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Submission date: 03-Jun-2025 09:16AM (UTC-0700)
Submission ID: 2615197515
File name: 1._baroud_01-24.docx (351.35K)
Word count: 6689
Character count: 41986

Journal of Education and Teacher Training Innovation (JETTI)
Published by Pusmedia Group Indonesia

Journal of Education and Teacher Training Innovation
Volume 3 Issue 1 Year 2025 Pages 01-24
e-ISSN : 3025-3500
DOI: 10.61227
e-mail : jetti.pusmedia@gmail.com
https://journal.pusmedia.com/index.php/JETTI

Postgraduate students' usage patterns, perceptions, and attitudes toward artificial intelligence applications in learning: A case study of the University of Zawia, Libya

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Abstract:
This study examines the integration and impact of Artificial Intelligence (AI) applications and tools within postgraduate programs at the University of Zawia, Libya. In the context of rapid technological advancements, higher education in Arabic-speaking regions is increasingly shaped by social, economic, and religious factors. While AI is transforming global educational practices through adaptive learning platforms, virtual tutors, and personalized experiences, its adoption in Libyan universities remains limited and underexplored particularly in relation to ethical considerations and student preparedness. Employing a mixed-methods approach, this research combines quantitative survey data from 150 postgraduate students with qualitative insights to examine levels of awareness, perceptions, challenges, and usage patterns of AI tools in academic contexts. The data were analyzed using basic statistics, mainly percentages, to identify trends that support the study's objectives. By exploring how students utilize AI to enhance their academic performance, the study aims to offer practical recommendations to promote AI literacy, address ethical concerns, and align institutional policies with technological advancements. The findings contribute to the broader discourse on the role of AI in higher education, with a focus on sustainable integration and the preservation of academic integrity within Libya's educational institutions.

Keywords: Artificial Intelligence, Postgraduate Education, Learning, Teaching

Article info: Submitted : 2025-04-28 | Accepted : 2025-05-26 | Published : 2025-06-03

Introduction

Higher education in Libya developed rapidly with the introduction of many unique postgraduate programs starting from humanities and social sciences then science, economy and engineering. The University of Zawia was established in 1988 and initiated the postgraduate studies programs during the 1990s. The educational system was influenced by many social, economic and religious aspects as society, economy and religion play an essential role in Libya and other Arabic countries (Riyadi et al., 2024; Firdaus et al., 2025; Primarni et al., 2025). Thus, the need to adopt modern technologies which could improve the educational system is a necessity.

Artificial Intelligence (AI) transformed various fields of education significantly, including higher education. It becomes an essential tool for enhancing learning and

teaching processes and scientific research. AI has attracted considerable interest because of its ability to revolutionize traditional learning methods and improve students' educational experiences (Abbas et al., 2023; Masuwd et al., 2024; Elihami et al., 2024). Thus, with the continuous progress in this field, it has become possible to customize the educational process according to the needs of each student, which enhances their educational experience and makes it more interactive and effective. Moreover, AI-powered solutions such as adaptive learning platforms, virtual tutors and automated administrative processes are promoting tailored learning experiences and alleviating the burden on teachers (Kenchakkanavar et al., 2025). The positive impact of AI-based solutions in the education sector helps students get the most out of the educational process according to their individual abilities and needs.

AI offers multiple benefits to students, as it contributes to enhancing their understanding of courses, improving their learning and communication skills, in addition to simplifying the technical aspects of academic subjects (Ngonso et al., 2025). Through tools such as adaptive learning systems and smart assistants, students can interact with content in more effective ways, leading to faster and deeper comprehension of complex concepts. If a system demonstrates core capabilities such as language acquisition and translation, the generation of videos, images, and music, the collection of knowledge, and the ability to solve problems through machine learning techniques, it can be reasonably inferred that artificial intelligence AI is present (Douglas et al., 2022). Thus, AI is seen as not just a technical tool, but an integrated system capable of teaching, creating, and solving problems. By using AI in academia, it yields several advantages, including the improvement of academic performance, expanded access to diverse digital learning resources, and the promotion of personalized learning experiences (Maganga & Srivastava, 2024; Budiningsih et al., 2024; Ratnasari et al., 2025).

The University of Zawia, as one of the leading educational institutions in Libya, seeks to integrate modern technology, especially Artificial Intelligence, into educational curricula to enhance the learning experience of students and the staff alike. From this standpoint, the interest of postgraduate students has increased in employing artificial intelligence applications in to improve their learning skills. According to the studies, most faculty members have a positive attitude of AI in teaching and learning process (Baroud et al., 2024). Previous studies in this field, reveal that “AI-powered research tools are capable of automating time-consuming tasks, such as summarizing content, organizing research materials into structured documents, and streamlining the overall research process (Asongo et al., 2024). The previous literature on AI in education has primarily examined undergraduate students and faculty members in university of zawia , with limited attention to postgraduate learners' utilization of AI tools a critical gap this study addresses.

Thus, both, undergraduate and postgraduate students at the University of Zawia used AI applications to enhance their academic skills. Despite the huge benefits provided by AI applications, their use is not without negative aspects, especially with regard to privacy and ethics. Therefore, studying the impact of these applications in the higher education environment, especially postgraduate studies, at the University of Zawia is essential to understand their effectiveness and the extent of students' readiness to benefit from them sustainably.

The importance of this study comes from the increasing need to improve teaching methods in postgraduate studies in light of the accelerating digital technological changes. The continuous development of AI technologies imposes on universities the necessity of adopting educational strategies that are in line with these changes, which contributes to enhancing the efficiency of the educational process and achieving the best academic result. This study explores the use of AI applications among postgraduate students at University of Zawia, assessing their level of awareness, perceptions, and the challenges they faced regarding AI-enhanced learning. By examining how students integrate AI tools into their academic work. Also, this research will contribute to a broader understanding of the role of AI in higher education. The findings will offer valuable recommendations for improving AI literacy and ethical usage among postgraduate students, ensuring that these technologies enhance learning experiences while maintaining academic integrity.

