

Unpacking Higher Education Students' Relationship with AI

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Abstract - This exploratory study examines higher education students' engagement with Artificial Intelligence (AI) tools in Portuguese polytechnic institutions. Based on survey data from 171 students, the research analyzes usage patterns, motivations, perceived barriers, ethical concerns, and self-assessed competence. ChatGPT emerged as the most widely used tool, primarily for grammar correction, drafting texts, and summarizing articles. Students reported strong motivations linked to productivity and academic support, while concerns centered on information reliability, academic integrity, and data privacy. Although most students expressed moderate confidence in using AI, only 53% showed interest in formal training. Ethical engagement was evident through cautious use and information verification, yet formal practices such as citation were inconsistently applied. The findings highlight both the opportunities and challenges of AI use in academic contexts and underscore the need for inclusive, equity-driven educational strategies. Future research will explore how gender influences AI engagement and ethical awareness in higher education.

Keywords - Artificial Intelligence (AI), Higher Education, Student Perceptions, Ethics, Portugal

I. INTRODUCTION

With the growing integration of Artificial Intelligence (AI) into society, it becomes essential to reflect on its implications for Higher Education. UNESCO [1] stresses the urgent need to train students not only as responsible users but also as co-creators of AI technologies, developing competencies such as a human-centered approach, AI ethics, technical knowledge, and system design.

The exponential growth of artificial intelligence (AI) in higher education has sparked intense academic, technical, and policy debates about its implications for equity, ethics, and digital literacy [2]. While research on the integration of AI tools into students' academic practices is expanding, most studies remain concentrated in anglophone or technologically advanced contexts, leaving underexplored the experiences of students in national settings with distinct digitalization profiles and policy frameworks [3], such as Portugal.

In Portuguese Higher Education Institutions, the presence of AI remains diffuse and uneven, both in terms of access and pedagogical appropriation. Empirical data are scarce, particularly concerning how students with diverse demographic profiles - such as gender, disciplinary background, or technological capital - engage with, understand, and manage these technologies in their academic routines [4]. This gap is especially relevant in light of national

commitments to equity and inclusion, as articulated in strategic frameworks like the National Strategy for Equality and Non-Discrimination [5] and the Portuguese AI Strategy 2030 [6]. These initiatives explicitly recognize the need to foster critical digital competencies through inclusive and intersectional approaches.

Moreover, international debates around AI in education have increasingly emphasized the importance of algorithmic justice and user empowerment, particularly for groups historically underrepresented in technological domains [7]. In this light, understanding how students perceive AI - not only as a functional tool, but also as a social and political object - is essential to building ethical and equity-oriented pedagogical practices.

This research aligns with these efforts by offering empirical insights into the relationship between gender and AI in Portuguese higher education. This exploratory study was conducted in polytechnic higher education institutions in Portugal, focused on the professional contexts of the authors, who are mainly polytechnic higher education teachers. The study is part of the project "Mapping and Analysing Gendered Dimensions in Higher Education Students' Expectations and Perceptions of Artificial Intelligence Use", which is being developed by the Centre for Studies in Education and Innovation (CI&DEI) in collaboration with the Interdisciplinary Centre of Social Sciences (CICS.NOVA).

The study here presented is the first phase of the project, and aims to investigate the use, perception, and ethical management of Artificial Intelligence (AI) by higher education students within an academic context. To achieve this, several research objectives have been outlined. Firstly, the study aims to analyse usage patterns of AI tools among students. Secondly, it intends to explore the motivations that drive students to use AI, as well as the perceived barriers that may hinder its adoption. Another key objective is to investigate how students perceive the reliability, quality, and timeliness of information generated by AI. Additionally, the research will assess students' self-perceived competence in using AI technologies. Ethical considerations are also central to the study, as it seeks to examine how students engage with ethical issues arising from the use of AI in academic tasks. Finally, the study will explore students' expressed interest in receiving formal training on AI use in higher education, providing insight into their potential needs and preferences for academic support.

