Investigating Higher Education Students' AI literacy
A case study of Mohamed First University

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Abstract:
Technological advances, particularly in artificial intelligence (AI), are reshaping literacy beyond traditional reading and writing, which requires new skills and competencies as well as the adoption of new standards and approaches in education. This study examines AI literacy among students at Mohammed I University (UMP), drawing on a broad perspective and guided by a four-pillar framework - knowing and understanding, using and applying, evaluating and creating with, and addressing the ethical issues surrounding AI. Employing a quantitative research design, the study collects data through a survey. The findings, in turn, indicate that students demonstrate strong accessibility to AI-powered tools and increasing interest in their applications. However, concerns emerged regarding limited conceptual knowledge, misuse of AI for unethical purposes, overdependence, and insufficient awareness of issues such as bias, job displacement, and privacy. These results underline the need for integrating AI literacy into higher educational practices, with a focus on critical thinking and ethical use.

Keywords: AI literacy, higher education student, investigate, Mohammed I University.

1. INTRODUCTION

Literacy, which has been traditionally conceived as the ability to read, write and comprehend, has undergone significant transformation due to the rapid technological advancement and digital transformation. This transformation has necessitated the development of new skills and competences and the adoption of new standards and approaches to education. There has been a shift from print-based literacy (though it remained fundamental and prevalent) to digital literacy, which involves the use of technology for learning, communication, creation, productivity, performance and responsibility (Mansour, 2022, p. 43 & Healey, Flint & Smith, 2008). Yet digital literacy alone is no longer sufficient in a world increasingly shaped by autonomous and intelligent technologies. Unlike digital literacy, which focuses mainly on working on and producing information with technology, AI literacy requires understanding how algorithms make decisions, recognizing potential biases in machine outputs, and reflecting on the ethical, social, and economic consequences of AI systems. Therefore, everyone, regardless of their field of study or profession, needs to possess at least a basic knowledge of AI to participate responsibly and effectively in an AI-empowered/driven society.

The rapid advancement of AI-powered technologies has significantly impacted higher education. AI-powered tools, such as intelligent tutoring systems and automated grading software, are transforming learning and teaching processes (Siemens & Gutiérrez, 2010). These tools offer personalized learning experiences, streamline administrative tasks, and enhance student engagement (Peppers & Rogers, 2004). Owing to the recognition and appraisal of their potential, a significant number of higher education institutions have integrated AI-powered tools into their curricula. Besides, a vast number of students are embracing these tools. However, the increasing reliance on AI also raises concerns related to academic integrity, overdependence, data privacy, and the potential deskilling of both learners and educators. As AI continues to permeate higher education, it is necessary for students and teachers to develop AI literacy, which not only involves the understanding of AI concepts, but also the utilization of its tools, assessment and development of its applications, and the ethical implications (Ng, Leung, Chu & Qiao, 2021; Russell & Norvig, 2016).

This study aims to investigate the current state of AI literacy among students at University Mohamed Premier (UMP), Oujda, Morocco. By setting the following objectives, it will provide valuable insights into the current state of AI literacy among students and contribute to the development of effective strategies for enhancing AI education and awareness. First, it aims to assess the extent to which students own and can access AI-powered tools, as well as the types of such tools they are familiar with and use regularly. It explores how students utilize these tools for diverse purposes and to evaluate their perceptions about utilizing them for learning, creation, sharing, and safety. Next, it aims to investigate students' understanding and awareness of the job displacement, ethical considerations and potential risks, including issues like bias, privacy, misinformation, and the dangers of AI misuse. It intends to investigate students' competences such as critically assessing AI-generated content and to evaluate their skills in utilizing these tools productively and responsibly. Ultimately, the study seeks to pinpoint areas where AI literacy can be enhanced within the university. It tends to develop recommendations for incorporating AI education into the curriculum, and suggests strategies for fostering the ethical and responsible use of AI among students. To attain these goals, a quantitative research method involving a survey questionnaire will be employed. The survey will delve into four aspects of students' AI literacy: understanding AI concepts, utilizing its tools, assessing and developing its applications, and considering its ethical implications. It intends to answer the following research questions:

1) How often do students use AI-powered tools? And for what purposes?
2) Do students understand AI concepts and technologies?

3) How do students perceive the effectiveness and limitations of AI-powered tools in enhancing learning outcomes?
4) To what extent are students aware of the ethical implications of AI, such as bias, privacy, and job displacement?
5) To what extent are students competent in using AI-powered tools?
6) Are students willing to collaborate with AI-powered software?

2. LITERATURE REVIEW:

2.1. Literacy over time

The evolution of literacy is a fascinating journey that mirrors the development of human civilization. Each phase of this development has necessitated a new type of literacy. In turn, each type of literacy opens new avenues for human thought, expression, and progress and marks a noteworthy leap in human communication and understanding (Diringer, 1968, p. 13). The invention of the printing press and the subsequent development of mass literacy further expanded human potential. However, in the 21st century, the concept of literacy has undergone a profound evolution. The digital era has witnessed the emergence of new forms of literacy which helped reshape the way we interact with information and each other. However, with AI emerging as a powerful force, the boundary of literacy has to be redefined to include new aspects of human-machine interaction and knowledge acquisition as well as the demands on a new set of skills and competencies.