Methodology

This study uses a mixed-methods approach, integrating both quantitative and qualitative methodologies to explore the utilization of artificial intelligence AI applications and tools in learning by postgraduate students at University of Zawia, Libya. The questionnaire survey provides a comprehensive understanding of students' perspectives, experiences, and challenges regarding AI learning tools.

The target population consists of postgraduate students enrolled in various programs at University of Zawia. The study employs a stratified random sampling technique for the questionnaire to ensure representation from different academic disciplines. A total of 150 students from diverse postgraduate programs will participate in the questionnaire.

The structured questionnaire will be created using Google Forms to gather data on students' usage patterns, perceptions, and attitudes toward AI applications in learning. The questionnaire consists of closed-ended and Likert-scale questions, covering various aspects of AI use by postgraduate students. The questionnaire link will be distributed through institutional email and student networks to ensure students' participation.

The data were analyzed using basic statistical methods, primarily through calculating and interpreting percentages. The results were presented in the form of

statements followed by analysis of these findings to identify patterns that support the study's objectives and contribute to answering its research questions.

Result and Discussion

The main goal of this study is to investigate the postgraduate students' usage, patterns, perceptions, and attitudes toward AI applications in learning at the University of Zawia. Thus, it is important to begin with a demographic overview of the study sample to provide a comprehensive understanding of the context in which the study was conducted. It is important to begin with the participants' characteristics, ensuring that the subsequent analysis is grounded on a clear understanding of who the respondents are in terms of gender, age, academic level, and field of specialization.

The study sample was distributed between males and females, to affirm diversity in responses and enhancing the comprehensiveness of the results, with females accounting for 66.7% of the questionnaire responses and males 33.3%. In terms of age distribution, the sample reflected a broad demographic spectrum. Approximately 48.7% of participants were over the age of 35, which indicating a strong representation of the experienced individuals. The middle age categories, specifically those aged 25–30 and 31–35, collectively constituted 43.3% of the respondents, while younger participants under the age of 25 represented only 8% of the total sample.

In regard to the academic level, the majority of participants were Master's students, accounting for 62.7% of the responses. Notably, over half of the respondents were in the thesis preparation phase, whether at the Master's or Doctoral level, which suggests a strong engagement with academic research processes and highlights the relevance of AI applications to both scholarly inquiry and broader learning activities. Participants also reflect a wide range of academic disciplines within the university. These included the humanities and social sciences, applied and engineering sciences, as well as economic and administrative sciences. This disciplinary diversity contributes to the richness and generalizability of the findings. However, it is worth noting the absence of responses from medical fields, which may be attributed to the recent initiation of postgraduate programs in medical sciences at the university which, at the time of data collection, had only completed a few weeks of instruction.

Questions 1: Do You Have Knowledge Of AI Applications Used in Learning?

The survey results indicate a variation in the level of knowledge among postgraduate students regarding artificial intelligence AI applications used in learning (figure 1). About 24% of the respondents reported having extensive knowledge of these applications, reflecting a strong awareness and deep familiarity with the field. Meanwhile, the largest proportion, 38%, indicated a moderate level of knowledge, suggesting partial exposure to these technologies without full proficiency in their use within the educational process. Additionally, 27% reported having limited knowledge,

highlighting the need for enhanced training and awareness about the importance of these applications. Conversely, 10% of the students stated that they had no knowledge of AI applications at all, pointing to a knowledge gap that requires educational strategies aimed at integrating such technologies into the curriculum and organizing workshops to familiarize students with the basics of AI tools.

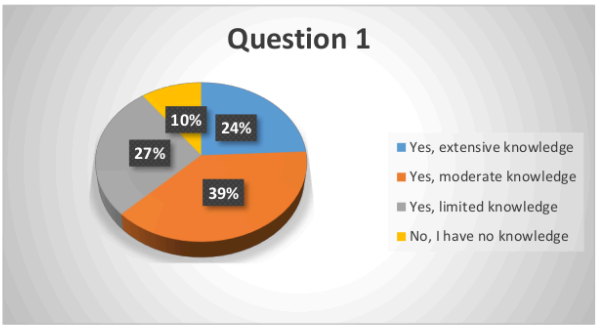

Figure 1.
Chart Illustrating the Percentage Distribution of Responses to Question 1.

Questions 2: What Are Your Sources of Knowledge About These Applications?

Moreover, the survey results reveal that most postgraduate students rely on self-directed online learning as the primary source of knowledge about AI applications in learning, with 55.3% (figure 2) selecting this option. This underscores the importance of digital resources and accessible online content in enhancing understanding of such technologies (Setyaningrum et al., 2024; Mustakim et al., 2024; Ramdhan et al., 2025). Furthermore, 50% of respondents identified colleagues and faculty members as important sources of their knowledge, indicating the role of the academic environment and social interaction in spreading awareness about AI in education. Although some training opportunities are available, only 11.3% acquired their knowledge through training courses, suggesting a need to organize more formal training programs within academic institutions. On the other hand, 12% of participants reported having no prior knowledge of AI applications, pointing to the necessity of intensified awareness and training efforts to ensure that all students can benefit from these emerging technologies.

