorities would have to be concentrate, both at EU level and at national level: Member States have the task of identify main initiatives and related implementing rules, in accordance with local characteristics and traditions, in order to promote the inclusion and the social integration of migrants and promote contact and confront between newcomers and the receiving society.

Therefore, in order to identify some best practices, the analysis must centralize on the delineation of the structure and objectives of the integration policies not only at European level, but also at national level, examining regulations, strategies, innovative praxis and actions undertaken in some Member States such as Belgium, Denmark, Finland, France, Germany, Greece, Netherlands, Spain, Sweden and United Kingdom and, obviously, Italy.

Keywords: comparative law, integration, migration policies, family, school, productive sphere, European Union, Italy, Belgium, Denmark, Finland, France, Germany, Greece, Netherlands, Spain, Sweden and United Kingdom.

1. Introduction

The topic of integration of immigrants is today one of the most debated issues in the environment civil-comparative and assume various connotations depending on the social-economic-geographic-cultural context of the legal systems to be examined²⁶⁷.

The decisional process in subject is concentrated, firstly, to communitarian level; indeed, the definition and the execution of immigration policies fall within the competence of the E.U., although lacking in exclusive character, having to practice sharing with Member States, to ensure a link between legal migration policies and integration strategies in accordance with real needs and structural characteristics at the national level. In this context, the family and the school, together with the productive sphere, constitute a privileged socializing context in which the action of public authorities would have to be concentrate, both at EU level and at national level: Member States have the task of identify main initiatives and related implementing rules, in accordance with local characteristics and traditions, in order to promote the inclusion and the social integration of migrants and promote contact and confront between newcomers and the receiving society²⁶⁸.

Therefore, the analysis must centralize on the delineation of the structure and objectives of the integration policies not only at European level, but also at national level, examining regulations, strategies, innovative praxis and actions undertaken in some Member States such as Belgium, Denmark, Finland, France, Germany, Greece, Netherlands, Spain, Sweden and United Kingdom and, obviously, Italy.

The individual issues analyzed in this report cover the following topics :

- 1) participation of the principal national laws with international conventions enacted on the subject ;
- 2) laws and regulations governing the admission of refugees in the various States;
- 3) rules for the management, hospitality, housing and assistance for migrants arrive at the border;
- 4) the effectiveness of procedures to assess if the applicant is entitled to refugee status, of iter for naturalization and of asylum policy, recently hit by international emergencies, such as, first and foremost , the current refugee crisis in Europe.

All Countries examined here have acceded to the 1951 Geneva Convention, relating to the Status of Refugees, and in particular its Protocol of 1967, on which is based the Common European Asylum System; the States underwriters of the Convention are required to protect refugees on their territory in accordance with the principle of non-refoulement (non-return of refugees to places where their lives or freedom would be threatened for race, religion, nationality or membership of a particular social group or political opinion). The Convention permits divergent practices in the processing of applications; so these Countries examined vary significantly discipline on their receptivity of asylum seekers, introducing many procedures to be applied to different categories of applicants, including, in particular, the inhabitants of the countries where the United Nations High Commissioner for Refugees (UNHCR).

Established that asylum seekers are required to submit an application for asylum to the competent authorities of the Country, this report must examine the different types of assistance provided to migrants in any jurisdiction, analyzing especially the issues of accommodation, food, access to medical care,

²⁶⁷ See L. Rinelli, African migrants and Europe. Managing the ultimate frontier, London - New York, 2016, passim.

²⁶⁸ See A. Di Pascale, Integrazione e mercato del lavoro: il modello proposto dal diritto comparato, Milano, 2010, passim.

education, employment, travel documents and information about their legal rights; moreover, in some States, the requirements for naturalization aren't different for refugees and ordinary immigrants, while, in others, certain criteria, such as the required length of residence, discern between refugees and other migrants.

Some Countries have provisions for family reunification by allowing those granted international protection to be applied for such protection for family members outside the country; furthermore, practices vary considerably regarding permission to travel within and outside the jurisdiction and the type of documentation required for travel permit.

2. European Union

The integration is an important aspect of the broader immigration policy of the European Union²⁶⁹; in fact, in recent years increased greatly the sensitivity in the field through the adoption both of legal instruments, both of non-binding acts.

Initially, the Tampere European Council in 1999, the first five-year programme of the new common immigration policy, stressed the "importance of arranging a more vigorous policy of integration of third-country nationals, aiming to ensure equality of rights and obligations than those that accrue to European citizens"; in 2004, the Hague programme remarked "the need for greater coordination between national immigration policies and European initiatives"; the subsequent Treaty of Lisbon expressly sanctioned the "existence of a competence in the field of integration in the European Union", which aims to promote and support the action of Member States by means of soft-law.

The regulatory framework of the U.E. under topic grew slowly, but progressively, and is currently composed of: Common Basic Principles on integration; two manuals for the integration policy and organisations competent authorities; three annual reports on migration and integration; the creation of National Contact Points on Integration ("NCPI"); the establishment of a specific fund to support national initiatives on the topic and, more recently, a specific website and the European Forum on integration.

During the period 2011/2014, the European Union has introduced a Common European Asylum System (CEAS), attempting to remedy at the current refugee crisis which has placed under extraordinary pressure especially the "States Members of first entry" (like Greece and Italy) and ensuring international protection not to migrants departed for economic reasons, but only fled to a well founded fear of persecution²⁷⁰.

The CEAS is composed of a number of directives and regulations that require action by the EU Member States or are directly applicable within their national legal systems: at the center are the right to asylum and the prohibition of refoulement, which must also be according with the case law of the European Court of Justice and the European Court of human rights.

During 2015, various EU agencies provided assistance, financing, training and experts to the Member States to implement CEAS; in particular, in November the Commission EU signed an Action Plan with Turkey, designed to reduce the migration flow entering EU through Greece, but the but the introduction of the possibility of resettlement, from now deemed an integral part of CEAS, is actually subjected to serious and well-founded complaints.

²⁶⁹ See C. Costello, The human rights of migrants and refugees in European law, Oxford, 2016, passim.

²⁷⁰ See G. Cataldi, A mediterranean perspective on migrants' flows in the European Union. Protection of rights, intercultural encounters and integration policies, Naples, 2016, passim.

Directive 2013/32/EU on Common Procedures for Granting and Withdrawing International Protection defined “international protection” as a request made by a third-country national or a stateless person who seeks refugee status or subsidiary protection; applications for international protection submitted by third-country nationals or stateless persons are governed initially by Directive 2011/95/EU, which establishes common standards to grant international protection to those who qualify, and by article 3(1) of the Dublin Regulation 604/2013, which is binding on Member States and Norway, Iceland, Liechtenstein, and Switzerland.

If article 47 of the Charter of Fundamental Rights of the European Union guarantees the right to an effective remedy to everyone, according to article 46 of the Common Asylum Procedures Directive European Union law requires that asylum seekers must have the right to request a review of a negative asylum decision before a court or tribunal in the case of

- (a) an unfounded negative decision on the applicant’s application for international protection;
- (b) a decision that the application is inadmissible;
- (c) a decision to withdraw international protection;
- (d) a decision taken at the borders or in a transit zone.

Applicants have the right to remain in the Member State where they applied until the competent authority decides on the case, but not the applicant to a residence permit; Member States must allow applicants to move freely within their territory, or within an area assigned to them, and give them permission to leave the assigned area.

Directive 2013/33/EU of the European Parliament and of the Council of 26 June 2013 requires EU Members to guarantee “material reception conditions” (i.e., housing, food, clothing) and health care to ensure an adequate standard of living and to guarantee the physical and mental welfare of applicants for international protection, as well as to provide applicants access to the labor market no later than nine months from the date when the application for international protection was made.

The rate of employment of third-country nationals (52.7%) is significantly lower than that of citizens of the Union (64.4%); this difference is unfortunately particularly marked among women.

Moreover, migrants are more present in the riskier sectors of employment, in undeclared work of low quality and population sectors most exposed to health risks and social exclusion; a specific issue is concerned, in addition, highly skilled migrants or educated, who are often unable to find a job that matches their qualifications and have to accept low-skilled and poorly paid jobs.

