

How AI Tools are Accepted and Utilized in Academia: A Mixed Methods Study

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ABSTRACT

This mixed methods study investigates the factors influencing the acceptance and utilization of Artificial Intelligence (AI) tools among students and associates in a higher education institution, using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The study employed a cross-sectional design with an embedded parallel mixed-methods approach. A total of 298 students and 56 associates from a private college in the Philippines voluntarily answered the study's online survey. It reveals that students and associates are highly familiar with AI and utilize it for various academic tasks, with performance expectancy and facilitating conditions identified as the primary drivers of acceptance. The findings underscore the importance of comprehensive training, transparent AI governance, and ethical guidelines to foster responsible AI integration in academia. The study also discusses the ethical considerations surrounding AI's use in education, emphasizing the need for responsible implementation to maximize its benefits while minimizing potential risks.

Keywords: Unified Theory of Acceptance and Use of Technology (UTAUT), Mixed Methods Study, Artificial Intelligence, Higher Education

INTRODUCTION

Artificial intelligence (AI) has rapidly transformed various sectors, and education is no exception (Madyatmadja et al., 2021). Although still emerging in education (Bimalendu, 2023), AI holds immense potential for personalizing learning, providing feedback, and automating tasks (Dignum, 2021; Tanveer et al., 2020). This can empower teachers to focus on creative instruction and student support (Mohammad & Saheal, 2023). Studies show that AI instruction fosters trust, self-confidence, and analytical skills, crucial for critical thinking (Irfan, 2023; Muthmainnah et al., 2022). However, ethical considerations regarding privacy, bias, and impact on values require careful attention (Baskara, 2023). Hence, integrating AI into education requires focusing on its benefits and potential drawbacks. Understanding stakeholder perceptions of AI tools is critical for navigating ethical concerns and maximizing the positive impact of technology on learning (Funmi & Xu-Sheng, 2020; Rusandi, 2023). This potential is rooted in significant advancements AI has made in recent decades.

AI has transformed society significantly since its emergence in the 1950s. Advancements like machine learning and deep learning have fueled this revolution, enabling computers to learn and improve (Suram & Namatherdhala, 2022). ChatGPT, a powerful natural language processing (NLP) system developed by OpenAI, exemplifies this progress (Jianyang & Yijia, 2023). This generative pre-trained transformer model can hold human-like conversations because of its extensive training on vast amounts of text data, and it continuously developing for more applications (Dis et al., 2023). It also can be applied in

various fields, including healthcare (Kothari, 2023) and education (Sallam et al., 2023). However, concerns regarding the accuracy and potential for plagiarism necessitate ethical considerations (Aljanabi, 2023; Boschee, 2023). Despite these ethical concerns, the potential benefits of AI, particularly in education, are too significant to ignore.

AI offers diverse educational benefits, including personalized learning platforms, intelligent tutoring systems, and automated assessment tools (Salas-Pilco & Yuqin, 2022; Zheng & Badarch, 2022). These tools aid in mathematics, foreign languages, and K-12 settings (Akgun & Greenhow, 2021; Bronwyn, 2023; Pokrivčáková, 2019). However, again, the authors emphasized that the ethical considerations regarding data privacy and algorithmic bias require careful attention (Berendt et al., 2020; Lydia et al., 2023). Additionally, effective AI integration involves teacher training, proper curriculum alignment, and addressing potential job-displacement anxieties (Dubey et al., 2022; Pucchio et al., 2022). This means responsible use of AI is paramount for maximizing educational benefits (Akgun & Greenhow, 2021). While AI's benefits in education are clear, its acceptance in the academic community is another matter.

Integrating AI into education relies on stakeholders' willingness to adopt it (Clark-Wilson et al., 2022). The Unified Theory of Acceptance and Use of Technology (UTAUT) model provides a framework for understanding this acceptance. It identifies the key influences on technology adoption, including social circles (Social Influence), access to resources and support (Facilitating Conditions), perceived ease of use (Effort Expectancy), anticipated benefits (Performance Expectancy), and data privacy concerns (Perceived Security) all play a role. By understanding these factors through UTAUT, educators and policymakers can integrate AI to maximize its potential within educational settings (Azalan et al., 2022). Though the UTAUT model provides a comprehensive understanding of AI acceptance in education, it also highlights areas that require further exploration.