A forthcoming phase of this research project will incorporate a focused gender analysis to deepen the

understanding of how gender may influence students' engagement with AI technologies. This future investigation will examine whether usage patterns, motivations, and barriers vary across gender groups, and whether gender plays a role in shaping perceptions of AI-generated information, such as its reliability and usefulness. It will also assess potential gender-based differences in self-perceived competence, ethical awareness, and confidence in using AI tools. Furthermore, it will explore whether interest in formal AI training differs by gender, with the goal of informing inclusive and responsive educational strategies. This upcoming phase will contribute to a more comprehensive and equitable perspective on the integration of AI in higher education.

By doing so, the project aims to inform institutional and educational policies that do more than simply keep pace with technological innovation - they critically interrogate the social conditions of its adoption.

II. THEORETICAL FRAMEWORK

Artificial intelligence (AI) is increasingly integrated into higher education, transforming how students learn, interact, and manage their academic lives. Students are using AI for maximized productivity [8], [9], [10], such as automating routine tasks (e.g., conducting information searches), language support, writing assistance, accessing instant help and feedback through chatbots and virtual assistants, and generating ideas. AI fosters collaborative learning environments [9], enabling peer learning, enhanced interaction with content, and cooperative projects, even across physical distances. AI also has the potential to enhance customized support for international students as well as inclusivity and accessibility for students with special needs [10].

However, its adoption brings challenges such as those related to impacts on independent learning, academic integrity and ethics, privacy, digital inequality, and the need for balanced human interaction. Excessive over-reliance on AI can hinder the development of independent learning and knowledge systems [11], [12]. Unclear guidelines [8], like vague and inconsistent messages from teachers and institutions, raise concerns about plagiarism and ethical use [9]. There are also issues around data privacy, since AI tools typically need access to extensive personal data to operate efficiently [8]. Unequal access to AI tools, contributing to widening the gaps between students with different levels of technological resources and skills [13], [14], and biased AI algorithms that can perpetuate or exacerbate educational inequalities [14] are also issues to consider. Increased use of AI may reduce meaningful interactions between students and educators, impacting the learning experience [14].

Barriers such as concerns about privacy or ethical issues [14], as well as distrust and lack of knowledge [15] can moderate acceptance and use. Besides these, there are other moderators that can shape how effectively AI is adopted and integrated, such as technological proficiency and prior experience, disciplinary context, and demographic variables like age and gender. Technological proficiency significantly moderates the adoption and effective use of AI tools, impacting how users perceive ease of use, usefulness, and satisfaction with AI systems [15], [16]. Prior technology experience and technological self-efficacy also act as moderators, influencing acceptance and engagement with AI applications [15], [16]. Though academic discipline may not always be a significant moderator [16], possibly due to the universal appeal of AI functionalities, differences exist

between STEM and non-STEM disciplines in AI adoption patterns [15]. Students from engineering apparently use chatbots like ChatGPT to a much higher degree expressing stronger optimism towards AI, than students from the arts and humanities and from medicine and health care [17].

Demographic factors, including age and gender, also influence the intention to use AI, although their effects are complex and often non-linear [18]. Younger students may show greater comfort with experimentation, while older students may bring more critical perspectives shaped by experience. Gender-related dynamics - such as confidence levels, perceived competence, and self-efficacy - have also been shown to impact engagement with AI [19], [20]. According to some studies gender significantly shapes how higher education students perceive, engage with, and benefit from AI. When compared to boys, girls express more concerns about AI's role in the academic context [17], as well as report significantly lower levels of exposure, perceived knowledge and ability to apply AI, less perceived need to learn AI for their future, less awareness of the potential use of personal data by AI tools, and less optimism about the potential positive impact of AI in society [19]. Intersecting gender and academic discipline, girls and women are underrepresented in AI-intensive fields [21]. Gender stereotypes that often portray girls as less technology-oriented and socialization processes that tend to associate technology and engineering with boys may be associated with reduced interest in computing among girls [20].

