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Teachers' Perceptions of AI in Supporting Students' Learning within a Globally Diverse Digital Settings

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ABSTRACT

This study aims to investigate how teachers perceive AI tools in their efforts to enhance teaching practices and student learning in higher education. It examines the potential benefits and challenges of AI as seen by teachers in this setting regarding student learning. Using a quantitative correlational approach with surveys of 102 teachers in higher education institutions in four countries, Bangladesh, Malawi, Saudi Arabia, and Peru, the study found that teachers' demographics, AI familiarity, AI usage, and personalization of AI are key factors influencing AI

use in higher education. The Unified Theory of Acceptance and Use of Technology (UTAUT) served as the framework for analyzing the results, which largely show that teachers see AI as helpful in enhancing student learning. It also reveals that teachers view AI as beneficial for student learning, that familiarity with AI impacts its use, that students' use of AI is perceived as unethical, and that teachers use AI as a personal choice. The study reports a strong link between AI familiarity and perceived effectiveness (r = 0.75), meaning that more familiar individuals tend to see AI as more effective in education. It also finds a strong connection between age and perceived effectiveness (r = 0.60), and between teaching experience and perceived effectiveness (r = 0.55). This suggests that older teachers or those with more teaching experience or exposure to AI generally see AI as more effective. Successful AI integration in higher education demands teacher training, ethical frameworks, balanced pedagogical strategies, and institutional support. As AI and its integration in higher education continue to evolve, perceptions, tools, and pedagogical practices may shift, requiring ongoing longitudinal research to track changes.

Keywords: Generative AI; Teachers' training; Higher education, Digital transformation; Transformative learning

INTRODUCTION

With the release of OpenAI's ChatGPT in November 2022, the education sector experienced a significant shift in teaching and learning methods, material development, and students' academic activities (Imran & Almusharraf, 2023). This advancement in generative AI technology has significantly influenced higher education, facilitating the integration of innovations in software and hardware tools for teaching and learning (Maqbool et al., 2025; Ayanwale et al, 2025). In this way, the rapid advancement of GenAI tools and technology has influenced the higher education sector in various ways, including the acceleration of the integration of emerging digital tools, e-learning, writing tools, and virtual learning environments such as virtual reality, adaptive learning platforms, and intelligent tutoring systems. In this sense, generative artificial intelligence plays a crucial role in the teaching and learning process, notably in the higher education context. Therefore, AI's rapid advancement has affected students' skills attainment, such as critical thinking, creative writing, problem solving, and academic writing, which play a critical role in higher education success.

However, the rapid increase in the integration of AI in education has raised enthusiasm among students and teachers, as well as concerns, particularly regarding ethical and biased data issues (Iddrisu et al., 2025; Barrane et al., 2018; Imran & Almusharraf, 2024). While AI tools offer personalized learning and help improve instructional efficiency, their widespread adoption remains uneven, particularly among teachers who serve as key implementers. In higher education, students' perceptions and attitudes toward AI implementation favor utilisation of AI as a learning tool (Slimi et al, 2025). Previous studies have shown that technological paradigms regarding the manipulation of equipment in classes influence student learning (Akinoso, 2023; Zulaiha & Triana, 2023; Zhou et al., 2008). However, students and learners' acceptance alone does not guarantee effective AI integration in education. Therefore, teachers' opinions, readiness, understanding, and attitude towards AI technology and its applications in the classroom are significant.

The latest studies (Maqbool et al., 2025; Imran et al., 2024; Rashid et al., 2025; Wang et al., 2025) show that researchers and policymakers are currently concentrating on the application of AI in education to enhance teaching efficacy and personalise learning experiences. Teachers are paramount in the realm of education; hence, they play a significant role in the implementation of AI technology. Their preparation, attitudes, and beliefs significantly influence the efficacy of AI. Teachers' perspectives on the utilisation of AI vary depending on the developmental status of their particular countries, regions, and continents. Such conditions influence the professional development of these teachers. Liu and Chang (2024) found that teachers' social networks and professional experiences significantly influence their perceptions of AI utilisation in pedagogy and learning. Research indicates that educational institutions must implement support systems that foster positive emotions and enhance teachers' digital competencies, taking into account their professional experiences and ICT proficiency (Gull et al., 2020).

Moreover, many teachers experience skepticism or resistance when asked to incorporate AI into their teaching practices. The same would apply to the speed with which they can adopt and adapt to emerging technologies in teaching and learning environments. Such concerns revolve around a lack of knowledge about artificial intelligence and the resources needed to engage with it in teaching practices. These concerns also include fears of job displacement, ethical ambiguities, and uncertainty about AI's impact on students' autonomy and academic integrity.

This current study, therefore, explores teachers' perceptions of the benefits of AI in higher education, the barriers to AI adoption in higher education, and the factors influencing AI adoption

within the framework of the Unified Theory of Acceptance and Use of Technology (UTAUT). Due to the rapidly growing demand and interest in AI integration in the education sector, there is an urgent need to thoroughly examine these factors from teachers' perspectives with regard to students' learning. Therefore, this study contributes to the discussion by investigating how teachers from diverse sociocultural backgrounds perceive AI's educational value, challenges, and readiness for adoption for teaching in a higher education context. This study, therefore, aims to answer the following questions:

1. How do higher education teachers perceive the benefits of using AI tools to enhance students' academic skills in higher education?