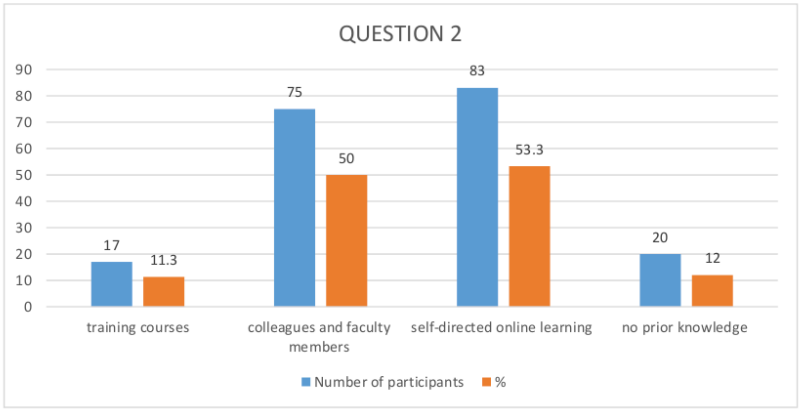

Figure 2.
Chart Illustrating the Number of Participants and the Corresponding Percentage for Each Response in Question 2.

Questions 3: Which Types of AI Applications Do You Frequently Use in Your Studies?

The survey results show that ChatGPT is by far the most used AI application among postgraduate students, with 93.3% of users indicating reliance on it in their academic work. This reflects the widespread popularity of the tool, given its advanced natural language processing capabilities, assistance in text composition, idea generation, and answering academic questions. Studies affirms that "ChatGPT demonstrates strong performance in clarity and is improving in accuracy and consistency, supervisor feedback remains superior in providing relevant, accurate, and engaging guidance." (Bouzar et al., 2025)

On the other hand, Deepseek emerged as another frequently used application, with 34.7% of respondents indicating its use, suggesting student interest in tools specialized in research and analysis. Tools for data analysis such as SPSS and Python were used by 19.3%, reflecting their importance in handling research data, especially in disciplines requiring quantitative and statistical methodologies. The use of Google Bard was reported by only 12.7%, possibly indicating lower awareness of this tool compared to ChatGPT, or a preference for more familiar applications. Grammarly was used by 8%, a relatively low figure, which may suggest less reliance on language editing tools compared to others. Finally, 8% of students mentioned using other unspecified applications, indicating that some students depend on specialized tools tailored to their particular academic needs (figure 3). These results underscore the importance of raising awareness about the diverse AI applications and their

capabilities, as well as providing adequate training to maximize their benefits in research and learning contexts. These results highlight the need to enhance awareness and training programs related to AI applications and to encourage students to explore their potential in improving educational experiences especially practical work (Baroud et al., 2024).

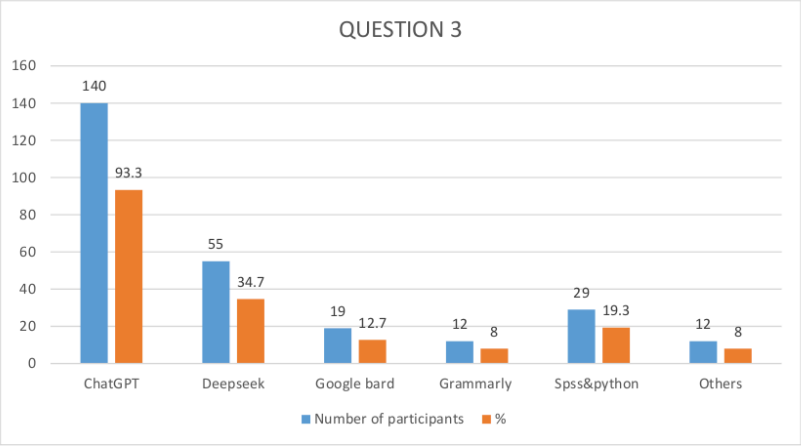

Figure 3.
Chart Illustrating the Number of Participants and the Corresponding Percentage for Each Response in Question 3.

Question 4: In Which Areas Have AI Helped You the Most?

The survey results highlight the significant role AI has played in supporting postgraduate students at the University of Zawia across various academic domains (figure 4). The most commonly cited benefit was information retrieval, with 92.7% of respondents stating that they rely on AI technologies to access information sources quickly and effectively. This trend underscores the increasing role of AI in facilitating academic research and data analysis. Additionally, 58.7% of students reported using AI to enhance their writing skills, confirming the value of these tools in improving the quality of academic output and supporting more accurate and professional text composition. The results assure that AI, "is capable of detecting grammatical, spelling, and punctuation errors in real time and making suggestions for improvement (Duong et al., 2024). 31.3% of participants noted that they use AI for reviewing and editing texts, demonstrating the usefulness of intelligent tools such as Grammarly in improving the linguistic accuracy of academic writing (Wahyudi et al., 2024; Yanto et al., 2024; Agustina et al., 2025).

In terms of solving mathematical or scientific problems, 22.7% of students utilized AI to support their understanding of technical and scientific concepts, highlighting its importance in engineering and technical fields. In contrast, the use of AI for language learning was limited, with only 8.7% reporting such use, suggesting that language acquisition still largely depends on traditional methods. Similarly, 10.7% used AI tools for time management and task organization, which may point to a lack of awareness of AI's potential in enhancing productivity through planning and organizational applications. These results indicate a need to further educate students about the broader areas where AI can contribute effectively, beyond academic writing and research, to ensure more comprehensive integration of AI into the learning process.

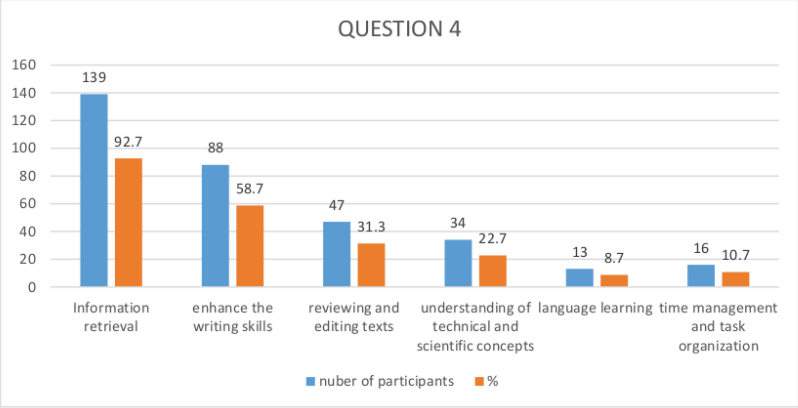

Figure 4.
Chart Illustrating the Number of Participants and the Corresponding Percentage for Each Response in Question 4.