Diversity management is a key instrument for promoting the integration of migrants into the labour market; it may also prove to employers an effective strategy and beneficial for achieving the objectives of their business, because manage and adapt the organization of labour taking full advantage of the skills offered by employees of different origins and training (b.a., language skills and intercultural understanding²⁷¹) can certainly increase the focus on business opportunities in foreign markets.

However, the said integration into the labour market cannot be achieved in the long run if not relying on generalized integration of migrants in social, cultural and political life of the host country²⁷²; in this perspective, rightly and laudably, Member States are required to give to the minor children of applicants and to the applicants who are minors access to the state educational system under completely similar

²⁷¹ See F. Forsberg Lundell - I. Bartning, Cultural migrants and optimal language acquisition, Bristol, 2015, *passim*.

²⁷² See M. Crock, **Migrants and rights**, Burlington, 2015, *passim*.

conditions as their own nationals within three months from the date the application was made and to provide preparatory classes, including language classes, to minors, if would be necessary to facilitate their participation in education.

Member States EU must guarantee the right to effectively make a claim for international protection without obstructions or undue delay; they are allowed to adopt or retain more favorable standards as to who qualifies as a person in need of international protection and on reception conditions, as long as such rules and standards are, in general, compatible with EU rules.

3. Belgium

Belgium is a Country with a long tradition of immigration and, compared to the other States examined, the immigrant population is rather heterogeneous: in particular, migrants, arrived in several successive waves of immigration (the colonial history hasn't had an important effect on topic), only 45% came from the Member States of the U.E. (if in 1950's immigrants were mainly of Italian origin and had settled mainly in industrial areas of Wallonia and Limburg²⁷³, the successive waves in the 1960's-1970's are came from Morocco and Turkey and settled mainly in the big cities of Brussels, Antwerp and Ghent).

The complex administrative structure, which generates considerable difficulties of management policy for lack of coordination and interaction between different actors, divide between the federal level, regions and linguistic communities (each with its own Government) also the specific skills in the area of immigration and integration: while the first is responsible for defining the rules on entry, residence and expulsion of migrants (in particular, the Centre pour the égalité des chances et la lutte contre le Racisme, created in 1993, watch over respect for fundamental rights of aliens, promotes equality of opportunity and the fight against all forms of discrimination, exclusion, restriction or preference based on nationality, support cooperation and dialogue between public and private actors involved in the policies of integration of immigrants), the seconds (Flemish, French and German) process integration policies.

Integration policies, totally lacking in 1970 (at that time the receive activities were guaranteed exclusively by local immigrant associations or Belgian organizations, although financed by the State) and launched only in 1984, introducing dual "jus soli" by "Citizenship Code", are divided into the following main profiles: simplification of the acquisition of citizenship; fight against racism and discrimination; specific measures against unemployment and social exclusion²⁷⁴.

Notable is the difference of approach to defining new rules and criteria for the attribution of nationality between Flemish and French speaking communities: in the first is greater the influence of the Netherlands and is inevitable the support for minorities policy, promoting cultural diversity (indeed, the Decree for the civic integration, adopted by the Flemish Government on 2003 and entered into force on 2004, has introduced a mandatory path of integration, inspired by the Dutch model, aimed at all adult newcomers who settle in a town in Flanders, and at those who have arrived more than a year and have applied for welfare, which provides for a language course - between 90 and 180 hours - , a social orientation course - about 60 hours - and a job orientation course); in the second dominates a speech of inspiration to

²⁷³ See N. Perrin - M. Poulan, *Italiens de Belgique. Analyses sociodémographiques et analyses d'appartenances*, Louvain-la-Neuve, 2002, passim.

²⁷⁴ See D. Jacobs - A. Rea, *Construction et importation des classements ethniques. Allochtones et immigrés aux Pays-Bas et en Belgique*, in *Revue européenne des migrations internationales*, 2005, pp. 35-59.

“républicanisme Français” (in Wallonia, after a decree was adopted in 1996 specifically to provide a legal framework for reception and integration of foreigners and their children that identify, inter alia, regional funding measures to support associations and local authorities, were created in 2002 the Walloon Intercultural Forum and in 2003 the Conseil consultatif wallon pour intégration des étrangères ou d'origine étrangère persons, both coordinated with seven des Personnes Étrangères of centres Régionaux d'Intégration et origin Etrangère - CRI -) for ensuring the implementation of the different aspects of integration, including housing, health and education)²⁷⁵.

The “Citizenship Code” on 2000 designated four ways to acquire Belgian nationality: by declaration of nationality, with the “easy option”, by marriage to a Belgian citizen and by naturalization²⁷⁶.

4. Denmark

Denmark was the first signatory to the 1951 Geneva Convention Relating to the Status of Refugees and its 1967 Protocol; ratification was made through the Danish Aliens Act, which gave asylum to those who qualify as refugees under the Convention (persons who “owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it”).

Asylum seekers who don't qualify as refugees may receive the so-called “subsidiary protection” “if returning to their home country would mean they face capital punishment, torture or inhumane or degrading treatment or punishment” or the so-called “temporary protection status” “to individuals who face capital punishment, torture or inhumane or degrading treatment or punishment due to severe instability and indiscriminate violence against civilians in their home country”.

Denmark, signatory to the Refugee Convention, received refugees both through the U.N. High Commissioner for Refugees relocation program, both through application from persons arriving at the border, vetted by the Danish Immigration Service and by the police²⁷⁷; in rare cases, such as when an asylum seeker is suffering severe illness, asylum seekers may receive “humanitarian protection”, temporary and only lasts as long as the humanitarian grounds for protection (e.g., the illness persists).

Unaccompanied minors have the right to special representation (through a guardian) and receive Danish temporary residence permits and, in this perspective, allows for family reunification; moreover, asylum seekers are housed in asylum centers and after six months of applying are allowed to find their own housing and receive cash benefits until their application has been processed, if they cannot support themselves (but, however, they can't buy real property).

Moreover, unlike asylum-center housing, which is financed by the State, an asylum seeker must finance his own housing, contract with the Danish Immigration Service, promise to leave the country if he or she is denied asylum and doesn't receive extra monetary benefits to cover his or her expenses in such housing; in

²⁷⁵ See M. Van Meeteren, *Irregular migrants in Belgium and the Netherlands: aspirations and incorporation*, Amsterdam, 2014, passim.

²⁷⁶ See D. Torton - J. Gonzales, *Immigration in Europe. Issues, Policies and Case Studies*, Bilbao, 2003, passim.

²⁷⁷ See J.S. Nielsen, *Islam in Denmark. The Challenge of Diversity*, Plymouth, 2012, passim.

addition, he or she may receive other benefits/assistance from the government, such as hygiene products or baby-care products, and have the right to urgent health care; in detail, asylum seekers under the age of eighteen have the same right to health care as Danish children, as asylum seekers aged seven to sixteen have the right to attend school free of charge either at the asylum center, remotely, or at local schools.

To receive Danish Citizenship through naturalization a person, habitually, must be a permanent resident of Denmark; in detail, refugees for receive citizenship after eight years of continuous residence (nine years for other foreigners) must pass a language test as well as history and civics tests, swear allegiance to Denmark, not have a criminal record and meet selfsufficiency requirements²⁷⁸; from 4 february 2016 eleven laws entered into force to stem the influx of asylum seekers and make Denmark a less attractive destination and they are applicable also to asylum seekers already arrived in the country.

The most relevant measures are the introductions of residence permits shorter, more strict policies on family reunification and the seizing of valuables from asylum seekers; the Danish Ministry of Immigration, Integration and and Housing justified this controversial initiative by noting that the Danish welfare is designed to help people who don't have the financial capacity to help themselves, but not those who, in contrast, may do so (and this principle also includes asylum seekers).