2. What factors influence teachers' acceptance and use of AI tools in teaching in higher education?

Literature Review

Teachers' perceptions of AI are shaped by their understanding of what AI is and how it can be utilized in educational settings. Studies indicate that teachers often have limited knowledge of AI, leading to misconceptions about its capabilities and limitations (Zawacki-Richter et al., 2019). While some view AI as a tool to enhance instructional efficiency, others express concerns about its complexity and potential to enhance traditional teaching roles within a particular context (Gratz & Looney, 2020; Luckin et al., 2022; Rosenberg, 2023). Luckin (2018) proceeds by asserting how critical teachers are as agents of change and influencers of AI use in the higher education sector. However, despite faculty resistance to the adoption and use of technology in teaching in higher education (Gratz & Looney, 2020), teachers generally recognize several benefits of AI in higher education. Such benefits vary depending on the institutional, national as well as regional contexts. According to recent studies, some of the benefits of AI include personalized learning, enhanced administrative support, improved accessibility, and increased efficiency.

AI-driven tools are handy in supporting teachers in addressing individual student learning challenges (Holmes et al., 2019; Major et al., 2021; Opesemowo, 2024a, 2024b). AI tools are enablers to the creation of individualised learning spaces, enabling students' self-paced learning (Singh, 2024). AI is therefore an opportunity for teaching and learning in the higher education sector for student-centred learning (Whalley et al., 2021). If these opportunities are developed in a flexible (or agile) way, there is a high likelihood of enhancing personalized learning. Furthermore, studies by Maqbool et al. (2025), Imran et al. (2024), and Kühnberger et al. (2020) show that AI can automate routine tasks, such as grading and attendance tracking, allowing

teachers to focus more on instruction. This is an indication that in an era marked by the rapid evolution of technologies (Popkova & Gulzat, 2019; Ahmad et al., 2022), AI makes a significant contribution to the enhancement of student learning by supporting the management of a teacher's routine tasks enabling easier workload management by teachers (Hashem et al., 2024).

Along with the numerous benefits and facilitations, AI has particular concerns and challenges for teachers. Recently published literature (Bashir et al., 2025; Al-Omari et al., 2025; Wardat et al., 2025; Rashid, 2025) acknowledges the transformative potential of artificial intelligence in teaching and learning. Several key obstacles hinder its widespread adoption, notably insufficient training and professional development, ethical and privacy concerns, and institutional and cultural resistance. A considerable number of teachers report feeling ill-equipped to incorporate AI into their instructional practices, primarily due to limited access to targeted training and ongoing professional development (Tondeur et al., 2020). Despite the wide variations in training and professional development strategies and practices in higher education institutions, exacerbated by regional and global digital divides, a significant number of authors in the field of digital education lament that insufficient training and professional development are a significant barrier to the adoption of AI in higher education.

On the other hand, teachers express concern about various issues, including data security, algorithmic bias, and the potential for AI technology to be used for negative purposes, such as spying on students (Williamson & Eynon, 2020). Teachers in colleges and universities also do not want to employ new technology in the classroom too regularly (Holloway, 2025). Teachers are highly concerned about new technology, which includes the risk of computers replacing their employment (Szontagh, 2025), and the notion of losing control or ownership over information, which has long been viewed as teachers' property (Kuhlen, 2016).

Research in low- and middle-income countries highlights challenges related to budgetary constraints and inadequate digital literacy, whereas studies in high-income countries focus on professional development and advanced technology infrastructure (Khalid et al., 2022; Kalima, 2023). Similarly, in their recent study, Yusuf et al. (2024) emphasized that the availability of resources at various social levels is not equal. Therefore, the limited availability of multicultural perspectives regarding the importance and use of AI in higher education should be considered. Understanding of these discrepancies is essential for developing context-specific interventions.

To support the analysis and discussion, this study used the Unified Theory of Acceptance and Use of Technology (UTAUT) theory. This theoretical framework was used to analyse teachers' perceptions and the potential impact of AI in education. UTAUT is frequently applied to study teachers' attitudes toward the adoption of technology AI (Shalzad et al., 2024). Figure 1 illustrates how the UTAUT model was used to explain teachers' perceptions towards acceptance of AI in teaching.
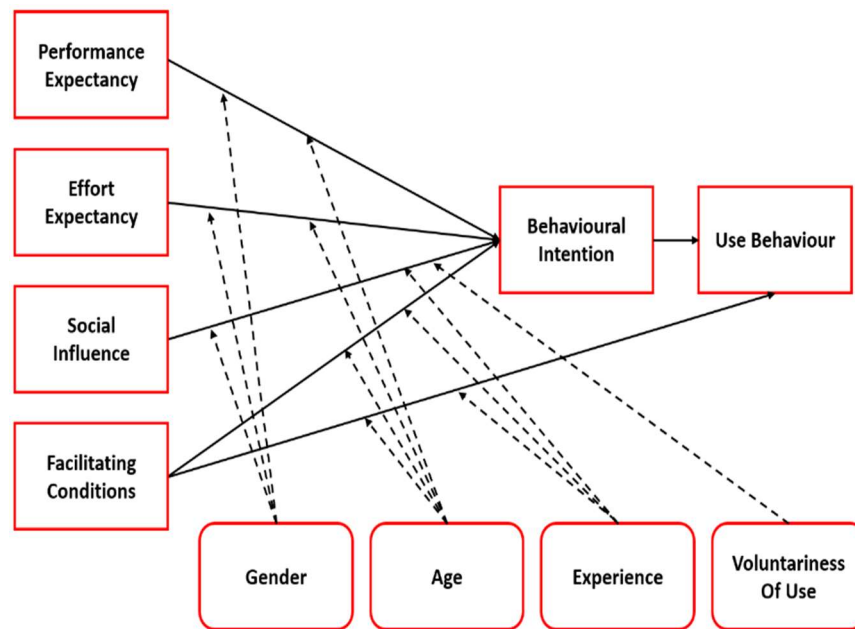

Figure 1: UTAUT Model (Venkatesh et al., 2003).