Question 5: Do You Believe that Using AI Applications Helps Improve Your Academic Performance?

The survey results indicate that the vast majority of postgraduate students at the University of Zawia believe that the use of AI applications contributes to enhancing their academic performance, albeit to varying degrees (figure 5). Approximately 36.7% of respondents stated that AI significantly assists them, reflecting the substantial impact these technologies have on facilitating academic research, improving writing, and solving complex problems. Additionally, 48.7% reported that AI helps to some extent, suggesting that while they find it useful, it is not necessarily a complete substitute for traditional learning methods.

Conversely, 9.3% of participants felt that AI has no effect on their academic performance, possibly indicating limited usage or minimal perceived value in their academic context. Notably, 5.3% believed that AI causes problems in learning, which may stem from concerns about overreliance on technology, potential impacts on critical thinking, or diminished learner autonomy. These findings underscore the need to guide students in using AI effectively as a supportive tool, without compromising their analytical abilities and independent learning (Alouzi et al., 2025).

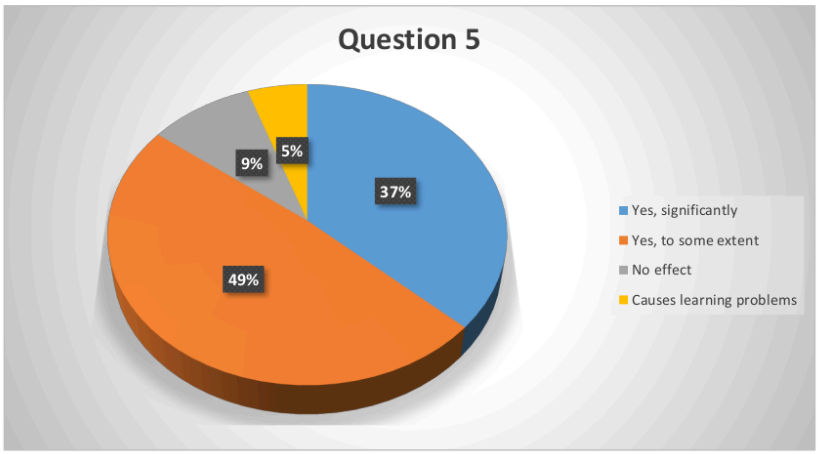

Figure 5.
Chart Illustrating the Corresponding Percentage for Each Response in Question 5.

Question 6: What Are the Main Challenges You Face when Using AI Applications in Learning?

The survey reveals several challenges faced by postgraduate students in utilizing AI applications for learning (figure 6). Academic concerns, particularly regarding integrity and ethical usage, emerged as the most prominent challenge, cited by 45.3% of participants. This reflects apprehensions about how these tools might affect research quality and independent thought, highlighting the need for clear institutional guidelines on responsible AI usage in academia (Strzelecki, 2024).

Furthermore, 26% of respondents reported difficulties in understanding how to use AI applications, indicating a pressing need for training programs and workshops to enhance students' digital literacy. Another 16% pointed to the lack of adequate resources on how to use these tools, suggesting insufficient instructional content within academic institutions. From a technical standpoint, 12.7% of students indicated problems related to poor internet access or the lack of appropriate devices, limiting their ability to effectively utilize AI technologies. These findings emphasize the

importance of strengthening digital infrastructure, providing comprehensive training, and implementing policies that promote ethical and effective AI use in educational environments.

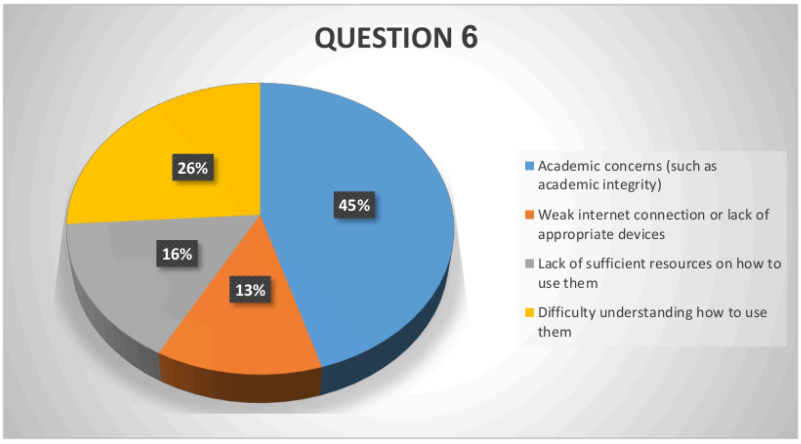

Figure 6.
Chart Illustrating the Corresponding Percentage For Response in Question 5.

Question 7: Do You Believe that AI Helps You Better Understand Academic Content?

The survey indicates that most postgraduate students believe AI contributes to a better understanding of academic content, though to varying extents (Figure 7). About 34% of respondents stated that AI greatly enhances their comprehension of scientific concepts, indicating its effectiveness in simplifying information, offering detailed explanations, and providing instant answers that support self-directed learning. The largest portion, 41.3%, noted that AI helps them to some extent, recognizing its value while still relying on traditional methods such as lectures and academic discussions. Meanwhile, 19.3% felt that AI does not significantly improve their understanding, which could be attributed to the complexity of the subject matter or the limited capabilities of certain AI tools in explaining specialized concepts. Only 5.3% stated that AI does not help at all, possibly reflecting a preference for conventional learning methods or ineffective use of AI tools. These outcomes underscore the importance of enhancing students' AI usage skills and developing more domain-specific tools tailored to diverse academic needs.