5. Finland

After that Finland acceded to the 1951 Geneva Convention Relating to the Status of Refugees (and its protocol), actually Finland's Aliens Act and special legislation prescribe how asylum seekers should be treated while they await a decision; moreover, Finland accepts "quota refugees" through a relocation program administered by the UNHCR as well as asylum applications from individuals arriving at its borders. Indeed, in addition to UNHCR refugees, Finland also grants asylum to migrants seeking subsidiary protective status – expressly, who "is subject to a real risk of serious injury (death penalty or execution, torture or other treatment or punishment that is inhumane or degrades human life, or serious or personal risk that stems from indiscriminate violence in connection with an international or internal armed conflict) if he or she is sent back to his or her home country or country of permanent domicile, and he or she cannot or because of that risk does not want to avail him or herself of that country's protection" – .

In Finland may still receive asylum, as third category not qualified as refugees or persons in need of alternative protection, the migrants who search for humanitarian protection, who cannot return to their home country due to an environmental catastrophe, a violent conflict, or a serious situation threatening human rights; at last, a bona fide asylum seeker is a fourth category of persons who meet the criteria of refugee under the Convention Relating to the Status of Refugees.

Finland carries out background checks on all asylum seekers; it also analyses whether the asylum seeker could have sought refuge within his or her home country and also carries out medical testing to determine the age of asylum seekers; an asylum seeker can gain Finnish citizenship after four years as a continuous resident, followed by five years as a permanent resident of Finland: before attaining continuous residency, an asylum seeker receives temporary residency of varying duration²⁷⁹.

²⁷⁸ See J.H. Friberg, *Labour migrants from Central and Eastern Europe in the Nordic countries*, Copenhagen, 2013, passim.

²⁷⁹ See E. Nykanen - E. Pirjatanniemi - O. Sorainen - I. Staffans, *Migrants law in Finland*, Alphen aan den Rijn, 2011, passim.

A person must have been granted asylum before he or she can apply for family reunification, which is possible for legal guardians, spouses, children under the age of eighteen and in rare cases for other family members who are dependent on an asylum seeker who has been granted residence (proof of financial capacity to care for one's family members is not required for the reunification of immediate family members), but can be refused in cases where there is reason to believe that a person has received legal status by providing false information to the authorities.

Persons who seek asylum status can receive cash benefits, schooling, and health care provided by the government and migrants who are granted asylum receive social services from the local municipality where they live: indeed, asylum seekers arriving in Finland can receive a monthly cash benefit, which is meant to cover such things as the cost of clothing, minor health care expenses, personal expenses such as telephone service, social services and "urgent health care" (included "dental, health care, substance abuse care and psycho-social support")²⁸⁰.

Children who permanently reside in Finland are mandated to attend school starting the year they turn seven years old; asylum-seeking children (both unaccompanied minors and minors arriving with their legal guardians) have a legal right to attend school free of charge; schooling for persons who do not permanently reside in Finland may be carried out remotely.

By the fall of 2015 the number of asylum seekers in Finland had increased nearly tenfold from 2014 levels; because the largest increase was seen among Iraqi citizens, the Finnish government was prompted to negotiate a repatriation agreement with Iraq.

6. France

France is traditionally a country of immigration, both for its colonial past²⁸¹, both for the specific structure of the labour market, and has a long tradition of offering asylum to refugees; today the migrants amounts to about 5 million (nearly 60% is inserted into the labour market, especially on medium-low target).

The preamble of the French Constitution of 1946, which was incorporated by reference into the preamble of the current Constitution of 1958, declared that "[a]ny man persecuted in virtue of his actions in favor of liberty may claim the right of asylum upon the territories of the Republic": asylum applicants have a general right to stay in France until their asylum request has been processed and decided upon, and that, barring any threat to public order, all persons who qualify for asylum must be allowed to stay in France.

In addition to this constitutional foundation, French asylum law rests heavily on international and European law (of particular importance are the 1951 Geneva Convention Relating to the Status of Refugees, and the European Union Regulation of 26 June 2013, referred to as the "Dublin Regulation") and propose two types of asylum protection: refugee protection and subsidiary protection. An applicant for asylum must be either on French territory or at a French border crossing point to request asylum; before coming, however, an asylum seeker may request a special visa for the purpose of asylum from a French embassy or consulate for be authorized to work while his/her application for asylum is being processed and evaluated.

Once in France, asylum seekers must register at a local prefecture as the first step of the asylum application process and then must send his/her application form to the French Office for the Protection of Refugees

²⁸⁰ See J.H. Friberg, *Labour migrants from Central and Eastern Europe in the Nordic countries*, Copenhagen, 2013, *passim*.

²⁸¹ See N. McMaster, *Colonial migrants and racism. Algerians in France: 1900-62*, New York, 1997, *passim*.

and Stateless Persons (OFPRA), which determines who is eligible for refugee status or subsidiary protection within six months (the OFPRA's decisions may be appealed to the National Court for Asylum Law); being a refugee greatly shortens the naturalization process, should the person wish to obtain French citizenship.

Refugees and beneficiaries of subsidiary protection have the right to live and work in France, to bring their spouse and children, to obtain travel documents from the French government and to get financial assistance called the Asylum Seeker Benefit (ADA), if their monthly income is under a certain threshold. At the same time they are required to sign the most significant innovation introduced in recent years in France to ensure the integration: the "accommodation and integration contract" ("Contrat d'Accueil et d'Intégration" or "CAI"), made mandatory by 1 January 2007²⁸², proposed at every newcomer, who aspires to establish itself in a stable manner in French territory, for a period of one year and may be extended only in exceptional cases, signed on an individual basis, is a prerequisite for the issue of a residence permit and imply the fulfillment of the condition of Republican integration (since "choose to live in France means having the will to integrate into French society and accept the fundamental values of the Republic", in addition to the oral and written knowledge of French, the CAI implies, therefore, the obligation for foreign nationals to respect the fundamental principles of French law including invoked), by which asylum seeker commit to attend a civic training program, an information session on life in France and, if necessary, language classes; moreover, asylum may be denied or revoked for individuals who have committed crimes or whose presence would be a threat to society or national security.

It was subsequently also introduced a "reception and integration contract" ("CAIF"), in force since 1 January 2009 and which can be signed jointly by family members, upon one or more children benefited from family reunification, which requires participation in a training course on the rights and duties of parents in France, as well as compliance with the obligation to attend school.

Refugees and beneficiaries of subsidiary protection have similar rights to social benefits as French citizens do (they are covered by the French universal health insurance scheme, for example, and they may get various social welfare benefits - guaranteed minimum income, family subsidies, access to social housing, etc. - under the same conditions as French citizens), but only have access to certain special aid programs during the time that their application for asylum is being processed, in order to facilitate their settlement into French society; specifically, asylum seekers may reside in special temporary housing facilities called Centers for the reception of asylum seekers (CADA) while their asylum applications are being processed.

In 2004 was introduced the high authority to combat discrimination and for equality (HALDE) with the aim of counteracting the work of all forms of discrimination prohibited by law (including racial or ethnic origin) and to provide the necessary information to assist the victims, identify and promote good practice; In addition, a law adopted in March 2006 and aimed at guaranteeing equal opportunities introduces a series of measures to strengthen the fight against all forms of discrimination, racial discrimination in particular.

The theme of the integration has become central to the political debate following the crisis of the suburbs in the beginning of this twenty-year period and terrorist acts of the last five years that have undermined French immigration policy, prompting the Government to rethink the whole system with the adoption of programmes to ensure appropriate integration of immigrants.²⁸³

²⁸² See A.G. Hargreaves, *Multi-Ethnic France. Immigration, Politics, Culture and Society*, New York, 2007, *passim*.

²⁸³ See L.S. Kulick, *La France en tant que pays d'immigration*, Paderborn, 2009, *passim*.

Over the past several years have been attempts to understand the reasons for this failure: some have pinned ideological aspects, emphasizing in particular the defeat of the assimilationist model, which had featured integration policies implemented in the country; others have pointed out the objective social marginalisation where immigrants and their children found themselves, because of the inadequacy of social facilities provided by the Government to reduce the disparities between social classes, such as public housing and education, which has compounded the problems rather than solving them²⁸⁴.