As UTAUT has become a widely used framework for examining teachers' perceptions of adopting and using emerging technologies in teaching, such as artificial intelligence (AI) (Shalzad et al., 2024), we utilized this framework to support our findings and discussion sections in seeking answers to the two research questions; *how do higher education teachers perceive the benefits of using AI tools to enhance students' academic skills?* And *what factors influence teachers' acceptance and use of AI tools in higher education?*

Guided by the UTAUT model, it is expected that teachers' gender, age, and experience will influence their perceptions of the benefits of AI in their teaching roles. The UTAUT model also suggests that performance expectancy (serving the purpose), effort expectancy (ease of use), social influence, and facilitating conditions of higher education institutions would equally influence the adoption of AI.

Methodology

The research process was developed in the context of teachers' perceptions about AI in higher education for the development of student skills, integrating researchers from four countries (Bangladesh, Malawi, Saudi Arabia, and Peru) representing diverse perspectives on the use of AI in higher education.

Research Design

This is a quantitative study designed to investigate teachers' perceptions of AI integration in higher education for the development of students' skills vis-à-vis student learning. The data were collected from the teachers working in higher education institutions from four countries, as previously stated, through an online survey form using Google Forms.

Design Instruments

The survey questionnaire was designed to include both Likert-scale and closed-ended questions to collect information from teachers regarding their familiarity with AI, their perceptions and attitudes towards the use of AI, the benefits of AI, potential challenges experienced when using AI, and the most important ethical concerns in using AI.

Data Collection

The survey data were collected from 102 teachers from four countries: Bangladesh, Malawi, Saudi Arabia, and Peru, representing diverse academic and sociocultural backgrounds. The teachers volunteered to participate in this project. All participants were actively engaged in teaching at the higher education level. The participants were purposively sampled.

All ethical and formal approvals were obtained before data collection. Informed consent was obtained from all participants to ensure confidentiality, voluntary participation, and the safety of privacy and personal data. For ethical approval, this project received ethical approval from the Institutional Review Board (IRB) of Daffodil International University, Bangladesh. This IRB reviewed the questionnaire items and approved the data collection procedures and ensured the authors' adherence to ethical research standards.

Findings

The study aimed to investigate teachers' perceptions of the impact of AI on students' academic skills. The study aimed to answer the following research questions: *How do higher education teachers perceive the benefits of using AI tools to enhance students' academic skills? And what factors influence teachers' acceptance and use of AI tools in higher education?*

Responding to the research question *How do higher education teachers perceive the benefits of using AI tools to enhance students' academic skills,* figures 2 to 7 present the demographics and usage of AI teaching in higher education.

Demographics and usage of AI in higher education teaching and learning (figures 2 to 7)
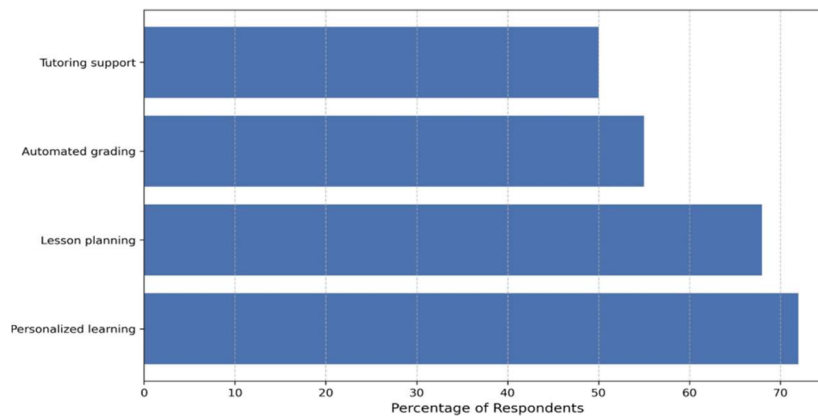

Figure 2: Primary Applications of AI in Classrooms.

Figure 2 indicates that although AI use is popular as a teaching tool among educators, it is still primarily used on an individual level or scale. This possibly shows that AI tools are new teaching and learning resources that require high awareness and teacher training or sensitization (Plattner et al., 2024). While some teachers are familiar with AI and recognize its potential, its everyday use in teaching remains limited and personal (Plattner et al., 2024). Equipping educational systems with AI capabilities allows both teachers and students to benefit from personalized and adaptive support (Alam & Mohanty, 2023). Plattner et al. (2024) emphasize the importance of carefully integrating AI into education to ensure it enhances rather than replaces traditional teaching methods and that any challenges are addressed thoughtfully.
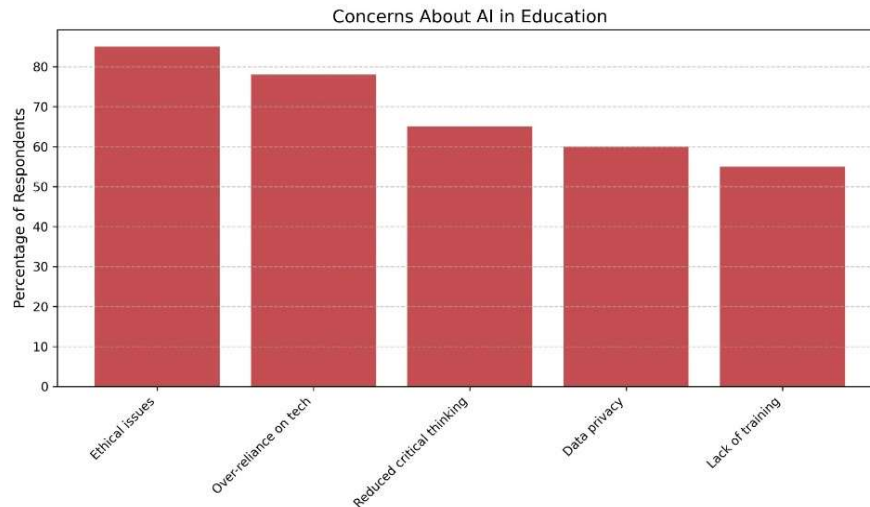
Figure 3: Concerns About AI in Education.