The rapid advancement of AI has led to a new era of literacy, where understanding, utilizing, and critically evaluating its systems is essential. This shift is driven by its pervasive influence, its algorithm's power exercise/dominance, ethical considerations, job market potentials and challenges, and the need for data-driven decision-making. Becoming ubiquitous, AI empowers many of the tools and services we use daily. (Buolamwini & Gebru, 2018) This increasing reliance on AI, as evidenced by the surge in its adoption rates across industries (Hooson & Pratt, 2024, p. 5), would lead to concerns about overdependence and potential negative consequences. Other ethical considerations are raised mainly with the ability of its systems to make decisions based on algorithms (Floridi, 2019, pp. 3-7). Understanding how data is collected, analysed, and used is vital for making informed decisions (Mayer-Schönberger & Cukier, 2013, p. 13). Moreover, as it continues to advance, individuals must proactively address these worries by acquiring AI skills to remain competitive in the job market (Pearlson & Saunders, 2016). In today's AI-driven economy, developing AI skills and competence help enhance employability and adapt to the evolving job market, which increasingly demands AI proficiency. All in all, this proactive approach will enable individuals to not only adapt to the technological breakthroughs but also to shape its future development.

2.2. The Next Frontier

AI literacy can be defined by deconstructing the combination of literacy, digital tools, and AI. Traditional literacy involves reading, writing, and understanding information. AI, as defined first by McCarthy (2007, p. 2) and elaborated by Wang (2019) and Zawacki-Richter, Marín, Bond, & Gouverneur (2019), is the science and engineering of creating intelligent machines capable of performing cognitive tasks through evolutions in machine learning, natural language processing, and neural networks. AI literacy, then, could be conceived as being able to live, learn and work in a digital world powered by AI (Ng, Leung, Chu & Qiao, 2001, p. 4). However, it is intrinsically linked to digitalized tools and digital literacy, which encompasses a broad range of skills, from basic computer use to complex problem-solving (Mansour, 2022, p. 43). While many people acknowledge AI services and devices, they often lack a deeper understanding of the underlying concepts and potential ethical implications (Burgsteiner, Kandlhofer, & Steinbauer, 2016; Ghallab, 2019). Therefore, AI literacy should cover a spectrum of knowledge (Tadimalla & Maher, 2024) ranging from a comprehensive

understanding of basic AI concepts, the ability to utilize AI tools effectively, productively and ethically.

AI literacy demands a robust understanding of both core AI concepts and supporting technologies (Eaton & Epstein, 2024; Southworth et al., 2023). Burgsteiner et al. (2016) and Kandlhofer et al. (2016), for example, defined AI literacy as the ability to understand the basic techniques and concepts behind AI in different products and services. It encompasses mastering a broad range of technical skills, including fundamental AI principles, mathematical foundations, and programming techniques. (Tadimalla & Maher, 2024) Core AI techniques such as machine learning, deep learning, and natural language processing are essential for AI literacy. Furthermore, a comprehensive understanding of technologies such as big data, cloud computing, and data mining is crucial.

While this technical foundation is essential for AI literacy (Tadimalla & Maher, 2024), it is equally important to foster knowledge of AI's societal implications, practical applications, and ethical considerations. AI literacy is linked to perceived abilities, confidence, and readiness in learning AI (Druga, Vu, Likhith, & Qiu, 2019; Lin et al., 2021). It involves understanding the impact of AI on society, including potential job displacement, education prospects and privacy concerns. For example, "understanding how technologies will impact labour markets is crucial for determining whether people will be able to transition from declining occupations to the jobs of tomorrow" (*The Future Jobs Report 2023*, p. 24). Additionally, AI literacy should equip learners with the ability to apply AI concepts to real-world situations (Rodríguez-García et al., 2020) and to be aware of the ethical implications of AI technologies. Unfortunately, AI ethics is often overlooked in favor of technical concerns (Hagendorff, 2020). AI, despite its benefits, can be a double-edged sword, leading to issues such as algorithmic bias and malicious use (Brundage et al., 2018). Thus, prioritizing economic and technological incentives over ethical principles can lead to a lack of accountability and moral responsibility (Hagendorff, 2020). Educating AI ethics to foster social responsibility and ensure the ethical and beneficial deployment of AI is paramount (Dignum, 2019).

This new type of literacy empowers individuals to both harness the potential of AI tools and critically assess their impact. It involves developing a keen awareness of AI's ethical implications, biases, and societal consequences (Ng, Leung, Chu & Qiao, 2021), along with the ability to critically evaluate AI technologies and effectively communicate and collaborate with AI (Long & Magerko, 2020). Nowadays, AI technology is becoming increasingly important across various disciplines and industries. However, it is crucial for individuals to learn how to use AI technologies ethically and responsibly. (Ng, Leung, Chu & Qiao, 2021, p. 5)

By adopting this perspective, AI literacy frameworks often encompass four key aspects: knowing and understanding, using and applying, evaluating and creating with, and addressing ethical issues related to AI (Long & Magerko, 2020; Ng, Leung, Chu & Qiao, 2021, p. 6; Tadimalla & Maher, 2024). One important aspect of this approach is that it aligns well with Bloom's taxonomy. The latter is a framework that categorizes learning objectives into six levels of thinking: know, understand, apply, analyze, evaluate and create. On the other hand, AI literacy starts with knowing and understanding the fundamental functions of AI and how to utilize AI-powered digital tools. Lacking knowledge of even basic AI functions (e.g., memorizing and demonstrating the meaning of AI concepts) hinders any further development of students' AI literacy. The next step involves using and applying AI, which represents a further level of thinking. Here, students can execute and implement their knowledge of AI concepts and applications in various contexts and scenarios. Evaluating and creating with AI entails even higher-order thinking skills, such as decomposing and abstracting an AI problem, analyzing, appraising, predicting, and justifying decisions made with AI applications. It also includes 'collaborating' with AI applications to produce novel or original work. At this stage, students actively contribute to the construction and development of AI. Finally, AI ethics incorporates a

human-centered approach in education, considering issues such as fairness, accountability, transparency, ethics, and safety. Students at this phase begin to critically evaluate AI for social good.