Understanding the ways higher education students use AI, their perceptions about the opportunities and concerns it raises, while also considering the factors that can shape usage patterns and how effectively it is adopted, is crucial for maximizing the benefits of AI in academic settings. Also, as it is "a rapidly moving target", it's critical to ensure that all students develop a "core set of knowledge, skills and values for interacting ethically and effectively with AI" [1] (p. 13), making the most of its potential and benefits.

III. METHODOLOGY

This exploratory, descriptive and quantitative study aims to investigate the use, perception and ethical management of Artificial Intelligence (AI) by higher education students in an academic context.

A. Data collection instrument

Before the questionnaire was applied, a pre-test stage was carried out, in which 18 students, from master's and bachelor's programmes, contributed with inputs for its reformulation (improving some questions, introducing other applications and improving some scales).

The questionnaire consists of 13 questions and, at the end, there is a field for the sociodemographic characterisation of the participants. In this article, only the data relating to the questions in the following dimensions will be presented: analysing patterns of use of AI tools among students (Q2 and Q4); exploring the motivations that lead students to use AI, as well as the perceived barriers that may hinder its adoption (Q5 and Q6); analysing how students deal with ethical issues arising from the use of AI in academic tasks (Q7 and Q8); assessing students' perceived competence in using AI technologies (Q12); and interest expressed in obtaining formal training on the use of AI in higher education, allowing needs and preferences to be identified (Q13).

B. Sample description

The questionnaire was administered in the classes of the teachers taking part in this research, but also in the classes of their colleagues. The sample is therefore one of convenience, as students from these classes who wanted to take part in the study responded.

The sample consisted of 171 higher education students aged between 18 and 53, with an average age of 22.22 (standard deviation: 5.317). Of the 171 students, 127 were female (74.3%), 33 were male (19.35%) and 11 students chose not to indicate their gender (6.4%). With regard to the Higher Education Institutions to which they belonged, 97 students attended the Polytechnic Institute of Lisbon (60.9% at the School of Education, 35% at the School of Social Communication and 4.1% at the Higher Institute of Engineering) and 74 attended the School of Education of the Polytechnic Institute of Viseu. The students who took part in the study were distributed across the following levels of education: 111 were studying for a bachelor's degree (64.9%), 54 were studying for a master's degree (31.6%) and 6 were studying for a postgraduate degree (3.5%).

C. Data analysis

To analyse the data obtained through the questionnaire, a descriptive analysis was carried out, using various frequency distributions and measures of central tendency, depending on the type of variable being analysed.

IV. RESULTS

A. Analyse usage patterns of AI tools among students

Usage patterns vary considerably across AI platforms (Table I). ChatGPT is the most frequently used, with 42.1% of respondents reporting weekly use and 23.4% using it daily. Additionally, 14.0% use it monthly, while only 7.0% report not using it at all. In contrast, the remaining AI tools examined in this study show considerably lower usage rates. For instance, Claude, Perplexity and Scite are not used by over 90% of respondents (92.4%, 93.6% and 98.8%, respectively), with only small percentages using them weekly or daily. These findings indicate a clear dominance of ChatGPT in the user base, with other AI systems playing marginal roles in regular academic use.

TABLE I
Frequency of Use of AI Tools (by Platform)

Tool	I do not use it	Once or twice per semester	Once or twice per quarter	At least once per month	At least once per week	At least once per day
ChatGPT	7.0%	9.9%	3.5%	14.0%	42.1%	23.4%
Claude	92.4%	0.6%	0.0%	1.2%	2.9%	2.9%
Google Gemini	78.4%	3.5%	1.8%	8.2%	5.3%	2.9%
Microsoft Copilot	83.6%	1.2%	2.9%	5.8%	5.8%	0.6%
Perplexity	93.6%	0.6%	0.0%	1.8%	3.5%	0.6%
Scite	98.8%	0.0%	0.0%	0.0%	1.2%	0.0%

In addition, data indicate varied levels of adoption of AI tools for different academic purposes (Table II). The most frequent use was observed in grammar checking, with 26.3% using it at least once a week and 11.1% daily. Other forms of writing assistance also showed relatively high usage, with 29.8% reporting weekly use. The drafting of initial versions of texts and summarizing scientific articles were also frequent tasks, with weekly use reported by 26.3% and 24.6% of respondents, respectively.