As noted in Figure 3, overreliance on AI is a significant concern associated with AI. Relying too heavily on technology can negatively impact students' critical thinking and motivation (Plattner et al., 2024). The other concern raised about AI use in teaching and learning is ethical issues. Salloum (2024) indicates data privacy, algorithmic bias, the impact on student and teacher autonomy, and accountability as major ethical concerns in the use of AI.
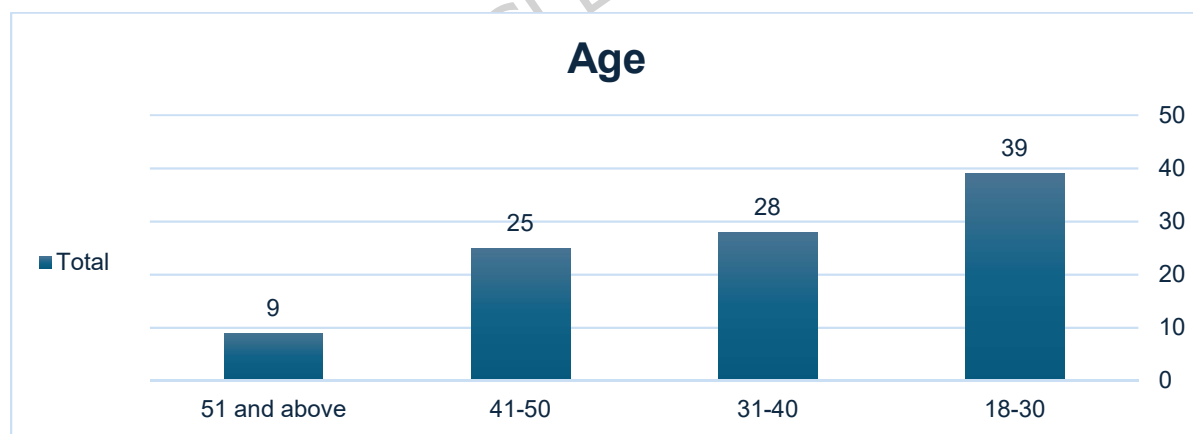

Figure 4: Teachers' Age Range.

Going further with Figure 4, the majority of the respondents were younger teachers (ages 18 to 30). However, it would be premature to conclude that younger generations are more receptive to the adoption of new technologies such as AI than older teachers. The nature of respondents in this

regard plays a bigger role in determining the results. However, studies by Sahari (2024) confirm AI familiarity as a main factor influencing AI adoption and use rather than age.
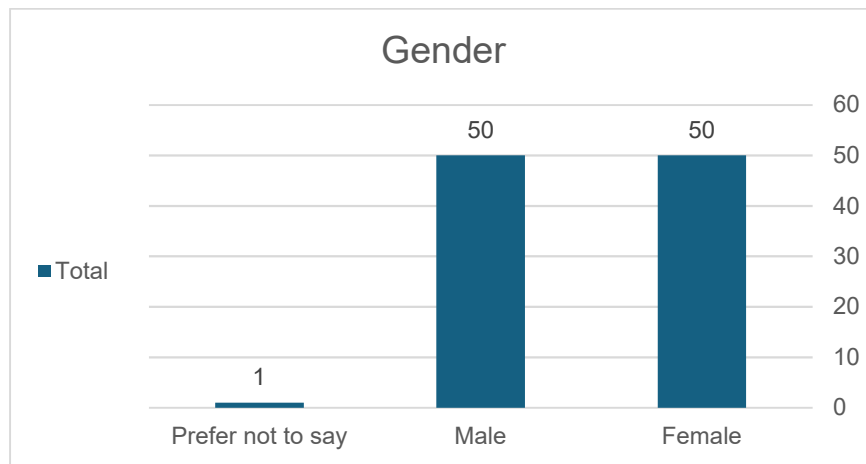

Figure 5: Teachers' gender by response.

Figure 5 illustrates that gender is not a significant factor in determining the use, acceptance, and adoption of AI. As earlier alluded to by Sahari (2024), in Figure 7, AI familiarity would equally be regarded as a significant factor influencing AI adoption, use, and acceptance rather than gender.
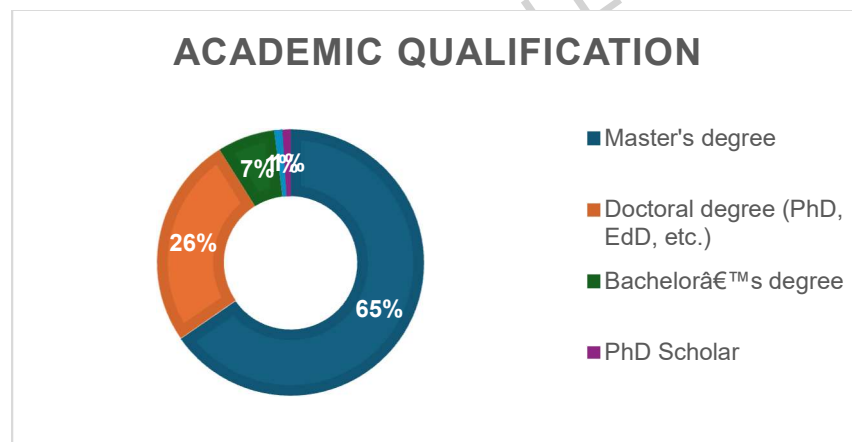
Figure 6: Academic Qualification.