2.3. Why AI literacy

The Future Jobs Report 2023 (pp. 38-39) highlights the growing importance of technological literacy, and AI and big data skills, in the workplace. These skills were ranked sixth and sixteenth, respectively, among 26 core skills deemed essential for workers in 2023. The report predicts a substantial rise in their importance by 2027, forecasting them to rank third and seventh, respectively. While AI integration has the potential to displace certain jobs, it is also expected to create new opportunities in emerging sectors. As Ng, Leung, Chu, and Qiao (2001, p. 1) noted, while not all disciplines will be replaced by AI, those with AI knowledge will have an advantage in the future workforce. To address these evolving issues, the report urged reskill and upskill priorities in the next five years. AI and big data skills are a top priority for businesses, particularly large companies with over 50,000 employees (*The Future Jobs Report 2023*, p. 46). Approximately 75% of companies plan to adopt AI within the next five years.

AI literacy offers numerous potential benefits for higher education students. First, as Bawden (2008, p. 102) argues, digital literacy is essential for equal opportunities in the knowledge-based society. Although technology is reshaping the job market, it also reshapes job content, and the skills needed. (*The Future Jobs Report 2023*, p. 24). Second, the widespread use of AI-powered technologies, such as chatbots and translation apps, accentuates the importance of understanding and utilizing AI in everyday life (Ng, Leung, Chu & Qiao, 2021, p. 2). Learners must not only be consumers of AI applications but also understand the underlying technologies. They are required to acquire fundamental AI concepts, skills, knowledge and attitudes. Such a literacy, therefore, empowers individuals by providing them with the tools to understand, utilize, and critically evaluate AI technologies., which enables them to make informed decisions about the potential benefits and risks of AI. Additionally, AI fosters problem-solving and critical thinking skills, as students can utilize AI tools to analyze complex problems and generate innovative solutions. It is crucial to address the biases and limitations inherent in AI systems (Buolamwini & Gebru, 2018) to promote ethical AI development and use. By understanding these issues, AI-literate students can advocate for equitable and responsible AI practices. As Davenport and Ronanki (Davenport and Ronanki, 2018) emphasize, AI literacy is essential for individual success in the age of automation and contributes to a future shaped by AI.

2.4. AI competencies

AI competencies have expanded significantly, aligning with the four-pillar framework (know and understand, use and apply, evaluate and create and ethics). This comprehensive approach ensures a deep understanding of AI, from basic concepts to advanced applications. (Tadimalla & Maher, 2024) AI competent students can develop a profound understanding of core AI concepts such as machine learning, deep learning, and neural networks. They have a knowledge of AI applications across various domains, can identify AI potentials and challenges, and are familiar with AI development tools and techniques. Using AI-powered tools, students can tailor educational experiences to their individual needs and promote their accessibility to various resources.

They can, learn, and are willing to collaborate with AI tools responsibly and effectively. This encompasses understanding their strengths and limitations, their ability to utilize these tools for various tasks. Being aware of the potentials and shortcomings of AI software and hardware, they can critically evaluate AI-generated content. For example, students become aware of how AI extracts meaningful insights from large datasets to inform decision-making and improve outcomes. In turn, students would start raising ethical considerations in AI. They would be able to identify and address potential risks associated with AI, such as bias, privacy

violations, and job displacement. They also develop a critical understanding of AI's impact on society, including issues of equity and accessibility.

Finally, students explore the broader social and future implications of AI. They can understand the broader economic, social, educational and cultural impact of AI, along with analyzing future trends and challenges. They foster critical thinking skills to assess the ethical and societal implications of AI advancements and engage in discussions about the future of AI and its role in shaping society. For example, students need to be aware of how to participate in AI responsible development and use.

2.5. Fostering AI literacy at higher education

To effectively foster AI literacy in higher education, AI should be integrated into curricula through a multi-faceted approach encompassing learning artifacts, pedagogical strategies, and subject matter (Ng, Leung, Chu & Qiao, 2001, p. 6). This approach reinforces three key knowledge areas: technological knowledge, pedagogical knowledge, and content knowledge.

The learning artefacts approach is devoted to fostering technological knowledge and motivating students to enhance their AI's conceptual understanding. This involves the understanding and application of domain-specific learning tools, such as hardware-focused artifacts (e.g., robots, sensors), software-focused artifacts (e.g., block-based programming), intelligent agents (e.g., chatbots), and unplugged learning tools (e.g., role-playing) (Kim, Jang, Choi, Kim, Jung, Kim, & Kim, 2021, pp. 1-13 & Ng, Leung, Chu & Qiao, 2001, p. 6).

To enhance AI literacy among higher education students, educators should employ a variety of pedagogical approaches, including experiential learning, problem-based learning, inquiry-based learning, and collaborative learning (Ng, Leung, Chu & Qiao, 2001, p. 6). Students should be familiarized with fundamental AI concepts, such as machine learning and deep learning, and understand the relationship between these concepts and real-world AI-powered applications. To apply this knowledge, students should engage in practical group projects that require independent analysis and problem-solving, along with conducting research projects to formally describe problems at a higher level of abstraction (Kandlhofer et al., 2016). By developing these skills, students can effectively apply AI knowledge and skills to address real-world challenges and prepare for future academic and professional pursuits.

Moreover, content knowledge pertains to the specific subject matter of AI literacy. It focuses on the learning curricula and activities such as how learners gain its concepts, and how they apply it to contexts of their interests (Druga et al., 2019; Lin et al., 2021). This includes the teaching of AI fundamentals to understand the applications of AI, how it can affect their lives, and the ethical issues that arise from its technologies. This literacy also includes curricula to prepare students to meet the future job demands.