By contrast, the use of AI for programming assistance was the least frequent, with 81.3% indicating they do not use it at all. Similarly, the translation of texts into other languages and the generation of images or videos were less commonly used on a regular basis, though a minority reported monthly or weekly usage. These results suggest that while AI tools are becoming integrated into academic workflows, their usage patterns differ substantially depending on the nature of the task.

TABLE II
Frequency of Use of AI Tools for Different Academic Tasks

Task	I do not use it	Once or twice per semester	Once or twice per quarter	At least once per month	At least once per week	At least once per day
Writing assistance – grammar checking	35.7%	5.3%	3.5%	18.1%	26.3%	11.1%
Other types of writing assistance	41.5%	3.5%	4.1%	14.6%	29.8%	6.4%
Translating texts into another language	49.1%	8.8%	7.0%	16.4%	14.6%	4.1%
Summarizing scientific articles	34.5%	8.2%	7.0%	21.1%	24.6%	4.7%
Bibliographic research	38.0%	11.1%	7.6%	17.5%	19.3%	6.4%
Data analysis and visualization	41.5%	6.4%	9.9%	16.4%	18.7%	7.0%
Drafting the first version of a text	39.8%	4.7%	5.8%	15.2%	26.3%	8.2%
Generating images or videos	45.0%	7.6%	7.0%	19.9%	17.0%	3.5%
Assistance with programming code	81.3%	4.1%	1.2%	2.3%	7.6%	3.5%

B. Explore the motivations that drive students to use AI, as well as the perceived barriers that may hinder its adoption

The results reveal that students are primarily motivated to use AI tools due to their perceived practical benefits in academic contexts (Fig. 1). The most strongly endorsed motivations were “To receive immediate and personalized support” and “To increase productivity and save time”, with 84.2% and 74.2% of respondents, respectively, selecting “Agree” or “Strongly agree”. Likewise, a substantial proportion of students reported using AI “To support academic work” (79.6%) and “To improve the quality of their work (e.g., writing, grammar, clarity)” (62%).

Motivations related to creativity and cognitive support also received relatively high levels of agreement. For instance, 57.9% of respondents agreed or strongly agreed with the statement “To stimulate creativity and generate new ideas”, and 65.5% reported using AI “To support research and synthesis of scientific information”.

Moderate agreement levels were observed for motivations related to overcoming academic challenges, such as “To overcome difficulties with academic writing” (57.4%) and “To receive support with qualitative or quantitative data analysis” (51.5%). However, items such as “To develop skills in the field of AI” and “To create or improve presentations and science communication materials” received lower endorsement, with only 36.2% and 45% agreement, respectively.

The least endorsed motivations were those related to external or social influences. Only 12.2% of students agreed or strongly agreed that they use AI “Because other students use it”, and just 11.7% agreed that they do so “Because their institution encourages it”. These findings suggest that students’ use of AI tools is largely driven by intrinsic academic needs and perceived usefulness rather than peer behavior or institutional pressures.