Figure 6 shows that the majority of the respondents (65%), according to qualification, were master's degree holders. This perhaps signals that they are emerging scholars and researchers who have the hunger and motivation to pursue further studies.
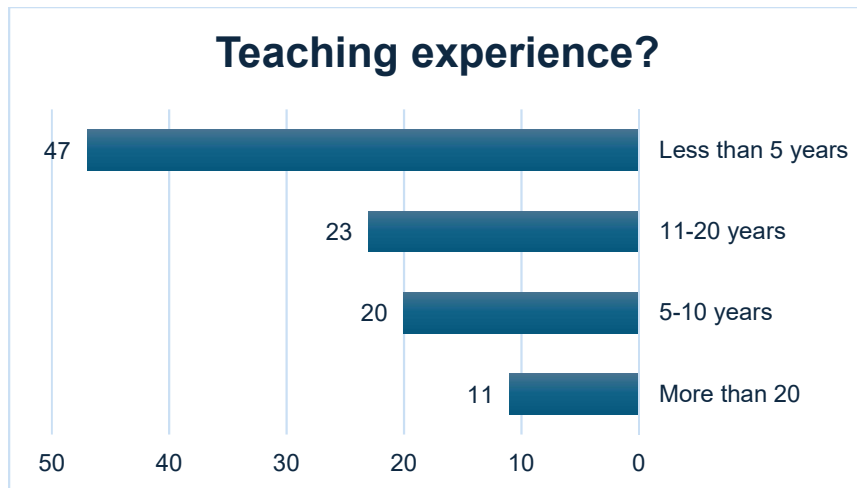
Figure 7: Teachers' professional experience

Going further with Figure 7 shows that teachers who are in the early years of their career progression with less than 5 years of teaching experience were reported to be higher (47 out of the 102 respondents) in using AI tools.

The following sections of findings, *Familiarity and usage of AI in teaching and learning (figures 8 to 12) and Personalization and usage (figures 13 and 14)* respond to the research question: *What factors influence teachers' acceptance and use of AI tools in higher education?*

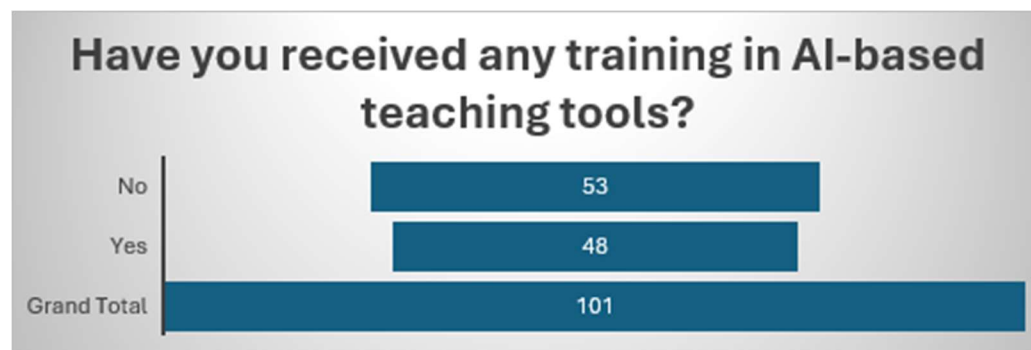*Familiarity and usage of AI in teaching and learning (figures 8 to 12)*

Figure 8: AI Training Level

Figure 8 indicates training as one way of getting AI skills that would help higher education teachers apply the technology in teaching and learning. Conversely, an equally significant number of respondents indicate that they had training in AI.
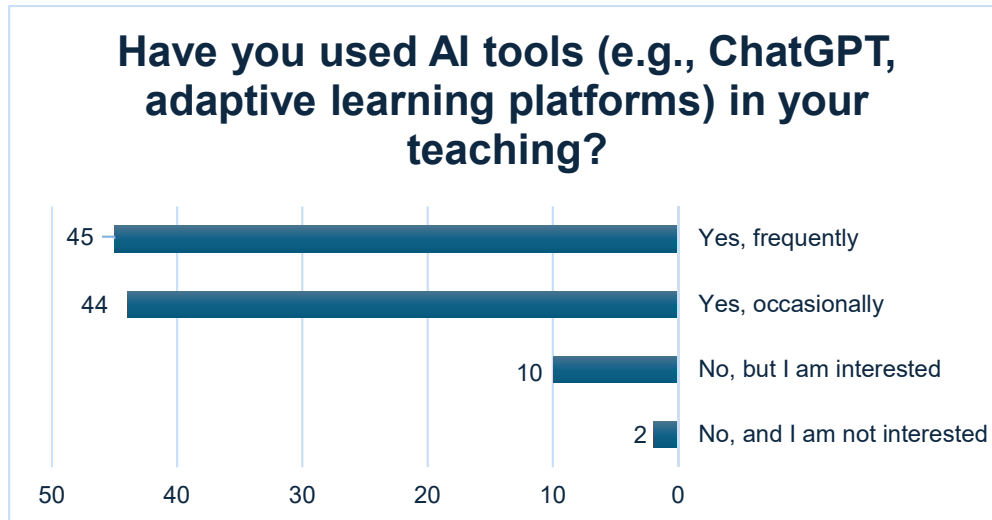