3. RESEARCH METHOD

The current study employs a quantitative survey design to investigate AI literacy levels among students of the UMP, Oujda. It is well-suited approach for collecting numerical data and analysing them to identify trends and patterns. Consistent with the study's objectives, the research will explore students' ownership and accessibility of AI-powered tools, their experience and conceptual knowledge of these tools, perceptions regarding the use of these tools for learning, creation and sharing, awareness of AI's ethical and safety implications, and AI-related digital competencies. As Creswell (Creswell, 2012, p. 21) argues, survey designs are effective for identifying trends in attitudes, opinions, behaviours, or characteristics of a larger population through the administration of a survey or questionnaire to a smaller sample group.

3.1. Participants and Sampling

The study involves 72 participants from UMP. The selection was based on factors such as accessibility, availability of time and resources, language compatibility of the questionnaire, suitability of participants, alignment with the study's objectives and questions, and the researcher's familiarity with this sample. To ensure a diverse sample, a combination of

convenience and snowball sampling techniques will be employed (Creswell, 2012, p. 143). Initially, surveys will be distributed to accessible students who are willing to participate. Subsequently, participants will be asked to distribute the survey to other eligible students, expanding the sample pool.

3.2. Instrument

The survey instrument will collect data on participants' email accounts, demographic information, academic levels, and ownership and accessibility of AI-powered tools. Additionally, the survey will include fifty other elements to assess participants' ownership and experience, perceptions for learning, creation, and sharing, awareness of ethical and safety implications, and the relevant digital competencies.

3.3. Data Collection Procedure

The questionnaire will be administered online through Google Forms. Participants will be invited to complete the survey via email or social media. To ensure data quality, clear instructions and a user-friendly interface will be provided. This questionnaire helps creating an organized survey, asking different types of questions, validating the data, storing and organizing the collected data, and providing statistics, tables and graphs.

3.4. Ethical consideration

The study will adhere to ethical guidelines for research involving human subjects. Before participating, participants will be informed that their data will be used exclusively for research purposes. Their privacy will be protected through strict confidentiality measures, ensuring anonymity. Their participation is voluntary. Moreover, data analysis will be conducted objectively, without bias or prejudice.

4. RESULTS AND DISCUSSIONS

To address the research questions, this section presents and analyses the data collected through the survey. The findings, presented in tables and graphs, are interpreted in relation to the existing literature and research questions, and highlight patterns, gaps, and potential implications. Data include participants' demographics, ownership and access to AI-powered tools, frequency and purpose of use, perceptions of effectiveness and limitations, awareness of ethical implications, and AI-related competencies.

4.1. Demographics:

TABLE 1: PARTICIPANTS' DEMOGRAPHICS AND ACADEMIC LEVEL

Participants' Gender		**Participants' Age**				**Current Academic Level**		
Male	Female	Less than 21	22- 25	26-31	More than 32	BA	MA	PhD
38	34	16	20	14	22	30	38	4
52,78%	47,22%	22,22%	27,78%	19,44%	30,56%	41,67%	52,78%	5,56%

The distribution of participants by gender shows a relatively balanced representation, with 52.78% males and 47.22% females. The near parity ensures that both genders are adequately represented in the study, minimizing bias in the interpretation of findings. The slight male predominance may reflect broader enrolment trends in certain programs at the university, yet it does not significantly distort the dataset. In terms of AI literacy, this balance allows for meaningful exploration of gender-related patterns in the adoption, usage, and ethical awareness of AI-powered tools.

The age distribution highlights the diversity of the sample, with 22.22% of participants under 21, 27.78% between 22 and 25, 19.44% between 26 and 31, and 30.56% above 32 years of age. It indicates the presence of both younger students, who are often considered digital natives, and older learners, who may bring professional or personal experiences that shape their

attitudes toward AI. Such variation enriches the study by revealing generational perspectives on AI literacy. For instance, younger participants may approach AI-powered tools with greater ease and experimentation, whereas older participants may exhibit heightened awareness of ethical, professional, and societal implications.

Regarding academic level, the largest proportion of participants were master's students (52.78%), followed by bachelor's students (41.67%), with doctoral students making up only 5.56% of the sample. These statistics reveal that the findings predominantly reflect the perspectives of postgraduate students who are already engaged in advanced academic training. The inclusion of a substantial number of bachelor's students provides valuable insights into how undergraduates interact with AI technologies, while the small number of doctoral students limits the extent to which firm conclusions can be drawn about their experiences. Overall, this composition enables comparison across different academic stages while highlighting the dominant role of master's-level perspectives in shaping the results.