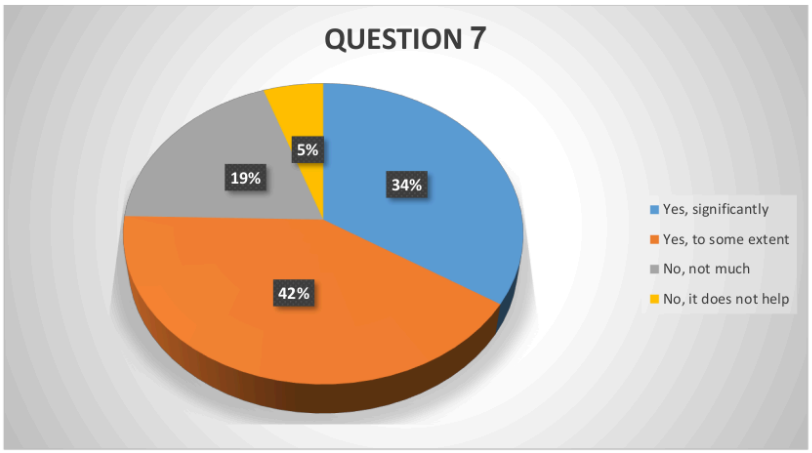

Figure 7.
Chart Illustrating the Corresponding Percentage for Response in Question 7.

Question 8: Are You Concerned that Reliance on AI Could Reduce Your Academic or Personal Skills?

The survey reveals a range of opinions among postgraduate students regarding the potential impact of AI reliance on their academic and personal skills (Figure 8). A total of 14% expressed strong concerns that using AI may diminish abilities such as analysis, critical thinking, and learning independence. Additionally, 28% shared moderate concerns, suggesting apprehension about the overuse of technology at the expense of traditional competencies.

On the other hand, 40% of participants stated that they do not believe AI reduces their skills, viewing it instead as a tool that enhances academic efficiency without replacing core abilities. Meanwhile, 18% were uncertain about its effects, indicating a need for further research into how to balance AI usage with skill development. These results highlight the importance of promoting responsible and balanced AI integration in education—one that supports rather than supplants fundamental student capabilities such as critical thinking, creativity, and autonomy (Baroud, 2024).

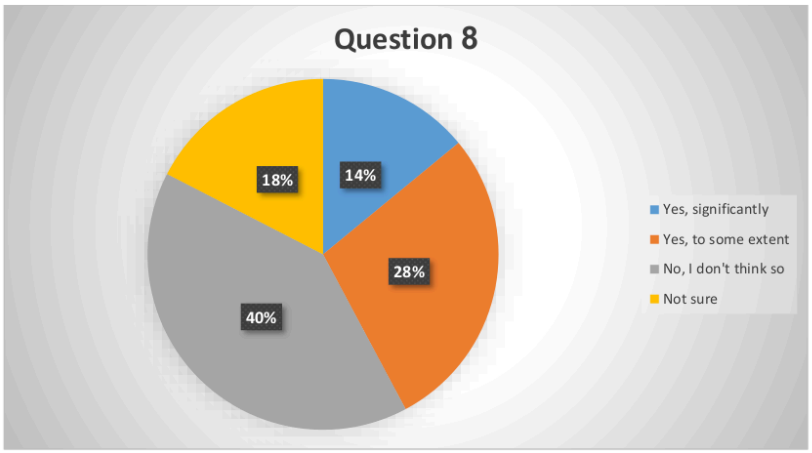

Figure 8.
Chart Illustrating the Corresponding Percentage for Response in Question 8.

Question 9: Do You Feel that AI Reduces the Importance of Interaction with Professors?

The survey results indicate a diversity of views among postgraduate students regarding the impact of AI use on interaction with professors. It includes oral communication which is very important in digital literacy as it motivates learning (Setiawan et al., 2023). Approximately 13% of respondents felt that AI significantly reduces the importance of such interactions, possibly reflecting a tendency among some students to replace academic engagement with intelligent tools that provide instant responses and detailed explanations. A further 28% believed that AI somewhat affects this interaction, suggesting a partial shift toward reliance on digital sources instead of direct engagement with faculty members.

Conversely, 34 % affirmed that their interaction with professors remains unaffected, implying that students continue to rely primarily on direct discussions and academic guidance despite their use of AI tools. Interestingly, 25 % stated that AI has improved their interaction with professors, as these technologies may help them better understand subjects beforehand, thereby enabling more in-depth and effective discussions (figure 9). These results suggest that AI may serve as a supportive tool rather than a substitute for human interaction. Thus, there is a need to strike a balance between technological utilization and preserving the academic role of faculty members in guiding and developing students' academic skills (Fatimah et al., 2023; Baroud & Aljarmi, 2025).

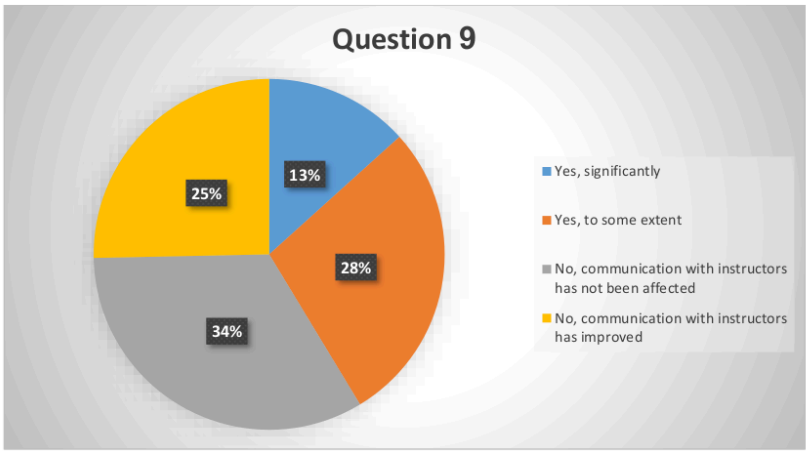

Figure 9.
Chart Illustrating the Corresponding Percentage for Response in Question 9.