Figure 9: Teachers' Level of AI Usage

Although the majority here indicated having used AI in teaching frequently (45 out of the 102 respondents), there were still many users (44 out of the 102 respondents) who did not use it frequently. This is evidenced in the majority having received no training in the use of AI in teaching and learning (see figure 8).
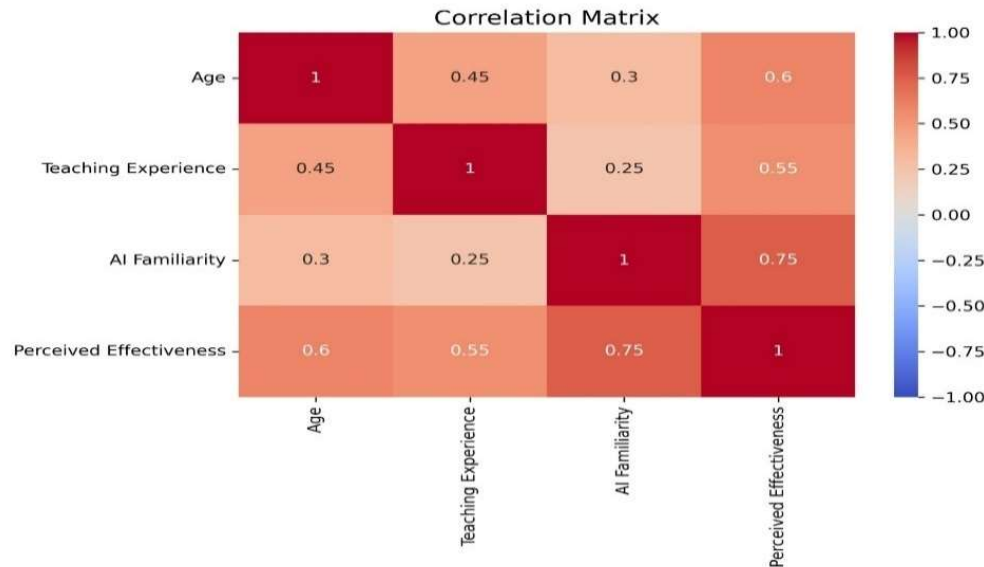
Figure 10: Correlation Matrix.

The correlation matrix in Figure 10 provides insight into the relationships between Age, Teaching Experience, AI Familiarity, and Perceived Effectiveness of AI in education.

AI Familiarity and Perceived Effectiveness demonstrate a strong positive correlation (r = 0.75), indicating that individuals who are more familiar with AI tend to perceive it as more effective in educational contexts. Age (r = 0.60) and Teaching Experience (r = 0.55) also show moderate positive correlations with Perceived Effectiveness. This suggests that older individuals and those with more teaching experience generally view AI as more effective, though to a lesser extent than those who are more familiar with the technology. A moderate positive correlation (r = 0.45) exists between Age and Teaching Experience, reflecting a natural association where older individuals typically have more experience. Correlations between Age and AI Familiarity (r = 0.30), as well as Teaching Experience and AI Familiarity (r = 0.25), are weak, indicating that familiarity with AI is not strongly dependent on age or teaching experience.
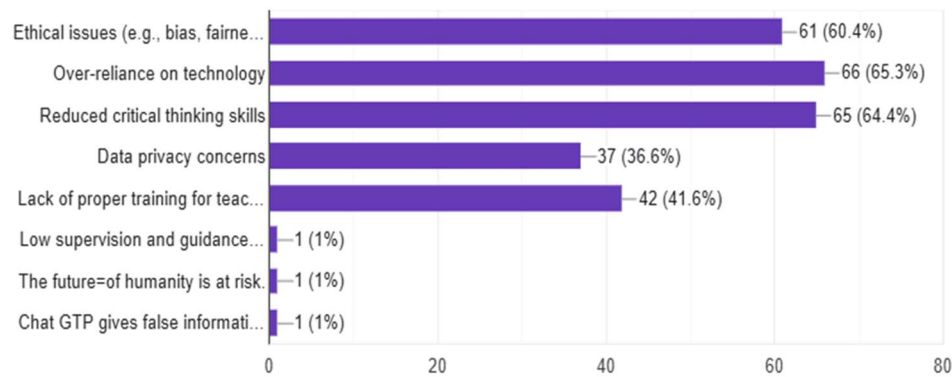
Figure 11: Teachers' biggest concerns regarding AI in education.

Despite ethical issues (60.4%), the teachers showed that over-reliance on technology (65.3%) is the biggest concern. A decline in critical thinking skills (64.4%) was also regarded as a significant concern regarding AI use in education.
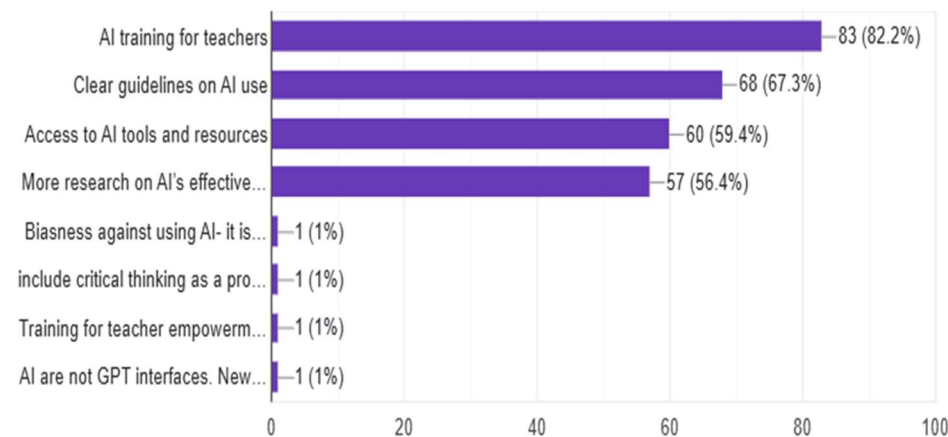

Figure 12: Effective AI integration in education

Figure 12 highlights teachers' opinions regarding how they can effectively use AI technology and tools in their daily tasks to impact quality education as follows; AI training for teachers (82.2%), clear guidelines on AI use (67.3%), access to AI tools and resources (59.4%), and more research on AI's effective use (56.4%).