4.2. Ownership and Accessibility to AI-Powered Digital Devices

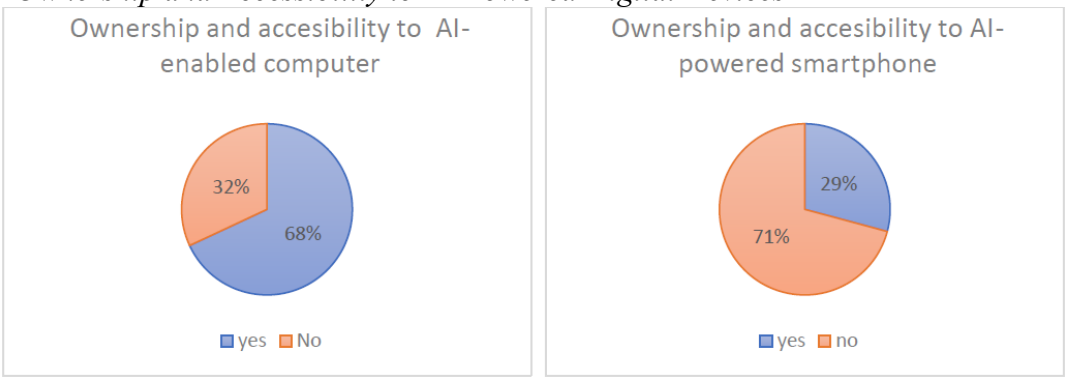

Figure 1: Students' Ownership and AI-powered Digital Tools

Figure 1 illustrates the distribution of AI-powered tools among students, showing that while a significant majority own AI-powered computers, nearly two-thirds reported that their smartphones are not AI-powered. The data portrays that although accessibility to AI-enabled devices is relatively high, students' perceptions of what qualifies as "AI-powered" remain limited. Many modern smartphones integrate AI features—such as voice assistants, predictive text, or image recognition—but participants may not recognize these as AI applications, instead associating AI only with more advanced or branded technologies (Russell & Norvig, 2016). This misconception suggests that students' access to AI tools is broader than they realize, which emphasizes the need for targeted awareness-raising initiatives in higher education. Strengthening this awareness is crucial, since students who fail to identify AI in their everyday devices may also struggle to fully grasp its role in shaping digital learning and broader socio-technical contexts.

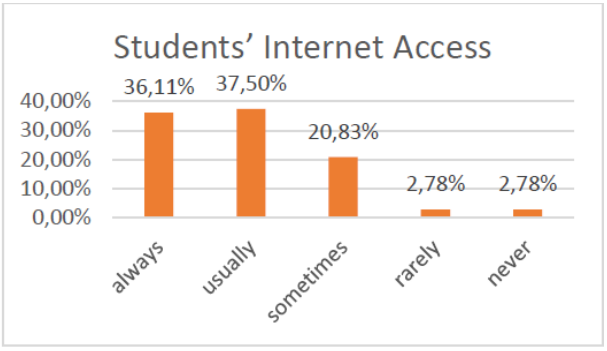

Figure 2: Students' Internet Access

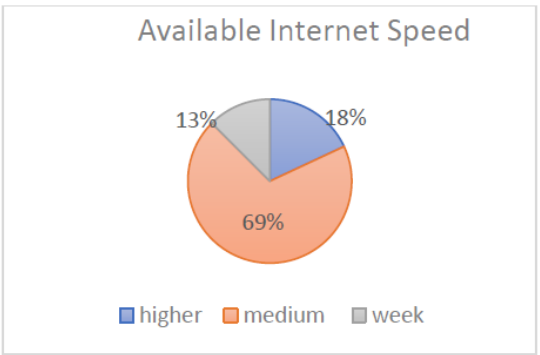

Figure 3: Available internet speed

Concerning the participants' frequency of internet use, the data suggests a high level of connectivity. A paramount portion reported daily access, while a substantial number use the internet several times a week. This data sheds light on the internet's paramount role in learning and communication among these students. While many participants enjoy medium-speed connections, a considerable number experience slower speeds which potentially impact their online activities and access to digital resources. Figure 3 illustrates this diversity in internet speeds. High connectivity and medium internet speeds reflect that infrastructure generally supports AI use, though slower connections may constrain consistent engagement. Also, the findings imply that accessibility alone does not ensure competent or ethical use, which reinforces the distinction between digital literacy and AI literacy (Ng et al., 2021).

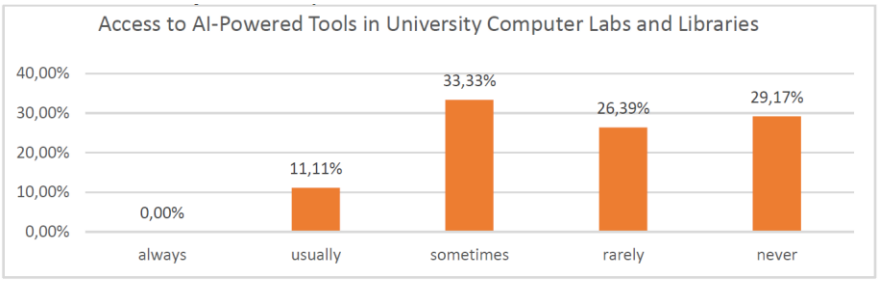

Figure 4: Access to AI-Powered Tools in University Computer Labs and Libraries

Asking the question "Do you have access to university computer labs or libraries equipped with AI-based tools?" was intended to investigate if the university provides students with AI-powered tools. The above figure conveys that students have opportunities to utilize such tools for academic purposes, which potentially fosters their learning experiences and research capabilities.

4.3. Experience and conceptual knowledge about AI-powered Tools

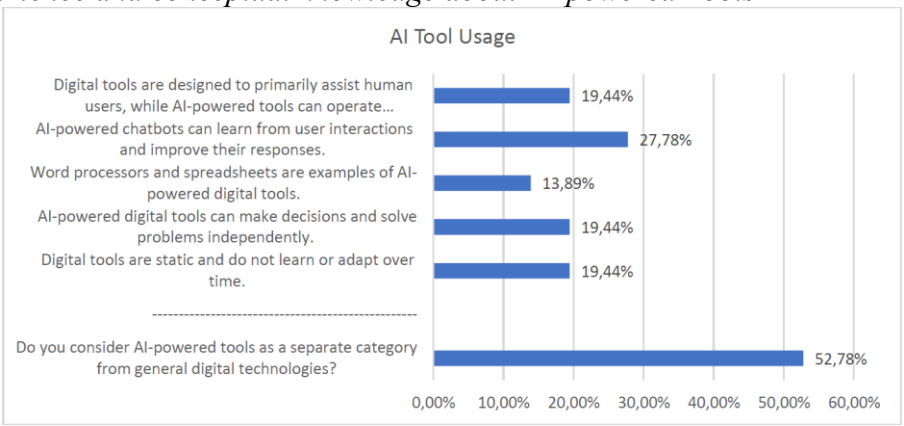

Figure 5: Students' experience and conceptual knowledge about AI-powered digital tools