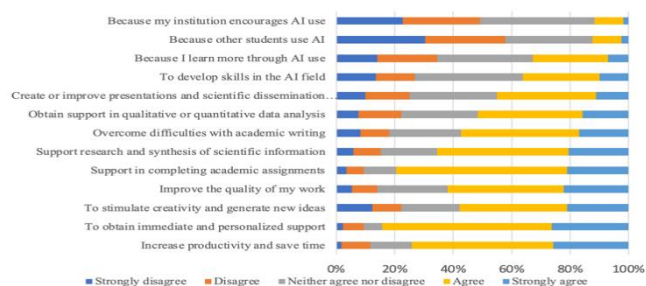


Fig. 1. Motivations that drive students to use AI

The data indicate that students hold various concerns about using AI tools in academic contexts, primarily related to the reliability and ethical implications of such technologies (Fig. 2). The most frequently reported concerns were “*Obtaining false results*” and “*Obtaining biased results*”, with 73.1% and 67.8% of participants, respectively, agreeing or strongly agreeing with these statements. A significant portion of students (65.5%) also expressed fear of “*Being accused of fraud by their institution*”, suggesting that academic integrity policies may impact students’ willingness to use AI. Furthermore, 45% of respondents reported lacking sufficient knowledge to use AI tools effectively.

Concerns about fairness and institutional restrictions were less prominent. Only 25.7% of respondents agreed that “*It is unfair to students who do not use AI*”, and a similar proportion (31%) believed that “*Their institution discourages or prohibits the use of AI*”. Financial barriers were not widely perceived as an issue, with just 18.1% agreeing that “*AI tools are too expensive*”.

Interestingly, while 36.5% of respondents stated they feel completely comfortable using AI tools, 40.5% expressed concerns about the “*Use of data to train AI models without authors’ consent*”, and 31% believed they might “*Learn more by not using AI*”.

These results reflect a nuanced perspective among students, who recognize both the potential pitfalls and ethical dilemmas associated with AI use, even if they largely feel comfortable engaging with the tools.

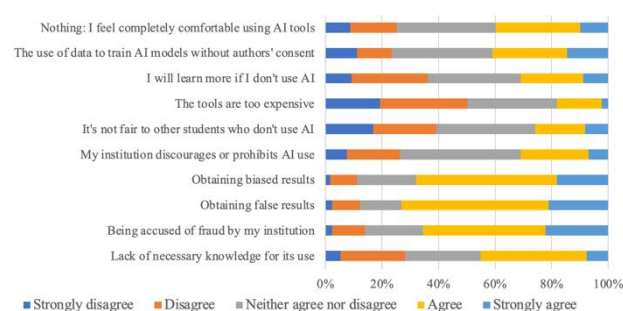


Fig. 2. Concerns about using AI tools in academic contexts

C. Examine how students engage with ethical issues arising from the use of AI in academic tasks

Participants were asked to indicate which ethical concerns they associated with the use of AI tools (Table III). Multiple responses were allowed. A total of 423 responses were recorded across five predefined concerns, corresponding to an average of approximately 2,5 concerns per respondent.

The most prevalent concern was plagiarism and academic integrity, cited by 86.5% of participants. This finding highlights widespread awareness of potential academic misconduct issues associated with AI usage. The second most common concern was excessive dependence on AI for content generation, reported by 71.2% of participants. This suggests considerable apprehension about over-reliance on AI tools potentially undermining learning processes.

Risk/potential for AI to fabricate bibliographic references or data was identified by 42.4% of participants, indicating awareness of AI's tendency to produce inaccurate or non-existent citations. Lack of transparency in AI-generated content concerned 38.2% of participants, reflecting unease about the opacity of AI decision-making processes. The least frequent concern was lack of knowledge about ethical implications of AI, reported by only 10.6% of participants, suggesting that most participants believe they have adequate understanding of AI's ethical dimensions.

In summary, the data reveal that students are primarily concerned with academic integrity, overreliance on AI, and the reliability and transparency of AI-generated content.

TABLE III
Ethical concerns associated by students with the use of AI tools

	N	%	% by case
Excessive dependence on AI for content generation	121	28,6%	71,2%
I don't know the ethical implications of AI	18	4,3%	10,6%
Lack of transparency in AI-generated content	65	15,4%	38,2%
Plagiarism and academic integrity	147	34,8%	86,5%
Risk/Potential for AI to fabricate bibliographic references or data	72	17,0%	42,4%
Total	423	100,0%	

Participants were asked to indicate the practices they adopt when using AI tools (Table IV). Multiple responses were allowed. A total of 335 responses were recorded across six predefined practices, corresponding to an average of approximately 2.1 practices per respondent.