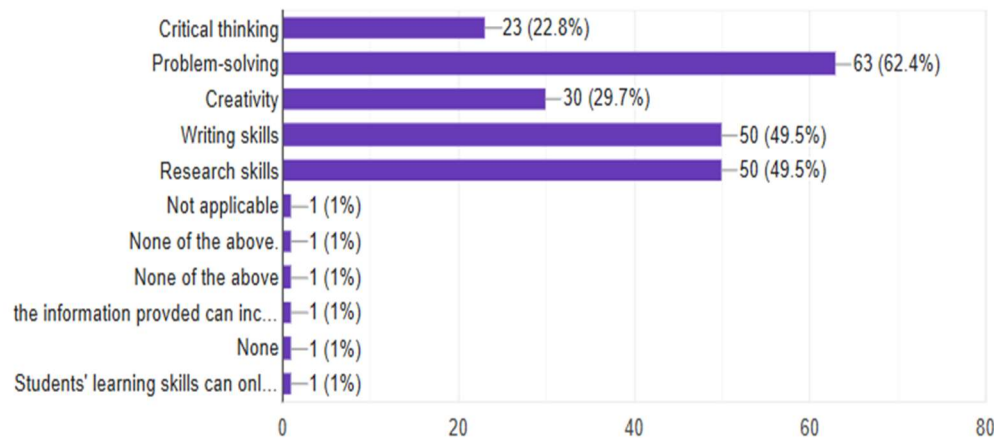*Personalization and usage (figures 13 and 14)*

Figure 13: Students' skills that teachers think AI can improve the most.

However, for the students' skills development, as Figure 13 illustrates, problem-solving is at 62.4%, writing skills at 49.5%, and research skills at 49.5%.
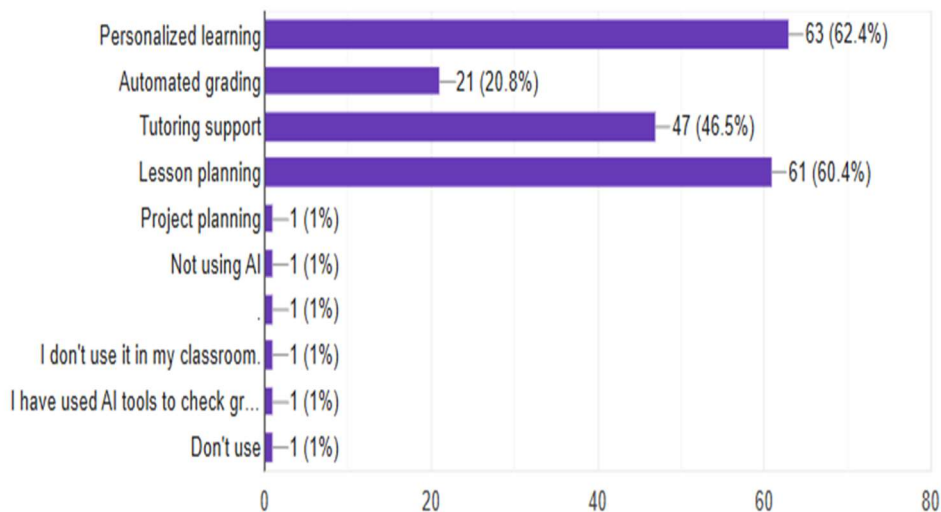

Figure 14: Teachers' primary application of AI in the classroom.

Figure 14 shows that teachers mainly used AI for personalized learning (62.4%), lesson planning (60.4%), and tutoring support (46.5%).

Discussion

A clear understanding has been derived from the findings of the current research regarding teachers' ideas, views, and perceptions of the impact of AI on students' academic skills, along with some influential factors for AI acceptance, as well as the use of AI tools at the tertiary level of education. After all, teachers acknowledge both the possibilities of AI in enhancing instructional practices and in strengthening their academic proficiency, especially in the development of critical thinking, problem-solving, contextual learning, writing, and research. In fact, their pattern of AI tools use is remarkably personalized, or highly individualistic, based on their interest, familiarity, training and issues related to the pedagogical and ethical implications of AI integration.

The first finding (from the figures 2-7) based on demographic figures highlights that though AI tools are getting popularity and visibility in the tertiary level of education, the use of the tools are still in the primary phase of higher education, except for the younger teachers and those with fewer years of professional training and experience. The above scenario echoes with the view of Plattner et al. (2024), who reported that the pattern of AI adoption tends to emerge initially among the teachers who showed the early-adopter tendency or who joined the profession at the same time frame when AI technologies enter into the education environment or ecosystem. However, the data summarized from the aforementioned questions of the questionnaire challenge the presupposition that gender and/or age inherently limit the rate of AI adoption, showing instead that familiarity rather than the demographic ingredients determines the pivotal role aligning Sahari's (2024) findings that both the competency and exposure outweigh age-oriented differences in adopting technology in higher education. The feature is radically changed by the contribution of the Master's degree holders as they with their inspiring spirit often try to explore and exhibit their true passion for both teaching and research with the help of AI tools.

One of the prime findings from the data set is that AI familiarity necessarily foretells powerful positive perceptions regarding the impact of AI (r = 0.75), which is more influential than teaching experience and age. This view particularly strengthens the current literature by showing that both the teachers' knowledge, skills, and confidence along with AI tools, remarkably help shaping their pedagogical application (Alam & Mohanty, 2023). Though there is a strong link, the research result shows significant gaps in terms of teachers training (Figure 8), that lead the motion towards inconsistent usage patterns (Figure 9). These figures of lacking in structured occupational development limits both the scale and quality of AI integration with a view that due to insufficient

training, the use of AI tools can not be placed either in mainstream or reforming resources in teaching and research in tertiary level education.