Question 10: Do You Feel that AI Makes the Learning Process Less Interactive or Enjoyable?

Survey responses reveal varying perspectives among postgraduate students regarding the impact of AI on interactivity and enjoyment in the learning process. About 12% stated that learning has become less interactive due to the use of (AI) applications, potentially indicating a replacement of collaborative activities and group discussions with individual tool usage. An additional 25 % noted a partial decrease in interactivity, reflecting concerns that reliance on such tools may reduce direct dialogue and idea exchange in educational settings. On the other hand, 40% reported that AI use does not affect their engagement in learning, suggesting that many students do not perceive a significant difference in the nature of their educational experience when using these technologies. Notably, 23% of students believed that AI has made learning more interactive by offering personalized learning experiences, varied content and interactive activities such as simulations and adaptive learning environments (figure 10**)**. These findings imply that the effect of AI on student engagement depends largely on how it is implemented. When integrated in a way that supports discussions and collaboration, AI can enhance interactivity; however, overreliance on it for individual use without complementary activities may diminish engagement (Paisun et al., 2024; Hilman et al., 2024).

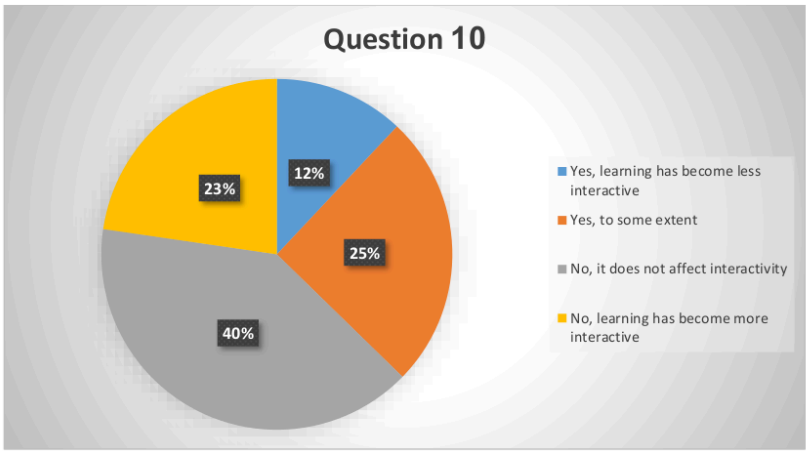

Figure 10.
Chart Illustrating the Corresponding Percentage for the Response in Question 10.

Question 11: Do You Believe that AI Tools Influence the Development of Critical Thinking Skills?

The survey results show varying perspectives among postgraduate students regarding AI's influence on their critical thinking skills. Around 13% expressed concern that AI significantly hinders their critical thinking, possibly due to excessive dependence on these tools for information and analysis instead of engaging in independent thought. A further 25% believed that AI somewhat impairs their ability to think critically, indicating an awareness of the potential decline in analytical and evaluative capacities when using these technologies without proper guidance.

Conversely, 31% stated that AI supports the development of critical thinking skills by providing access to diverse information, facilitating the exploration of multiple perspectives, and encouraging the consideration of new ideas. An additional 31% reported that they do not believe AI affects their critical thinking, suggesting a balanced approach in using these tools without undermining their analytical abilities (figure 11). These results highlight that AI's impact on critical thinking depends largely on how it is used. While uncritical use may lead to intellectual dependency and reduced cognitive effort, effective use can foster skills of analysis, comparison, and critique by providing varied information and advanced analytical tools. Therefore, it is essential to educate students on how to utilize AI as a supportive tool without replacing independent and creative thinking.

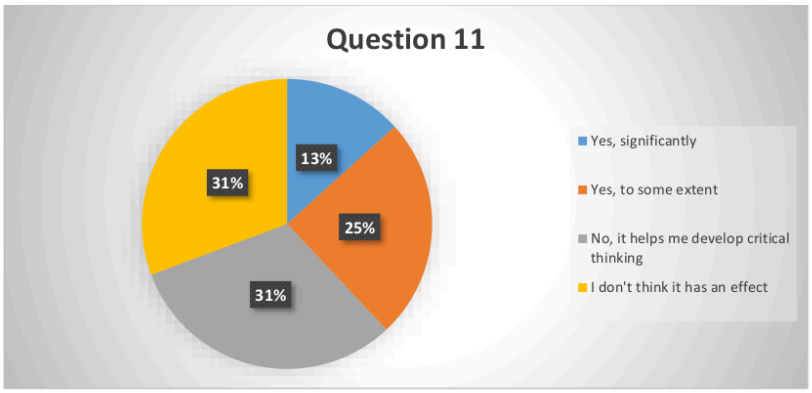

Figure 11.
Chart Illustrating the Corresponding Percentage for the Response in Question 11.

Question 12: Do You Feel that AI Tools are Compatible with All Learning Styles?

In regard to compatible with all learning styles, survey results show varied opinions among postgraduate students regarding the compatibility of AI tools with different learning styles. Figure 12 shows that around 30% of respondents believed that AI tools suit all learning styles, suggesting that these tools offer diverse content formats—textual, visual, and evaluative—capable of addressing a broad range of student needs. Deb Royet al., (2024) argues that "by enhancing learning experiences, streamlining assessments, and offering personalized education, AI-driven tools can significantly improve educational outcomes."