Figure 5 demonstrates that students' experience and conceptual knowledge of AI-powered tools remain relatively superficial. Although a portion of participants acknowledged AI-powered tools as distinct from general digital technologies, the responses revealed that their recognition of such tools is inconsistent and often limited to the most common or visible applications. Therefore, many students may conflate ordinary digital devices with AI-powered ones, which, in turn, reflects a lack of deeper understanding of the underlying technologies. The findings highlight a gap between exposure and comprehension: while students might frequently use AI-related applications, such as search engines or language tools, their ability to conceptualize these as AI-driven remains underdeveloped. This limited awareness indicates the

need for structured educational interventions that go beyond functional usage to foster critical knowledge of AI's distinctive features, mechanisms, and implications in academic and professional contexts.

TABLE 2: AI TOOL USAGE

	Yes	No
Have you ever used AI-powered tools like ChatGPT, Google Bard, or AI writing assistants?	74.3%	25.7%

TABLE 3: FREQUENCY OF AI TOOL USAGE

	Rarely	Daily	weekly	monthly
If yes, how often do you use them?	46.2%	34.6%	19.2%	00%

Table 2 reveals that a considerable majority of participants (74.3%) have used AI-powered tools such as ChatGPT, Google Bard, or AI writing assistants, while only a quarter (25.7%) reported no prior use. It indicates a strong uptake of AI technologies among students and suggests not only increasing accessibility but also growing curiosity and reliance on AI in higher education (Hooson & Pratt, 2024; Ng, Leung, Chu & Qiao, 2021). Table 3 further examines usage patterns among those who reported experience with such tools. The data shows that more than half of these students use AI-powered tools on a daily or weekly basis, while nearly half use them only rarely. Interestingly, no participants reported using these tools on a monthly basis, which demonstrates that AI tool usage is polarized - students either integrate AI regularly into their routines or use it sporadically for specific tasks. The prevalence of daily and weekly use underscores the potential influence of AI tools on academic practices, shaping learning habits, study strategies, and even professional skill development. However, the combination of widespread adoption and frequent usage may also suggest emerging patterns of overreliance, which in turn raises questions about students' ability to balance AI assistance with independent critical thinking and problem-solving.

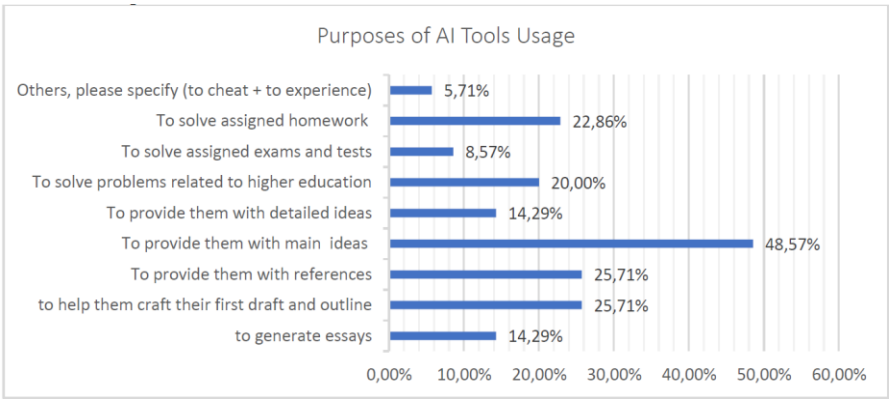

Figure 6: Purposes of AI Tool Usage

Regarding students' access to digital tools, this figure provides valuable insights into the diverse ways students utilize AI-powered tools. It reflects both the opportunities and challenges associated with their integration into academic life. The collected data report that students use these tools for legitimate academic purposes such as idea generation, drafting essays, and finding references, which suggests that AI is increasingly seen as a supportive resource for enhancing creativity, productivity, and research efficiency. This versatility demonstrates the strong potential of AI to complement students' learning processes and foster

motivation. However, the findings also reveal concerning patterns of misuse, with 24 participants admitting to relying on AI for unethical purposes, including assistance with homework, exams, and graded assignments. This duality highlights the need for clear ethical guidelines and digital literacy training to help students balance the benefits of AI while avoiding academic dishonesty. Overall, the figure underscores both the empowering role of AI in education and the critical importance of responsible usage.

4.4. Students' perception about using AI-powered tools for learning, producing, sharing and safety

TABLE 4: STUDENTS' PERCEPTION ABOUT USING TOOLS FOR LEARNING, PRODUCING, SHARING, AND SAFETY

	Strongly agree	Agree	Neuter	Don't know	Disagree
I enjoy using AI-powered digital tools.	9%	45%	18%	18%	9%
I think it is important to learn more to update my digital and AI skills.	21%	68%	6%	3%	3%
AI-powered tools improve my learning experience.	13%	56%	19%	6%	6%
AI-powered tools can enhance my creativity and productivity.	6%	48%	30%	9%	6%
AI-powered tools can enhance collaboration and knowledge sharing among students.	6%	56%	15%	12%	12%
AI-powered tools can improve independent learning.	12%	8%	52%	4%	24%
I think AI-powered technology is teaching me laziness.	18%	32%	24%	9%	18%