The most common practice was avoiding the direct use of AI-generated text in the final versions of assignments, reported by 77.8% of participants. Closely following, 75.3% of participants stated that they verify AI-generated information using credible sources, indicating a strong concern with the accuracy and reliability of AI outputs.

Following institutional guidelines on AI usage was reported by 18.5% of participants, while citing AI-generated documents was reported by 17.3%. These relatively low frequencies may point to uncertainty or a lack of clarity around formal referencing and policy requirements.

Seeking advice from teachers or academic advisors was reported by just 10.5%, and only 7.4% of participants stated that they were unaware of the ethical implications of AI.

In summary, the findings indicate that students are primarily concerned with maintaining academic standards through verification and cautious use of AI-generated content, though formal practices such as citation and adherence to institutional policies appear to be less consistently followed.

TABLE IV
Practices adopted by students when using AI tools

	N	%	% by case
I cite the AI-generated document when used	28	8,4%	17,3%
I verify the information generated by AI using credible sources	122	36,4%	75,3%
I avoid directly using AI-generated text in the final versions of assignments	126	37,6%	77,8%
I follow institutional guidelines on the use of AI	30	9,0%	18,5%
I seek advice from teachers or academic advisors	17	5,1%	10,5%
I am unaware of the ethical implications of AI	12	3,6%	7,4%
Total	335	100,0%	206,8%

D. Assess students' self-perceived competence in using AI technologies

Participants' self-assessed AI competence showed a moderate average level, with a mean of 3.08 (SD = 0.93) and a median of 3, on a scale from 1 to 5. The minimum and maximum values were 1 and 5, respectively, and the variance was 0.871 (Fig.3). These results suggest that, while participants generally perceive themselves as moderately competent, there is notable variability in their responses.

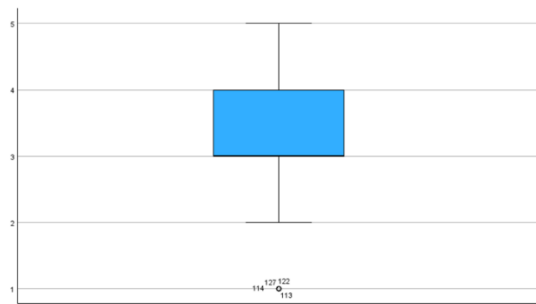


Fig. 3. Participants' self-assessed AI competence

E. Expressed interest in receiving formal training on AI use in higher education, providing insight into potential needs and preferences

Regarding interest in AI training for higher education, the sample showed a slight majority in favor of such training. Specifically, 90 participants (53%) expressed interest in receiving training on AI use in higher education contexts, while 81 participants (47%) indicated they were not interested in such training opportunities.

V. DISCUSSION

This exploratory study reveals a widespread AI tool adoption among Portuguese higher education students, mirroring global [22] and Portuguese (e.g., [4], [23], [24]) educational trends. Nonetheless, the participants' AI usage lacks diversity, with a pronounced reliance on ChatGPT, which is markedly favored over other prominent platforms such as Claude and Perplexity. The AI tools under study are primarily used for writing assistance - particularly for grammar correction, drafting initial versions of texts, and summarizing scientific papers. This usage pattern is in part consistent with global findings [25] that students use AI to assist them in writing, for personalized content recommendations, and research. Yet, it contrasts with other studies involving Portuguese higher education students, where AI tools are reportedly employed mainly for information search and idea generation [4], [24], implying that there may be course and higher education institution characteristics and specificities that may shape AI tool adoption and usage by these users.

Building on the Uses and Gratifications Theory [26], the findings suggest that students' use of AI tools is largely shaped by cognitive and utilitarian gratifications (such as the perceived usefulness, efficiency improvement and practical benefits of these tools for initiating and supporting academic tasks), that outweigh the influence of emotional or social gratifications.