The period 2003-2007 is characterized by a thorough review of legislation on immigration: seven regulatory reform the previous framework on integration, promoting Code de l'entrée et du séjour des étrangers et du droit d'asile (CESEDA) and concept of immigration choisie, thus introducing an obligation for immigrants, aspiring to establish itself on French soil in a stable manner, to undertake a process of integration, with the aim of fostering the inputs of those professional groups whose French labour market show a real need statement (such a view has also inspired the European framework, culminating in the adoption of the European Pact on immigration and asylum).

The migration should be treated as a whole and in partnership with the main countries of transit and origin and must be handled by the Ministry of immigration, integration, national identity and co-development, which in turn coordinates a public institute devoted to the receipt created in 2005 (Agence nationale de l'accueil des étrangers et des migrations (today, Office Français de l'Immigration et de l'Intégration –OFII–).

7. Germany

In Germany the right to asylum is a constitutional right granted to everyone who flees political persecution ("persecution that causes specific violations of individual rights and, due to its intensity, excludes the individual from the general peace framework of the state unit"), as stated in article 16a of the German Basic Law, for protect human dignity and reflect the view that any State hasn't the right to persecute an individual for his or her political or religious beliefs or other personal characteristics that mark him or her as different²⁸⁵.

An asylum seeker is allowed to stay in Germany if he or she is granted political asylum, refugee status, or subsidiary protection, or if the agency declares a deportation prohibition, in accordance with the Asylum Act and the Residence Act, which are the two most important immigration laws in Germany that provide rules for the admission and handling of refugee claims and have endure recently several amendments due to the current refugee crisis.

In Germany, there are two categories of naturalization (naturalization by entitlement and discretionary naturalization): a refugee can obtain citizenship after six years of legal residence, rather than eight, and naturalization of refugees has also been deemed presumptively in the public interest for purposes of discretionary naturalization; in order to determine whether a person is entitled to refugee status, an in-person interview is conducted and country-specific resources and experts consulted and every applicant

²⁸⁴ See D. Thomas, *Black France. Colonialism, Immigration, and Transnationalism*, Indianapolis, 2007, *passim*.

²⁸⁵ See D. Cooper, *Immigration and German Identity in the Federal Republic of Germany from 1945 to 2006*, Berlin, 2010, *passim*.

over the age of fourteen must submit to measures establishing his or her identity and provide fingerprints, which are cross-checked with national and European databases and the Visa Information System²⁸⁶.

The Deutsche Alien Offices are responsible for all issues concerning residence law, such as accommodation, board, and other benefits; the Federal Office of Migration and Refugees, therefore, must inform the local agencies if an application for asylum has been made or an asylum procedure has been concluded.

Refugees are generally housed in reception facilities, which provide them with essential items like food, housing, heat, clothing, health care, and household items in kind or in the form of vouchers, whereas persons who are housed outside of reception facilities primarily receive cash allowances to purchase essential items; while an asylum application is pending, applicants are not allowed to leave the area of the reception facility without permission.

If an asylum application has been denied, the applicant is obligated to leave Germany and the local agencies monitor the departure and will instigate deportation proceedings if the applicant on purpose doesn't depart; all refugees considered for resettlement must have been registered and recognized by the Office of the United Nations High Commissioner for Refugees (UNHCR).

On 24 October 2015, the Act on the Acceleration of Asylum Procedures entered into force and amended several laws in order to accelerate the asylum process; substitute in-kind benefits for cash benefits; reduce the financial burden on the German states and municipalities; reform integration policies for refugees; designate Albania, Kosovo, and Montenegro as safe countries of origin.

Additionally, on 1 August 2015, the Act to Redefine the Right to Stay and the Termination of Residence entered into force, amended the Residence Act by ordering a ban on entry and residence for applicants from safe countries of residence and in case of repeat follow-up applications and, furthermore, grants a residence permit to persons who can prove that they are well-integrated after a period of eight years and to well-integrated minors after four years²⁸⁷. Subsequently, on 1 November 2015, the Act to Improve the Housing, Care, and Treatment of Foreign Minors and Adolescents entered into force: its goal is to improve the situation of young unaccompanied refugees and provide them with appropriate care²⁸⁸.

At last, on 3 February 2016, the German government agreed on a set of stricter asylum measures (Asylum Package II), which accelerate the asylum application process; suspend family reunification for refugees with subsidiary protection status for a period of two years; decrease asylees' monthly cash benefits; facilitate deportation; establish a new Federal Police unit to help procure replacement documents; improve the safety of refugee minors; designate Algeria, Morocco and Tunisia as safe countries of origin.

8. Greece

Greece has suffered the brunt of migratory flows during the refugee crisis due to its geographical location and as first country of entry, pursuant to the Dublin Regulation; its legal system on asylum is based on the Geneva Convention of 1951 and its Protocol, and on E.U. law on the Common European Asylum System.

²⁸⁶ See D.B. Klusmeyer - D.G. Papademetriou, *Immigration Policy In The Federal Republic Of Germany*, New York-Oxford, 2009, *passim*.

²⁸⁷ See R.C.M. Beyer, *The Labor Market Performance of Immigrants in Germany*, Frankfurt, 2016, *passim*.

²⁸⁸ See L. Block, *Policy Frames on Spousal Migration in Germany. Regulating Membership, Regulating the Family*, Berlin, 2016, *passim*.

In 2011, the European Court of Human Rights and the Court of Justice of the EU found that Greece's asylum system suffers from "systemic deficiencies", including lack of reception centers, poor detention conditions, and the lack of an effective remedy; so the European Commission has recommended a number of remedial measures for Greece, including efficient border management and implementation of the "hotspot" areas for the proper registration and fingerprinting of migrants.

Consequently, Greece adopted two action legislative plans to address the problems, but however significant gaps still remain, as exposed by the extraordinary migrant crisis of 2015²⁸⁹ and as noted by the European Commission, which monitors closely Greece's compliance with EU asylum standards.

Greek asylum authorities attribute rights and benefits to persons granted international protection, refugee status or subsidiary protection and, particularly, ensure the family unity of those three category of migrants: indeed, the families of such persons acquire the same status as the applicant, unless they don't wish to have it; to those migrants recognized (and their family members) are granted a residence permit for three years, renewable at the request of the person concerned.

Recognized refugees take travel documents by the Passport Office of the Greek Police (required documents, duration and renewal are determined by Law 3103/2003) and are subjects to the Greek legislation on remuneration, terms of employment, training, and educational opportunities, while the persons recognized in need of international protection have access to employment, either salaried or independent, pursuant to Presidential Decree 189/1998.

Beneficiaries of international protection, recognized refugees or persons with subsidiary protection status have access to social welfare and have the right to health care under the same basis and conditions as nationals; therefore, those who have special needs, such as pregnant women, the elderly, unaccompanied children, people who have been subject to torture or other inhuman or degrading treatment, or persons with disabilities, as well as trafficking victims and those who come from conflict areas, are entitled to sufficient medical care, including psychological care and support, under the same conditions as nationals.

Furthermore, Presidential Decree 220/2007 provides for free healthcare services for all asylum seekers regardless of whether they are hosted in the reception facilities or not; however, access is conditioned depending on the economic status of the asylum seekers and, in the case of asylum seekers with disabilities, a monthly allowance is granted subject to Health Committee approval.

Minors who have been recognized as refugees must have access to education as well as adults have access to educational training and development under the same terms and conditions as nationals; in more detail, unaccompanied minors are provided with extra care and protection by the appropriate Greek authorities.

Recently, a joint ministerial decision, which was adopted in February 2016, provides the procedure to determine if an applicant is a minor: a guardian or a representative is appointed to represent the interests of the child and accommodations are provided either with family members, foster families, or special hospitality centers for minors. In argument, the European Commission's 2016 Recommendation to the Greek government asserted that the current guardianship system is problematic, since public prosecutors are appointed to represent minors and don't have appropriate resources to handle the large number of minors who need a guardian, and also noted the lack of a guardianship system within the Greek legal system to enable prosecutors to appoint permanent guardians.

²⁸⁹ See N. Teller, *The Chaos in the Middle East: 2014-2016*, Leicester, 2016, *passim*.