Meanwhile, 33% indicated that AI tools suit most learning styles, implying that while effective for some methods—such as self-directed or analytical learning—they may be less effective for socially interactive or group-based approaches. On the other hand, 27% believed that AI is suitable only for specific learning styles, indicating a perception that these tools are less useful for learners who prefer direct interaction, hands-on experiences, or applied activities. Notably, 10% of participants reported that AI tools do not suit their learning style, which may suggest a need for traditional instructional methods based on direct lectures or professor-student interaction. These findings indicate that while AI provides flexible learning solutions for many students, it may not fully replace traditional methods. Therefore, educational tools should be designed to integrate AI within interactive and blended approaches to better meet the diverse needs of learners and improve the academic experience.

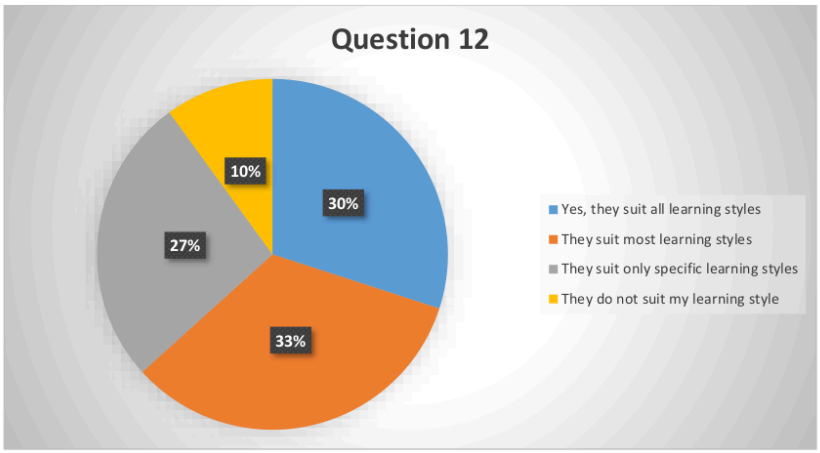

Figure 12.
Chart Illustrating the Corresponding Percentage for the Response in Question 12.

Question 13: Do You Believe that AI Reduces Your Ability to Solve Problems Independently?

The results demonstrate varied opinions among postgraduate students concerning AI's impact on their problem-solving abilities (figure 13). Around 12.7% of respondents reported that AI significantly reduces their ability to solve problems independently, which may indicate excessive reliance on these tools for solutions without sufficient personal effort in thinking and analysis. An additional 24.7% believed that AI somewhat reduces their problem-solving skills, reflecting concerns that easier access to solutions could hinder the development of creative thinking and independent academic reasoning.

In contrast, 38.7% stated that AI helps them solve problems by enabling them to analyse data, suggest alternative solutions, and provide practical models that enhance understanding and efficiency. Meanwhile, 24% of students indicated they do not use AI for problem-solving, possibly reflecting either a lack of necessity in their fields or a preference for alternative thinking and analysis methods. These findings suggest that AI can either support or hinder problem-solving skill development depending on its use. Thus, it is essential to promote a culture of responsible AI use, ensuring it complements human abilities rather than replacing them, while emphasizing the importance of nurturing students' analytical and creative thinking skills (Hamidah et al., 2024; Busthomi et al., 2024).

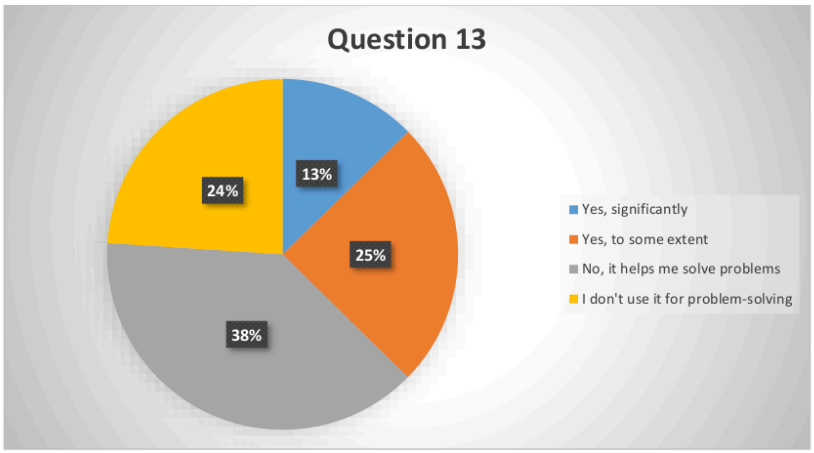

Figure 13.
Chart Illustrating the Corresponding Percentage for the Response in Question 13.

Question 14: Do You Have Concerns About Your Privacy when Using AI Tools?

Survey results indicate that privacy is a significant concern for postgraduate students when using AI tools. Figure 14 illustrates that approximately 34% of respondents expressed fears that their personal data might be exploited when interacting with such applications, reflecting anxiety over data misuse or leakage by service providers or third parties. Additionally, 24% reported partial concern about privacy, suggesting a moderate awareness of potential risks without a strong sense of immediate threat. In contrast, only 13% of respondents felt secure using AI tools, which may reflect trust in the data protection measures and encryption technologies provided, or a lack of prior negative experiences. Notably, 29% stated they had not considered the issue of privacy, suggesting incomplete awareness of data protection concerns among some users.

These findings underline the need to raise awareness about data security and privacy when using AI technologies. However, they cannot supplant the fundamental role of educators, who retain full responsibility and authority for personally educating and guiding students (Ruslan et al., 2024; Ningtyas et al., 2024; Masuwd & Baroud 2025; Abdulghani & Alrumayh, 2025). So, this can be achieved by clarifying privacy policies, offering students guidance on minimizing risks—such as avoiding entry of sensitive data—and using settings that enhance personal information protection.