On a crucial point, teachers' pessimistic view towards AI tools has been marked as findings of the research. Students' blind-dependency, ethical unawareness, significant deterioration in the development of their creativity and critical thinking (figures 3 and 11) are their particular concerns behind the perspective. According to Salloum (2024), this anxiety of the respective teachers is common around the globe which revolves round the challenge of violation of data privacy, algorithmic bias, and most importantly, distraction in human-created innovative pedagogy. Plattner et. al. (2024) supported an approach saying that AI can never replace cognitive effort but as a scaffold AI can enhance both problem-solving and inquiry. The necessity of framing AI is underscored thinking that AI may destroy the ability to think critically.

Associated with all these concerns, AI improves student learning, especially in problem-solving and personalized learning, which shows optimism regarding AI's potential (Figures 13 and 14). This is consistent with global studies noting that AI's strength lies in adapting feedback, pacing, and content to individual learners' needs, which emphasizes personalized learning. AI also helps with lesson planning and tutoring support, demonstrating the technology's emerging role in both instructional design and facilitation, as announced by some teachers. These roles placed AI for the betterment in the broader education landscape as an assistant to simplify the huge task responsibilities of a teacher.

From the teachers' data of this research, it has been acknowledged that some AI implementations, like clear guidelines, training, accessibility to resources, and more intensive research, can help them to become confident in using AI tools (Figure 12). Furthermore, aligning these with a proper policy framework, institutional support, and progressive professional development can direct teachers' way to a sustainable intellectual journey. Without thoughtful, structured support, AI will remain poorly utilized and inconsistent both locally and globally.

In this study, there is an integration of effective pedagogical implications for the use of AI in tertiary-level education. The mutual connection reveals that proper teacher training is indispensable for harmonizing AI tools in teaching and learning and pedagogy. Inconsistent use of AI among teachers results from a lack of structured professional development, which limits the

benefits of AI, such as instructional planning, personalized learning, and formative assessment. After all, AI should be used as a supportive tool, functionally keeping in mind that AI is never a substitute for teachers' expertise, which saves time and enables teachers to facilitate more quality teaching by engaging them in a more interactive environment and by implementing innovative pedagogy.

In fine, the study concludes showing that age and teaching experience, like demographic factors, usually never determine the rate of AI adoption. Hence, context-oriented, inclusive training is essential for all the teachers regardless to the background. To conclude, the research puts emphasis upon the role of proper policy making, appropriate infrastructure (institutional) development as well as suitable AI integration policy to ensure that both teachers and learners are equipped and strengthened to create a progressively transformed digital education landscape.

CONCLUSION

The research concludes with a view that teachers' perception about AI adoption is not a simplified statement, rather a complex concept generated by accommodating reflection from their cognitive, psycho-motor, and affective domains along with their experience and support system from the surroundings. In general, AI potential is credited to bring revolutionary changes in education but to ensure optimum results by proper acceptance, use and adoption of AI tools, massive obstacles to be overcome. A good number of teachers cherish the potential of AI and its impact in developing students' skills, both academic and future professional. Findings from the research exhibit that teachers' familiarity with and acceptance of AI predict the perceived effectiveness, as only the people who are proficient in the use of AI tools and are taking ongoing professional training can flourish successfully in the future.

Research data from the response of the teachers showed both concerns and challenges regarding the use of AI tools. On one side, they are more concerned about students' over-reliance on AI tools, the anxiety of reducing students' critical thinking, and some ethical issues during generating AI content, data privacy, and biased data output.

On the other hand, the results showed that the readiness of the institution is crucial in implementing AI successfully in the tertiary level of education. Usually, sufficient infrastructure,

technology-aided laboratories, and specialized training are essential for a smooth transition. In addition to that, proper AI usage planning and policy making, and positive leadership are the preconditions. It is challenging to cope with the ever-evolving educational ecosystem, teachers, and the front-line workers of the education system. The teachers are expected to be equipped with AI tools and be the facilitators with versatile teaching philosophy, techniques, and pedagogy. This transition among teachers is fundamental to this AI transition era. They need to be the instructional designers and ethical gatekeepers to train and save students to meet the future challenges. In this connection, future research planning may be how to bridge knowledge gaps, ethical issues, and by providing needs-based and upgraded training to empower the teacher to encounter the AI era successfully.

The research study showed that impactful AI integration in the academic horizon requires more than mere use of available AI tools. An effective AI integration in higher education demands appropriate teachers' training, contextual pedagogical strategy, proper ethical framework and institutional support. It is obvious that AI as well as its integration in tertiary level education continues to evolve, thus, perceptions, pedagogical practices, tools may also shift. Hence, there comes the requirement of continuous longitudinal research for tackling the changes. These will justify the ongoing policy making and continuous professional development in higher education institutions.

Recommendations

This study has provided an insightful understanding of teachers' perceptions about AI and its tools for the students' skills development. Therefore, based on the findings, actionable recommendations are proposed as follows.

First and foremost, institutions should develop interactive AI tools training modules for teachers with a variety of academic backgrounds. These programs must include pedagogy and ethics that extend beyond technical applications.

Second, clear and enforced AI use standards in teaching, student work, and evaluation are necessary to ensure academic integrity, transparency, and accountability particularly in low-resource institutions. Educational officials must prioritize digital equity.

Third, infrastructure and internet investments are necessary for regional AI deployment. It is recommended that teachers utilize, develop, and contextualize AI instruments. Participatory

design guarantees that tools are consistent with local curricula, student needs, and cultural norms. In order to effectively navigate AI-integrated classrooms, future teachers should incorporate AI literacy and ethics into their training at an early stage.

Finally, encourage the implementation of ongoing research and monitoring. Institutions should conduct longitudinal research on the impact of AI on academic honesty, student engagement, and teaching. This has the potential to enhance policies and plans in real time and encourage the implementation of reflective AI practices. Facilitate the reflection of AI experiences, the discussion of best practices, and the resolution of issues in teacher professional development programs.

Declarations

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