To ensure that the Common European Asylum System applies properly, on 10 February 2016 the Commission urged Greece to take additional measures to enable the eventual resumption of Dublin transfers, including bringing the reception conditions up to EU standards, ensuring effective access to the asylum procedures throughout Greece and resuming the operation of appeal committees.

The appropriate Greek authorities are required to provide assistance to those refugees and those who possess subsidiary protection to return to their countries of origin, if they so wish; in argument, the Commission has urged Greece to comply fully with the Returns Directive in order to ensure the return of those who do not qualify for international protection back to their country of origin and to utilize the maximum allowed detention of eighteen months to avoid a situation where detention ends before migrants are effectively returned²⁹⁰.

9. The Netherlands

The Netherlands stands out as a pioneer country in Europe for the attention to the issue of integration of minorities and the introduction of specific policies and since the 1960's has been the recipient of massive migratory flows, although in recent years we have introduced a more restrictive policy, in particular with regard to family reunification, based on a model where evidence of adequate integration becomes assumption to access and stay in the country²⁹¹.

Among the foreign immigrant population larger components are the Turk (11%), Moroccan (10%), those from the former colonies (10%) and the Netherlands Antilles (5%) and, above all, that coming from other OECD countries (35%, Germany, Belgium and United Kingdom in particular); however, the majority of migrants has made entry into the country in recent decades as a result of family reunion or on humanitarian grounds (from Iraq, Afghanistan and Iran in the first place).

Starting 1970's the Ministry of culture and social work developed a policy to address the needs of the groups identified as vulnerable (guest workers, asylum seekers, immigrants from former colonies - Suriname, Netherlands Antilles and Moluccas -); in particular, the increasing concentration of migrants and their families in specific urban areas urged local authorities to take action, by taking initiatives in the area of housing, education, healthcare, and pushing the national authorities to recognise - and funding - these measures the most important of which was the adoption of mother tongue and culture program (1974), for facilitate the reintegration of the children of guest workers to their countries of origin.

The report presented in 1979 by the Scientific Council for government policies "Ethnic Minorities" supported the need to fully recognise a number of immigrants have settled definitively in Holland and then start a policy aimed at integration; in response, the Government accepted the suggestion of creating a policy for ethnic minorities and developed in the 1980's a strong coordination structure to the implementation in the Ministry of the Interior (the Minority Policy Coordination Department), in order to avoid the risk of marginalization for groups with low socio-economic status and promote gender equality in socio-economic and religious equality, ensuring priority routes of the autonomy of these groups.

²⁹⁰ See H. O'Nions, *Asylum - A Right Denied. A Critical Analysis of European Asylum Policy*, New York, 2016, *passim*.

²⁹¹ See M. Van Meeteren, *Irregular migrants in Belgium and the Netherlands: aspirations and incorporation*, Amsterdam, 2014, *passim*.

If in 1980's, in the field of public housing, it was permitted to foreigners legally staying full access to "social housing", the discipline on citizenship was modified to include more elements of *ius soli*, making entry requirements for immigrants and their children and the promotion of the culture of migrants was left to the same groups and their organizations, while the role of the Government has been promoting opportunities for minorities, such as the special programmes in the languages of immigrants in the media, in 1990's the policy for minorities began to enter into crisis becoming subject to political debate, determining a location of afterthought that led to the adoption in 1994 of the document "Contourennota" that defines a new integration policy focused mainly around two new concepts of "good citizenship" and "self-responsibility"²⁹².

The political climate and the debate in the media put into question the idea of a multicultural society even in the 2000's; a series of violent actions committed by immigrants in 2003, which received great media hype, and then several events around the theme of fundamentalism and preaching a radical islam, whose were accused some imams, have helped strengthen the image of political failure; as a result, a special parliamentary Commission of investigation on integration policies was created, the integration policy coordination was moved from the Ministry of the Interior (of which had been a member for 22 years) to the Ministry of Justice, in the context of a new Ministry for foreigners and immigration and, since 2003, a "new policy of integration" has increased emphasis on the cultural adaptation of immigrants in Dutch society²⁹³ and has introduced a language testing of integration to deal with overseas for the purposes of issuing visas for family reunification to make the process of integration of newcomers in the Netherlands more efficient and effective (however, in general it does not cover those people who need to emigrate to Holland for other commercial purposes - subordinate or autonomous -, highly skilled workers, asylum seekers and those who require a temporary visa - study, medical care, etc. -, in addition, be exempt citizens of Suriname who completed at least one year of elementary education in the Dutch language in Surinam or the Netherlands in the case of family reunification. Also excluded are EU citizens and the European economic area, as well as from Australia, Canada, Japan, New Zealand, South Korea, Switzerland and United States)²⁹⁴.

Later, the Civic Integration Act (*Wet inburgering*), adopted on 20 November 2006 and entered into force on 1 January 2007, aims to ensure that foreigners residing permanently in the Netherlands acquire sufficient knowledge of the Dutch language and values and enable their effective participation in society, thereby increasing the speed and effects of the integration process; it identifies three groups of people who must maintain a civic integration path: the "old" arrived (*oudkomers*), newcomers (*nieuwkomers*) and the religious authorities (*geestelijk bedienaren*) and, in implementing the new system integration, recognizes a central role to the municipalities who have to organize various activities to ensure the effective

²⁹² See E. Vasta, From minorities' policy to majority's policy, in *Journal for Ethnic and Racial Studies*, 2007, pp. 713-740.

²⁹³ See H. Entzinger, Changing the rules while the game is on; From multiculturalism to assimilation in the Netherlands, in M. Bodemann and G. Yurkadul (a cura di), *Migration, Citizenship, Ethnos: Incorporation regimes in Germany, Western Europe and North America*, New York, 2005.

²⁹⁴ See D. Jacobs - A. Rea, Construction et importation des classements ethniques. Allochtones et immigrés aux Pays-Bas et en Belgique, in *Revue européenne des migrations internationales*, 2005, pp. 35-59.

implementation of the new system, such as courses or regional roundtables aimed at ensuring the exchange of information and training.

Finally, the Economic and Social Council in 2007 has addressed specifically the theme of the high level of unemployment of young foreigners, linked in particular to their low level of schooling/training; for this purpose, proposed measures especially to reduce early school leaving and to improve the labour market position of the children of immigrants (the second generation), which appear quite disadvantaged compared with young Dutch, despite the second generation is now relatively well integrated in the public sector, to an extent far greater than many other OECD countries.

Therefore, in recent years has been paid particular attention to making better use of immigrants' qualifications by introducing transparent procedures for the recognition of foreign degrees by a specific organism specially created: the Center for evaluation of credentials.

10. Spain

The Spanish Constitution has established that the terms under which citizens from other countries and stateless persons may enjoy the right to asylum in Spain will be determined by law; in furtherance of the constitutional mandate, Law 12/2009 Regulating the Right of Asylum and Subsidiary Protection (LRASP) was adopted to provide the legal framework applicable to refugees and stateless persons who seek asylum in Spain and applies to those who qualify as refugees under the definition provided by the 1951 Geneva Convention Relating to the Status of Refugees and its 1967 Protocol.

Spain's Law Regulating the Right of Asylum and Subsidiary Protection provides three types of international protection (conventional asylum for refugees, subsidiary protection and exceptional protection for humanitarian reasons) and also has a program for resettlement of refugees; as required by the LRAS, the Ministry of Interior examines the application and must render a decision within a deadline of six months, or three months in some circumstances, and the Office of Asylum and Refuge (OAR) within the General Sub-Directorate of Asylum of the Ministry of Interior is the authority on asylum matters.

Are excluded from refugee status individuals already protected under United Nations agencies other than the United Nations High Commissioner for Refugees (UNHCR); individuals whose country of residence has given them the rights and obligations inherent to the nationals of such country; individuals who have committed or instigated the perpetration of a crime against peace, a war crime, a crime against humanity, or a serious crime under Spanish law, or have engaged in organized crime; individuals guilty of acts contrary to the principles and purpose of the United Nations and its founders.