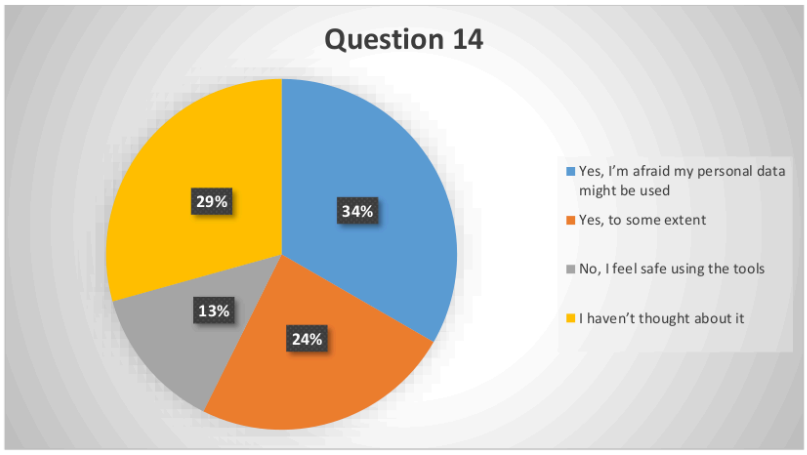

Figure 14.
Chart Illustrating the Corresponding Percentage for the Response in Question 14.

Question 15: What Type of Content Do You Prefer when Using AI to Understand Lessons?

Survey responses indicate that the vast majority of postgraduate students prefer textual and interactive explanations when using AI to understand their lessons, with 64% expressing this preference. This suggests that students seek detailed and structured content that aids in deep understanding through reading and direct analysis. By comparison, 20.7% preferred educational videos, highlighting the importance of visual content in simplifying information, especially in disciplines that require demonstrative examples or practical illustrations (Suroyya et al., 2024). Only 6% chose visual or illustrative content as their preferred learning method, suggesting that this type of content may not meet the needs of all students, though it remains useful for clarifying visual or complex concepts.

Meanwhile, 9.3% favoured quizzes and assessments, indicating that some users benefit from evaluative learning and feedback-based methods, which help measure comprehension and reinforce understanding through practice (Figure 15). These findings underscore the importance of diversifying AI-supported educational content delivery to accommodate different learning styles, with an emphasis on providing interactive and textual explanations as the most in-demand method, while supporting visual and assessment-based content as complementary tools to enhance understanding and engagement.

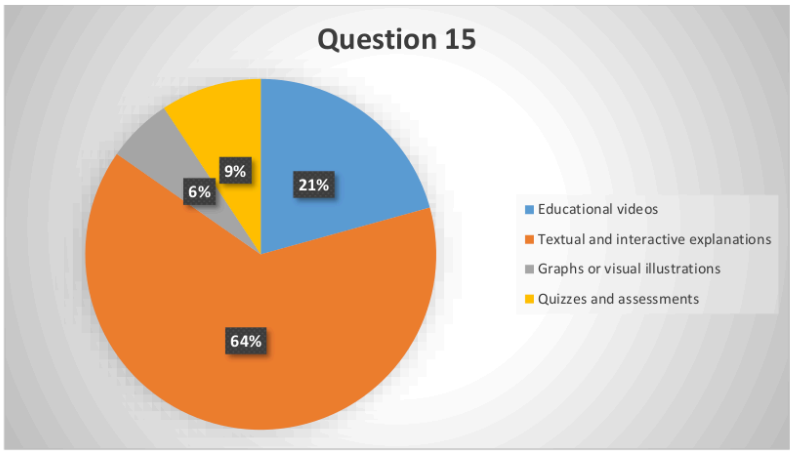

Figure 15.
Chart Illustrating the Corresponding Percentage for the Response in Question 15.

Implications and Impact of the Research Findings:

The implications of this research's findings have been summarized in Table 1, which includes the importance of artificial intelligence in the teaching and learning process in postgradude level.

Table 1.
Comprehensive Implications of AI Adoption in Postgraduate Education

Category	Implications/Impact
Practical Implications	• AI Literacy Programs: Need for structured training as only 11.3% received formal AI education • Ethical Guidelines: 45.3% expressed academic integrity concerns, requiring clear AI usage policies • Infrastructure: 12.7% reported technical barriers, necessitating institutional investments in digital resources
Theoretical Contributions	• Augmented Learning Model: Supports AI as complement to (not replacement for) human instruction • Cultural Adaptation: Highlights need for AI integration aligned with Libyan/Arab educational values • Dual Role of AI: Identifies both facilitative (92.7% for information retrieval) and disruptive aspects

Methodological Advancements	• Mixed-Methods Validation: Combines quantitative (SPSS analysis) and qualitative insights effectively • Research Gaps: Reveals need for medical field inclusion and longitudinal studies • Comparative Framework: Establishes baseline for Arab-region AI adoption studies
Stakeholder Recommendations	• Educators: Balance AI tools with critical thinking exercises (addressing 13% critical thinking concerns) • Policymakers: Develop national AI strategies addressing infrastructure (12.7% access issues) and training • Developers: Create Arabic-language, context-sensitive tools (64% prefer textual/interactive content)

Conclusion

This study underscores the transformative potential of Artificial Intelligence (AI) in advancing postgraduate education at the University of Zawia, Libya, while highlighting critical challenges tied to ethics, privacy, and institutional readiness. By employing a mixed-methods approach, the research captures diverse perspectives of postgraduate students, revealing their engagement with AI tools to streamline learning, research, and administrative processes. The findings emphasize AI's capacity to personalize education and enhance academic outcomes, yet they also caution against overlooking ethical risks and disparities in technological access.

The University of Zawia, as a case study, reflects broader opportunities for Libyan and Arabic higher education institutions to harness AI responsibly. To maximize benefits, proactive measures—such as AI literacy programs, policy frameworks for ethical use, and faculty training—are essential. Future efforts should prioritize balancing innovation with cultural and religious values inherent to Libya's educational context. This study advocates for strategic adoption of AI, ensuring it complements traditional pedagogies while fostering equitable, sustainable growth in postgraduate education. By addressing these dimensions, the University of Zawia can serve as a regional model for integrating technology-driven solutions that align with both global trends and local socio-educational priorities.

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