Concerning students' perceptions about using AI-powered tools for learning, producing, sharing, and safety, the data depicts a generally positive outlook. A majority of students express enjoyment in using AI-powered tools and recognize their potential to enhance learning experiences. A particularly strong consensus emerges around the importance of updating digital and AI skills, with nearly 90% of students either agreeing or strongly agreeing, which underscores students' recognition of the need for continuous learning in an evolving technological landscape. Furthermore, most students believe that AI can improve creativity, productivity, and collaboration, which highlights its potential to enrich both individual and collective academic practices. Yet, responses regarding AI's role in fostering independent learning are more divided, with over half of students remaining neutral and nearly a quarter disagreeing. Therefore, some uncertainty about whether AI supports true autonomy is still debatable. Additionally, a significant proportion of students (50%) express concerns that AI may encourage laziness which reflects apprehensions about over-reliance and reduced critical engagement. It is indicated that while students generally embrace AI as a beneficial learning aid, there is a clear need for structured guidance on responsible usage and ensuring that AI remains a complement to, rather than a replacement for, students' intellectual effort.

4.5. *Awareness of Ethical and Safety Implications of AI*

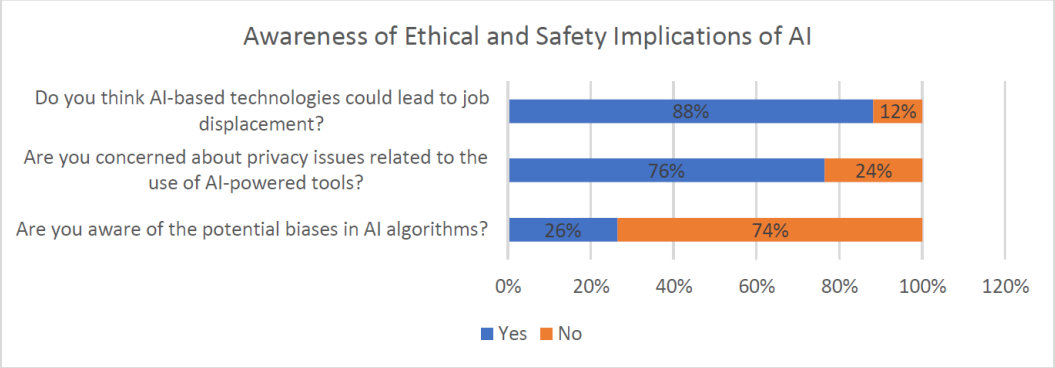

Figure 7: Awareness of Ethical and Safety Implications of AI

Figure 7 provides insights into students' awareness of the ethical and safety concerns surrounding AI technologies. The data reveal that while a substantial majority (76%) of participants recognize issues such as job displacement and privacy risks, only a minority (26%) acknowledge the problem of algorithmic bias. This discrepancy showcases that though students are generally alert to the visible consequences of AI on employment and data protection, their understanding of deeper, systemic issues like fairness, discrimination, and accountability remains limited. Such findings echo concerns raised in the literature that AI users often lack critical knowledge of how algorithmic decision-making can perpetuate inequalities (Ng et al., 2021). Consequently, the necessity for educational curricula to go beyond surface-level discussions of AI risks and explicitly address ethical dimensions such as bias detection, transparency, and responsible design.

The next Figure complements these findings by exploring the degree of trust students place in AI technologies. Despite their awareness of potential risks, students generally display a high level of trust in AI tools, which may reflect their reliance on these technologies for academic and personal tasks. This paradox—simultaneous awareness of risks yet continued trust—indicates a pragmatic acceptance of AI as both useful and indispensable in their daily lives. However, such trust, when combined with limited awareness of algorithmic bias, could make students more vulnerable to over-reliance and uncritical adoption of AI outputs. Thus, it is crucial to foster not only digital literacy but ethical literacy as well, with the intention to encourage students to balance trust in AI with critical evaluation and responsible use.

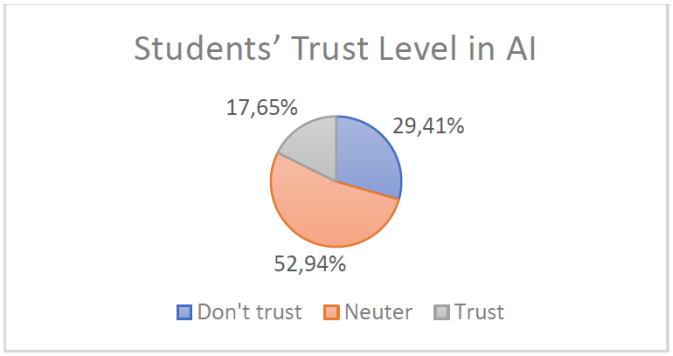

Figure 8: Trust in AI Tools

4.6. *Students' AI-based Digital Competence*

TABLE 5: STUDENTS' AI-BASED DIGITAL COMPETENCE

	Disagree	Neuter	don't know	Agree
I can use AI-powered technology to find specific information.	12.1%	33,3%	12,1%	42,4%
I can use AI-powered technology to produce anything.	34,4%	34,4%	21,9%	9,4%
I can differentiate between digital technology and AI-powered technology.	15,6%	21,9%	43,8%	18,8%
I am confident in my ability to use digital technology effectively	15,2%	45,5%	15,2%	24,2%
I can use AI-powered digital information to create my own new data by blending, adapting, applying, designing, and innovating.	12,1%	48,5%	24,2%	15,2%
I can critically evaluate information from different sources, including AI-generated content.	12,1%	42,4%	30,3%	15,2%
I have the skills necessary to identify misinformation.	31,3%	25,0%	25,0%	18,8%
I have the skills necessary to identify and address potential biases in AI-generated content.	25,8%	35,5%	22,6%	16,1%
If I identify misinformation, biases, and incorrect answers, I interact with the software and provide necessary guidance.	28,1%	31,3%	21,9%	18,8%
I am comfortable using AI-powered technology to solve complex problems.	30,3%	39,4%	15,2%	15,2%
I am comfortable using AI-powered tools to make decisions	39,4%	30,3%	18,2%	12,1%
I understand how to deal with intellectual property rights.	24,2%	30,3%	33,3%	12,1%
I help others develop their AI-powered digital competencies.	32,4%	29,4%	23,5%	14,7%
I need to develop my AI-powered digital competencies.	11,8%	29,4%	20,6%	38,2%