Asylum seekers are excluded from subsidiary protection if have committed or instigated the perpetration of a crime against peace, a war crime, a crime against humanity, or a serious crime under Spanish law, or have engaged in organized crime, if have been guilty of acts contrary to the principles and purpose of the United Nations and if have constitute a danger to the internal or external security of Spain.

The Spanish Law provides for the rights and obligations of international protection for applicants and those granted refugee status to include identity cards and travel documents, legal residence and work permits, social services benefits, education, health care assistance, social integration programs and family reunification²⁹⁵: while the Central State has authority over asylum, international protection, and refugee resettlement, the Autonomous Communities (Spanish regions) and local authorities are responsible, in their

²⁹⁵ See A. Geddes - P. Scholten, *The Politics of Migration and Immigration in Europe*, London, 2016, *passim*.

respective jurisdictions, for the implementation of social integration policies on employment, education, culture, health, welfare and housing for immigrants, including refugees; the government will set up social integration programs for protected people under equal opportunity and nondiscrimination standards.

Those granted international protection as refugees or beneficiaries of subsidiary protection have the right to apply for international protection of their family members, including spouses or partners in a permanent partnership or union, dependent parents and minor children. Other family members may be reunified upon proof that they were dependent on the applicant in the country of origin²⁹⁶.

The OAR may reject any application for international protection if Spain doesn't have jurisdiction to process the petition in accordance with international agreements; when the application doesn't meet the legal requirements for its processing; when the applicant already has refugee status in another state; when the applicant comes from a safe third country; when the application is a resubmission of a previous one already denied; and when the applicant is a national of another EU country (the nonadmission or rejection of applications for international protection results in the return, expulsion, or compulsory departure of the applicant from Spain).

11. Sweden

Sweden was the first country in Europe to grant asylum seekers from Syria permanent residence permits and, during the Iraq war, Södertälje, a small Swedish municipality, took more Iraqi refugees than the United Kingdom and the United States combined (from 2012 to 5 December 2015, asylum seekers arriving from Syria were automatically given permanent residence, but on 22 October 2015, the government signed a deal with the opposition that only family members and unaccompanied minors would continue to receive permanent residence permits)²⁹⁷.

Refugees are defined in Swedish law as persons who are refugees according to this Protocol, that is, a person who, "owing to well-founded fear of being persecuted for reasons of race, religion, nationality, sex, sexual orientation or membership of a particular social group or political opinion, is outside the country of his nationality and is unable to, or owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it".

A persons in need of subsidiary protection is "a foreigner who does not qualify under the Ch. 4 § 1 Aliens Act definition as a refugee, and who is outside of his or her country of citizenship because there is a well-founded reason to believe that the foreigner would be at risk of being punished by death or be subject to corporal punishment, other inhumane or degrading treatment or punishment, or [being] a civilian, be in serious risk of injury due to an armed conflict, and the foreigner cannot, or because of the risk mentioned above, does not want to avail himself to the home country's protection"; the same test applies to a stateless person who is outside a country where he or she has previously had his or her residence.

Sweden has revised its asylum policies considerably following the refugee crisis of 2015: today asylum seekers are given free housing, health and dental care and schooling for children ages pre-kindergarten to twenty, but family reunification has become more restrictive (after November 24, 2015, however, only

²⁹⁶ See D.L. Leal - N.P. Rodríguez, *Migration in an Era of Restriction and Recession*, Austin, 2016, passim.

²⁹⁷ See E. Fripp, *Nationality and Statelessness in the International Law of Refugee Status*, Portland, 2016, passim.

UNHCR quota refugees qualify for permanent residency: to become a citizen through naturalization a person must have been a permanent resident of Sweden for four years if he or she is a refugee).

There are also special rules for the acquisition of citizenship that apply to young adults: a young adult (between eighteen and twenty-one years of age) can acquire Swedish citizenship through notification if he or she has a permanent residence permit and has lived in Sweden since the age of thirteen, or fifteen if he or she is stateless; in addition to being a permanent resident, naturalization also requires that the person seeking citizenship be at least eighteen years old and prove his/her identity.

Persons arriving in Sweden as asylum seekers receive free housing and monetary support while their application is pending: while financial support is made up of a daily sum meant to cover the personal expenses of asylum seekers (such as clothing and telephone costs), they have the right to health care and dental care under the Health Care Act and the Act on Health Care for Asylum Seekers (also undocumented immigrants have the right to urgent health care at the cost of the municipality - county council -). Upon arriving in Sweden asylum seekers are either provided housing or are responsible for finding housing themselves; persons who find their own housing must provide the address to the Migration Authority.

Minors who are asylum seekers have the same right to health care as Swedish citizen children living in Sweden and have a legal right to attend school (ages pre-kindergarten to completion of high school) while awaiting asylum, but, on December 5, 2015, the government announced that unaccompanied minors who seek asylum in Sweden will be required to undergo medical testing unless they can prove their age: these medical age tests have been a controversial issue in Sweden²⁹⁸, because, after that in 2012 the National Board of Health and Welfare (Socialstyrelsen) published a report in which it criticized age determination through medical testing as unreliable, the Swedish Bar Association has also published ethical guidance stating that licensed attorneys should not participate in medical age determinations of their clients; in addition, the Swedish Supreme Migration Court (Migrationsöverdomstolen) found in September 2015 that the Migration Authority only needed to inform an asylum seeker of the possibility of undergoing medical age testing and that a decision on the asylum-seeker's application can be made without medical testing having taken place.

12. United Kingdom

Since 1891, the UK common law has provided that no alien has any right to enter this country except by leave of the Crown; in this perspective, the Aliens Restriction Act 1914, the Aliens Restriction (Amending) Act 1919 and the Rules and Orders made under these Acts gave the common law rule a statutory basis and formed the restrictions on immigration. The statutory regime governing immigration in the UK is currently contained in the Immigration Act 1971 and the Immigration Rules, made under it, are a very fluid set of rules that change frequently by a Statement of Changes which is laid before Parliament²⁹⁹.

The UK has extensive provisions in place to provide protection to persons seeking asylum while protecting the public from individuals who may exploit the asylum system; if the law requires individuals who are not British or Commonwealth citizens with the right of abode in the UK or members of the European Economic Area to obtain leave to enter the UK from an immigration officer upon their arrival, recently, a program has been introduced in response to the Syrian crisis, which accepts selected refugees from the Syrian region.

²⁹⁸ See P.W. Van Arsdale, *Global Human Rights: People, Processes, and Principles*, Long Grove, 2016, *passim*.

²⁹⁹ See C. Harvey, *Seeking Asylum in the UK: Problems and Prospects*, Oxford, 2000, *passim*.

The Home Office is the government department with primary responsibility for almost all aspects relating to immigration, including asylum, nationality and border control laws; UK Visas and Immigration, acting on behalf of the Home Secretary and Minister for Immigration, is responsible for processing asylum applications; Immigration Enforcement ensures that immigration laws are complied with, such as the prohibition on working without proper authorization, and also works to remove individuals that do not have permission to remain in the UK; the Border Force is responsible for immigration and customs controls at UK ports and airports and has recently been given the duty of conducting exit checks; HM Passport Office is responsible for processing applications for British passports, both overseas and in country.

Asylum is the term given to the protection offered to individuals who are fleeing persecution in their own country; as a general rule, asylum seekers may apply for asylum only after entering the UK and, if they meet the application criteria, receive refugee status. Decisions for asylum and humanitarian protection claims are considered on an individual, objective, and impartial basis: immigration officers don't take part in determining asylum applications but pass them on to UK Visas and Immigration, which makes a decision on behalf of the Secretary of State for the Home Department and must have knowledge of the "relevant standards applicable in the field of asylum and refugee law" issued by the Asylum Policy Instructions.

Applicants who don't receive refugee status may still be granted leave to remain in the UK for humanitarian or other reasons if there is a real risk that they would suffer serious harm after returning to their country of origin, but the nature of this harm isn't specified in the UN Convention and Protocol Relating to the Status of Refugees.