While acknowledging its potential, most participants seem to simultaneously adopt a critical and reflective stance toward AI tools use in the academic context, with prevalent concerns centered on information reliability and data privacy, as well as on the ethical implications of its use. These students are mainly worried with the risk of academic misconduct and excessive dependence on AI for content generation. These results align with prior studies (e.g., [4], [23], [24]), which highlight students' concern regarding the accuracy of AI-generated responses and their awareness of the potential for overreliance, aspects that can undermine the learning process [11], [12]. As such, the results underscore a set of antinomies in students' engagement with AI tools in the academic context [23], wherein the allure of the perceived gratifications derived from their use is counterbalanced by ethical questions regarding students' overreliance on these tools and an eventual lack of academic integrity.

Participants' concerns regarding the accuracy and reliability of AI-generated content have prompted the adoption of preventive strategies aimed at mitigating potential risks. These include refraining from directly incorporating AI outputs into the final stages of academic work and cross-checking information against credible sources. Such practices reflect a commendable commitment to upholding academic standards through critical verification and responsible use of AI technology—an approach that is especially valuable given the pivotal role of information accuracy and the cultivation of student autonomy in the learning process [24]. It is noteworthy, however, that other practices—such as disclosing the use of AI tools or seeking guidance from instructors or academic advisors—are applied less consistently. This inconsistency may be partially attributed to variations in students' self-perceived competence, which, while generally moderate, differs across the sample. Despite their limited expertise and confidence, which can influence their ability to navigate AI-integrated academic environments effectively, only half of the participants expressed interest in receiving formal training on AI use within the context of higher education, suggesting a potential gap between their perceived needs and actual preparedness.

A. Theoretical and practical contributions

This study contributes to the existing literature on artificial intelligence in higher education by examining higher education students' patterns of AI tool usage and the underlying motivations and obstacles shaping their engagement. By examining perceptions of reliability and informational quality of AI-generated content, the research provides valuable insights into students' evaluative frameworks when interacting with such technologies. Ethical engagement emerges as a central theme, with the study shedding light on how students confront and interpret the ethical implications of AI use in scholarly contexts. Finally, by exploring students' self-perceived confidence and interest in formalized AI training, the study identifies gaps in institutional support and informs the development of targeted educational interventions that align with learners' needs and aspirations.

B. Limitations and future research directions

The predominance of social sciences courses within the sample, together with the limited sample size, imposes a contextual constraint on the generalizability of the findings. Accordingly, these results should be interpreted with caution. Future research would benefit from employing larger, more diverse samples to enhance statistical power and representativeness. Furthermore, the data were exclusively collected through self-report measures, which are inherently susceptible to biases such as social desirability and inaccurate recall. To mitigate these limitations, subsequent studies should incorporate multi-method approaches, including behavioral observations or informant reports, thereby providing a more robust and objective understanding of this social phenomena. Employing a gender-sensitive lens in future research can enhance understanding of how gender influences students' use of and engagement with AI technologies and its broader implications.

VI. CONCLUSION

This study sheds light on the complex and evolving relationship between higher education students and artificial intelligence tools. While students largely embrace AI for its practical benefits, especially in writing and academic support, they simultaneously express critical awareness of its limitations, ethical risks, and the importance of responsible use. The predominance of ChatGPT, alongside low engagement with other AI platforms, suggests a narrow pattern of adoption, shaped by accessibility, familiarity, and perceived utility. Despite moderate self-assessed competence, the limited demand for formal training reveals a gap between student readiness and institutional preparedness. These findings underscore the urgent need for higher education policies and pedagogical practices that not only support digital literacy, but also promote ethical awareness and equitable access. As AI continues to reshape academic norms, future research, especially with a gender-sensitive lens, will be crucial to inform inclusive strategies that empower all students to engage critically and confidently with these transformative technologies.

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