Regarding the participants' AI-based digital competences, the study reveals the following. 42.4% can use AI-powered technology to find specific information. Though this suggests a foundational grasp of AI's potential, the number remains respectable in light of the emerging AI paradigm. It is noteworthy that 34.4% are unsure about using AI to produce anything, urging a necessity for continued exploration of AI's creative potential. While many students (43.8%) struggle to differentiate between AI and digital technology, it's encouraging that 42.4% can use AI for information retrieval. It is revealed that there is a potential gap in understanding the underlying principles of AI. Many students (45.5%) are confident in their digital technology skills, but fewer (24.2%) are confident in using AI-powered digital information for creative purposes. Students have developed their digital literacy, but they need to bridge the gap between digital literacy and AI literacy. While 42.4% of the participants can critically evaluate information, including AI-generated content, a smaller proportion (18.8%) can identify and address biases in AI-generated content. In addition, 31.3% of students are comfortable using AI-powered tools to make decisions, but fewer (12.1%) understand intellectual property rights. Developing critical thinking skills in the context of AI is paramount, yet it should address the ethical implications of AI use. 38.2% and 32.4% of the participants recognize the need to develop their AI-based competencies and are willing to help others develop their AI-based digital competencies, respectively. Students have positive attitudes towards both improving their skills and others.

Overall, the results indicate that while students are enthusiastic adopters of AI, their engagement is uneven, with strong technical use but weaker conceptual understanding and ethical reasoning. The findings reinforce the literature advocating for multi-faceted AI literacy programs that combine technical skills, critical thinking, and ethical reflection (Ng et al., 2021; Russell & Norvig, 2016).

5. CONCLUSION

This study aimed to investigate the current state of AI literacy among students at UMP, exploring their accessibility to AI-powered tools, conceptual understanding, usage patterns, perceptions, and awareness of ethical implications. While the findings demonstrated a high level of the participants' connectivity and accessibility to AI tools and a growing interest in their applications, several areas for improvement have been identified. The higher rates of connectivity and accessibility are due to the participants' ownership of tools and the availability of AI-powered tools in the University; however, the internet speed available is respectable. The study also revealed a growing interest and reliance on AI technology, with participants using it for diverse purposes, including learning, creation, and sharing. Nevertheless, a concerning trend emerged, with a significant number of participants admitting to using AI for unethical purposes like assisting in assigned homework, exams, and texts. Other concerns are related to the overdependence on AI, which may enhance laziness. In addition, the participants' conceptual knowledge of AI was found to be limited, as they sometimes were unable to differentiate between tools and AI-powered tools. Participants expressed positive perceptions about AI's potential benefits; however, they also exhibited awareness of potential risks such as job displacement and privacy concerns. Still, their understanding of AI biases was relatively limited. Moreover, to foster responsible and ethical AI use, it is crucial to develop students' critical thinking skills purposefully oriented towards the ethical implications of AI and equip them with a deep understanding of AI's potential for both good and harm. Taken together, these findings suggest that while students are eager adopters of AI, their practices remain uneven and sometimes problematic which underscores the urgent need for a structured framework of AI literacy in higher education. Such a framework should balance technical proficiency with ethical awareness and ensure that students not only use AI tools effectively but also critically question their outcomes and implications. By promoting digital literacy and AI literacy, educational institutions can empower students to deal with the complexities of the AI-driven future and contribute responsibly to shaping it.

6. IMPLICATIONS

The findings of this study have significant implications for educators, policymakers, and technology developers. Future educational efforts should incorporate AI as a core skill within the 21st-century literacy framework, alongside traditional skills such as reading, writing, arithmetic, and digital literacy. As stated in the Literature Review, to effectively foster AI literacy in higher education, AI should be integrated into curricula through a multi-faceted approach encompassing learning artifacts, pedagogical strategies, and subject matter (Ng, Leung, Chu & Qiao, 2001, p. 6). Practically, this means introducing foundational AI concepts such as algorithms, machine learning, natural language processing, and data ethics into undergraduate programs, either as stand-alone modules or embedded within existing courses across disciplines. Ethical dimensions of AI should be explicitly taught by linking them to real-world case studies in areas like plagiarism detection, surveillance, predictive analytics, and recruitment which helps students critically examine issues of bias, transparency, accountability, and social impact. Faculty development is equally important; training workshops and professional development programs should equip educators with both technical knowledge of AI tools and pedagogical strategies for fostering critical, ethical discussions in their classrooms.

Finally, partnerships between universities and technology developers can ensure that teaching materials remain up-to-date and aligned with the evolving AI landscape.

7. Future Research Directions

Longitudinal studies can track the evolution of AI literacy over time in order to identify factors that influence AI literacy development and the impact of AI education interventions. Qualitative research methods can encroach deeper into students' perceptions and experiences with AI, providing rich insights into their attitudes, beliefs, and values related to AI. Cross-cultural comparisons can help identify universal and culturally specific factors that influence AI literacy. Regarding AI use in universities, it is not just about the use of technology itself but about the culture that is growing around it. It is not a choice anymore but a necessity for institutions to endorse the prosperities and overcome the challenges and flaws.

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