Refugee status and humanitarian protection provide the individual with permission to reside in the UK for an initial period of five years, with the right to work and access welfare benefits; lawful residence in the UK for a continuous period of five years generally qualifies an individual to apply for UK citizenship.

If a person does not qualify for refugee status or humanitarian protection but removal would breach the UK's human rights obligations, a situation that typically arises when a person has strong private and family ties to the UK, he or she may be granted temporary permission to remain in the UK.

The determining factor for receiving asylum is whether the individual meets the criteria contained in article 1 of the Refugee Convention and Protocol, which defines a refugee as a person who "owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country".

In cases where the asylum applicant is not eligible for asylum, he or she may be entitled to stay in the UK on humanitarian grounds if is in the UK, or has arrived at a port of entry in the UK, and does not qualify as a refugee under regulation 2 of the Refugee or Person in Need of International Protection (Qualification) Regulations 2006; the key criterion to a grant of humanitarian leave is the existence of substantial grounds for believing that if the applicant returned to the country of origin he or she would face a "real risk of suffering serious harm" and the applicant is therefore unable to return to that country" (he or she must also not fall within a category of persons who are to be excluded from humanitarian protection)³⁰⁰.

In an attempt to remove the perception that the United Kingdom is a "soft touch" for asylum seekers and the public perception that asylum seekers are taking away money from benefits that citizens of Britain are entitled to, the early 2000's saw the government introduce a number of controversial new laws with the

³⁰⁰ See M. Symes - P. Jorro, Asylum Law and Practice, London, 2010, *passim*.

objective of not permitted to work, allow for administrative detention, limit the benefits provided and enable benefits to be withdrawn³⁰¹.

However, individuals lawfully present in the UK for specified periods of time, including those granted refugee status, may be eligible for naturalization if they meet additional criteria, in accordance with the British Nationality Act 1981, as amended; refugees may be able to obtain British citizenship through naturalization but this isn't granted automatically to individuals who have legally resided in the United Kingdom for any period of time or to individuals who marry British citizens or babies born in the UK (such individuals must meet specific criteria contained within the British Nationality Act 1981 and apply for citizenship).

Citizenship through naturalization is not an entitlement or right: certain legal requirements must be met and the Home Secretary must "see fit" to grant citizenship (having ability to communicate in English, Welsh, or Scottish Gaelic; being of sound mind; having a good character)³⁰².

In more detail, in all cases where children are involved Citizenship and Immigration Act 2009 requires the Home Office to safeguard and promote the welfare of children in the UK; in addition, individuals who obtain permanent leave to remain or citizenship are entitled to bring their immediate family members, defined as their spouse and any children under the age of eighteen.

Parents and grandparents of settled persons or citizens are permitted to join their children or grandchildren in the United Kingdom but only if they are over the age of sixty-five and have no other relatives to support them in their home country; other close relatives, such as aunts, uncles, brothers, and sisters may be eligible "if living alone outside the United Kingdom in the most exceptional compassionate circumstance" (there are financial requirements that the British citizen or UK resident must meet in order to ensure their family migrant).

13. Italy

Italy is among the few European countries to proclaim a right to asylum in their Constitution ("[a] foreigner who, in his home country, is denied the actual exercise of the democratic freedoms guaranteed by the Italian constitution shall be entitled to the right of asylum under the conditions established by law"); in addition, Italy has adhered to or ratified the most important international treaties providing for the protection of refugees and their families and also for an abbreviated procedure for the review of asylum requests under certain conditions (the Universal Declaration of Human Rights of 1948, the European Convention for the Protection of Human Rights and Fundamental Freedoms of 1950, the International Covenant on Civil and Political Rights of 1966 and, especially, the UN Convention Relating to the Status of Refugees of 1951)³⁰³.

Italy's legal system provides for a complex framework of assistance to asylum seekers and creates several government agencies at the national and regional levels to provide their assistance, including the review of their applications, financial and material help, and the monitoring of their activities within the country³⁰⁴:

³⁰¹ See L. Fransman, *British Nationality Law*, London, 2011, *passim*.

³⁰² See T. Brooks, *Becoming British. UK Citizenship Examined*, London, 2016, *passim*.

³⁰³ See P. Morozzo Della Rocca, *Immigrazione, asilo e cittadinanza*, Santarcangelo di Romagna (RN), 2015, *passim*.

³⁰⁴ See C. Hein, *Rifugiati. Vent'anni di storia del diritto d'asilo in Italia*, Rome, 2010, *passim*.

except in limited circumstances, refugees and protected persons may circulate freely in the national territory and the Italian law promotes appropriate initiatives to remove all obstacles for their integration.

Italian law defines “refugee” as “a foreign citizen who, on the basis of on a well-founded fear of being persecuted by reason of race, religion, citizenship, belonging to a particular social group [or holding a particular] political opinion, is found outside of the territory of his/her country of citizenship and cannot or, on the basis of such fear, is unwilling to avail him/herself of the protection of his/her country.”

Moreover, for Italian law persons eligible for “subsidiary protection” are foreign citizens who do not qualify to be recognized as refugees but with respect to whom there are reasonable grounds to consider that, if they return to their country of origin or, in the case of stateless persons, if they return to their country of previous usual residence, they would face a serious risk of suffering serious harm and, as a consequence of such risk, they may not avail themselves of the protection of that country.

Furthermore, “claim for international protection” is one aimed at obtaining the status of refugee or the status of person eligible for subsidiary protection and a “requester of international protection” is a citizen of a third country or a stateless person who requests to be admitted to an internationally protected category; instead, “humanitarian protection” is the protection granted to citizens of a third country who are found in objective and serious personal conditions that do not allow their removal from Italy and whose request for international protection is denied, while “unaccompanied minors” are those foreigners younger than eighteen years of age who are found, for whatever reasons, in the national territory, deprived of assistance or legal representation and, at last, “international protection” consists of the adoption of adequate measures to prevent the persecution of or infliction of serious harm on the affected persons³⁰⁵.

In Italy asylum seekers may be granted either refugee status or subsidiary international protection status, while deportation and repatriation proceedings are also regulated in national legislation (however, asylum-related administrative decisions are subject to judicial review)³⁰⁶; once granted protected status, refugees may avail themselves of all the education, work, health care, housing, and other benefits established by law for Italian citizens, and, finally, protective measures are established for unaccompanied minors found in the country.

Asylum requests must be submitted to the border police or to the office of the respective “questore” (head of the provincial police) with jurisdiction according to the requester’s residence, as well as asylum seekers must reveal all pertinent facts to the authorities and must produce all necessary documentation; the National Commission for the Right of Asylum leads and coordinates the Territorial Commissions for the Recognition of International Protection, update their composition, and gather statistical information; residence permits granted to persons who hold refugee status are valid for five years and are renewable³⁰⁷. Refugees and persons receiving subsidiary protection have the right to the same treatment established for Italian citizens who work for others or are self-employed and who register with professional entities, as well as may also access both to public-sector employment under the conditions and limitations established for E.U. citizens, both to the Italian general educational system and professional training, both to the same

³⁰⁵ See C. Commandatore - A. Di Gaetano, *Codice dell'immigrazione, dell'asilo e della cittadinanza*, Rome, 2014, *passim*.

³⁰⁶ See F. Scuto, *I diritti fondamentali della persona quale limite al contrasto dell'immigrazione irregolare*, Milan, 2012, *passim*.

³⁰⁷ See M. Asprone, *Il diritto d'asilo e lo status di rifugio*, Rome, 2012, *passim*.

treatment afforded to Italian citizens in matters of social and health assistance, including psychological treatment for previous torture and suffering experienced by them.

Italian law protects the family unity of those receiving refugee status and the status of subsidiary protection; therefore, family members who aren't entitled to the status of international protection enjoy the same rights afforded to their family member who enjoys such status, while family members of persons who are granted international protection status who are present in the national territory and aren't individually entitled to that right may obtain a residence permit on the basis of "family reasons" as provided in the law; instead, family members who are or would be excluded from refugee status or subject to subsidiary protection status aren't eligible to receive these benefits.

Residence permits for family reasons, from which refugees may benefit, are granted to

- foreigners who have entered the national territory with an entry visa for family reunification or for reunification with minor children;
- foreigners regularly residing in Italy on other grounds for at least one year who have contracted marriages within the national territory with Italian or European Union citizens, or with foreign citizens residing regularly in the country;
- foreign family members regularly residing in Italy who are in the process of complying with requirements for reunification with Italian or European citizens residing in Italy, or with foreigners regularly residing in Italy (in such cases, the family permit is transformed into a residence permit for family reasons); and
- foreign (including natural) parents of Italian minors residing in Italy (in such a case the residence permit for family reasons is also granted regardless of the possession of a valid residence permit, provided that the requesting parent has not been deprived of parental rights according to Italian law).

Unaccompanied minors found in the national territory who request international protection may benefit from the services provided by local entities specializing in that type of assistance and are placed in the care of an adult family member who is a regular resident and present in Italy; if that is not possible, judicial authorities may adopt other measures aimed at protecting such minors³⁰⁸.

In detail, when unaccompanied minors are involved, the border police or the office of the respective "questore" must immediately inform the System for the Protection of Asylum Seekers and Refugees (SPRAR) and the respective tribunal of minors for the adoption of appropriate measures; SPRAR's duties include monitoring the whereabouts of asylum requesters, refugees, and foreigners with humanitarian permits in the country, creating a database concerning interventions at the local level for the benefit of these persons; and promoting repatriation programs in conjunction with the Ministry of Foreign Affairs.

14. Conclusion

Among the main challenges that the European Union and its Member States are facing in these early years of the XXI century, the integration into society of new individuals is undoubtedly one of the most difficult and ambitious; it's closest the bond that exists between integration and citizenship, in a relationship of mutual influence and conditioning³⁰⁹.

³⁰⁸ See R. Pisillo Mazzeschi - P. Pustorino - A. Viviani, *Diritti umani degli immigrati. Tutela della famiglia e dei minori*, Naples, 2011, passim.

³⁰⁹ See K. Hailbronner - D. Thym, *EU Immigration and Asylum Law. A Commentary*, Oxford, 2016, passim.

From the analysis in this paper appear various ways of thinking about integration and its relationship with citizens, but, above all, the difficulty to rethink and adopt new effective models: in Europe, the choice of soft-law instruments, non-binding, but which provide for the direct involvement of government agencies, associations and civil society, was basically forced and dictated by the lack of specific expertise in the field and from aberrant excluding of any harmonisation between E.U. law and national rules.

The recent Stockholm programme, which defines the priorities for the areas of freedom, security and justice for the period 2010-2014, reaffirmed the centrality of integration policies, declaring that "a successful integration of third-country nationals is the key to maximizing the benefits of migration" and promoting exchanges between the different levels of the agencies involved, better interaction in all areas concerned and the establishment of intercultural dialogue and consultation mechanisms to involve civil society; moreover, the immigration policy debate is still focused on issues related to the fight against irregular immigration and the consequent introduction of more restrictive access mechanisms³¹⁰.

In detail, for the individual migrant current policies in some States seem to focus primarily on the first phase of the integration process, by implementing specific programmes for the newcomers (for example, France, the Netherlands and Belgium offer language courses, civics courses to acquaint foreigners with the main RuleSet, history and values of the host country and sometimes even the training/orientation to the labour market); in other Countries it's assumed that migrants should have access to certain services/rights fundamental (Denmark, Finland and Sweden, but this type of initiative has recently found consensus also in Italy, so that changes made in recent years to the discipline of immigration have introduced an integration agreement focuses on credits, with a commitment to underwrite specific integration objectives, to be achieved within the period of validity of the residence permit).

The welcome is a very important element of the integration process of migrants, which, just arrived, need to familiarise themselves with the wider social and cultural context of the host country through the exchange of information achieved through local or regional programs involving civil society, fundamental funding (including co-financing by the immigrant), compulsory elements and related sanctions; the participation of immigrants in civic life, culture and politics plays an essential role because it creates a sense of belonging and integration with regard to the community and society at large that encourages migrants to engage in community life and other social, cultural and political activities.

The exchange of information should cover a number of key issues, such as:

- a) political rights, civic citizenship and nationality;
- b) structures at national, regional and local level aiming at the participation of migrants, including the level of participation, on how to deal with religious and cultural differences within society;
- c) definition of benchmarks and indicators in order to measure the level of integration in these areas.

As expressed in the Commission communication "A Common immigration policy for Europe: principles, actions and tools" adopted in June 2008, "well managed immigration can contribute to economic growth" and to enhance the guests 'companies' integration at European and National levels is necessary to consolidate "the common Agenda for the implementation of the basic principles".

The European Union also seems aware of the problems facing the European labour market as a whole, in relation to the employment of foreign workers, and has attempted to identify some guidelines which

³¹⁰ See V. Chetail - P. De Bruycker - F. Maiani, *Reforming the Common European Asylum System (Immigration and Asylum Law and Policy in Europe)*, Leiden, 2016, passim.

should then be translated into concrete operational initiatives and tools; some of them are designed specifically to promote the strengthening of the integration of migrants into the labour market:

- 1) developing national "immigration profiles", which serve to provide an integral vision of the situation of immigration within each Member State at any given time, in particular with regard to national labour market participation and composition, in terms of qualifications, of migratory flows;
- 2) improving the effectiveness of policies and instruments for meeting between supply and demand for labour, which promote better education and training for third-country workers in order to adjust the qualifications of immigrants to the characteristics of national labour markets, creating appropriate mechanisms for the recognition of professional qualifications acquired outside the U. E. and dispensing information and training in the countries of origin;
- 3) analyzing the current situation and future trends, examining the business skills of immigrants and barriers legislative and operational that might hinder the attempt to build a business in the E.U.; based on this assessment encourages the introduction of measures to support the entrepreneurship of migrants;
- 4) increasing investment to provide employment to citizens of third Countries who are already legally in the E.U. and who are unemployed and economically inactive, with particular attention to women³¹¹;
- 5) supporting the development of specific integration programmes for newly arrived immigrants, which, for example, facilitate the acquisition of language skills and promote the practical skills necessary for an authentic intercultural adaptation and commitment to fundamental European values.

Therefore, at this stage of conception and reconsideration of integration policies in Europe, one of the main recommendations is, perhaps, to pick up the invitation of the E.U. to strengthen the mechanisms of involvement of the various actors involved at the national level and, above all, to participate actively in platforms specifically designed to encourage exchanges between the authorities of different countries³¹².

Migrants in the E.U. in general have lower educational attainment levels than natives; access to education is as good as universally guaranteed for migrant children across the Member States, but they have the right to access to good education proposal for their specific needs and for discover and develop their talents.

Several Countries, to avoid social and ethnic school segregation, have bilateral agreements on teaching in the language and the culture of origin of migrants; is necessary an overview of the adaptation of society educational and administrative systems to needs and challenges of emigrating pupils minors and adults.

Above all, for pragmatic reasons, a focus on initiatives by State actors and non-State actors in here examined States expresses the need to complete agreements between E.U. actors and third Countries actors for the development of academic and scientific research cooperation in areas of common interest, joining implementation of content and curricula and promoting the mobility of teachers; the idea would be to join efforts in order to provide throughout the world scientific and educational services that are up to date with the fast development imposed by the digital age, introducing a new model of university, a global "Smart University": jointly with universities in countries with different cultures, religions and politics would it be possible democratize access to knowledge in order to shape the future of the younger generation³¹³.

³¹¹ See T. Spijkerboer - Sarah Van Walsum, *Women and Immigration Law: New Variations on Classical Feminist Themes*, London, 2006, passim.

³¹² See J. Niessen - T. Huddleston, *Legal Frameworks for the Integration of Third-Country Nationals (Immigration and Asylum Law and Policy in Europe)*, Leiden, 2009, passim.

³¹³ See M.A. Garito, *L'università nel XXI secolo tra tradizione e innovazione*, Rome, 2015, passim.

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EADTU
6212 XN Maastricht
The Netherlands
Tel: +31 43 311 87 12
E-mail: secretariat@eadtu.eu

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