AI in education is an emerging field with several gaps in research. Limited research has been conducted on using AI to support education, highlighting the need for further investigation (Westman et al., 2021). More research is needed on AI chatbots and their applications in educational contexts (Yu-peng & Yu, 2023). The utilization of AI in teaching management and evaluation, such as intelligent teaching management and assessment systems, also requires closer examination (Zhang et al., 2023). Despite the long-standing concept of improving education through AI, its practical application in educational settings remains limited (Biswas, 2023). Given the current state of AI in education, there is a pressing need for more comprehensive and diverse research.

In general, AI has made a significant impact on various sectors, including education. It has personalized learning, provided feedback, and automated tasks. AI's advancements, such as machine learning and deep learning, have driven societal transformation. Despite ethical concerns, the potential benefits of AI in education, including personalized learning platforms, intelligent tutoring systems, and automated assessment tools, are significant. However, the acceptance and integration of AI in education depend on stakeholders' willingness to adopt it, as outlined in the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Despite AI's potential in education, there are research gaps, particularly in using AI to support education, AI chatbots in educational contexts, and AI's utilization in teaching and evaluation. These gaps highlight the need for further investigation.

AI has begun to transform how we live, work, and learn, particularly in education, using AI tools to enhance learning outcomes, personalize instruction, and automate various tasks.

However, there is still a limited understanding of how students and academic staff in higher education utilize and accept these AI tools. Therefore, this study aims to address several issues, including the general knowledge of students and educators about AI, their use of AI tools in academic tasks, and their acceptance of AI tools in terms of social influence (SI), facilitating conditions (FC), effort expectancy (EE), performance expectancy (PE), and perceived security (PS).

METHODS OF RESEARCH

This section addresses the research questions by discussing the research design and participants. Additionally, it delves into the data-gathering instruments and procedures and outlines the data-analysis procedure.

Research Design

This study employed a cross-sectional design with an embedded parallel mixed-methods approach (Hall, 2020). An online survey questionnaire was used to investigate the usage and acceptance of AI tools among students and associates. The questionnaire primarily used a quantitative approach, employing Likert scale items to measure the frequency of AI tool usage and the factors influencing their acceptance. However, open-ended questions were embedded throughout the survey to understand the participants' experiences and perspectives better. These questions, such as "If you are familiar with the AI tools mentioned above, but you do not use them, please explain why?" and "Describe how you use the different AI Tools you know.", aimed to explore the more nuanced understanding of their usage of the AI tools present. This mixed-methods approach allows for a more comprehensive exploration of AI tool usage and acceptance by combining quantitative data on the frequency and influencing factors with qualitative insights into the reasons behind their usage or non-usage. The qualitative data was analyzed using thematic analysis to identify key themes and patterns.

Research Participants

This study involved 298 students and 56 associates from a private higher educational institution in Manila. The sampling method used was convenience-voluntary sampling during the third term of the academic year from 2022 to 2023. Participants from various colleges, programs, and centers were invited to answer the survey to ensure diversity. As shown in Table 1, most student participants come from Digital Arts and Information Technology Management, comprising 25.17% and 24.83%, respectively. The remaining students are distributed across various fields, including Environment and Design (16.44%), Hospitality and Tourism Management (14.43%), Visual and Performing Arts (9.06%), Deaf Studies (5.03%), and Diplomacy and Governance (4.70%). Among the associate participants, the majority (80.35%) are teaching staff, while 19.65% are non-teaching staff.

Table 1 Distribution of participants by program and role

Students		
Program/Role	Frequency	%
Digital Arts	75	25.17
Information Technology Management	74	24.83
Environment and Design	49	16.44
Hospitality and Tourism Management	43	14.43
Visual and Performing Arts	27	9.06
Deaf Studies	15	5.03
Diplomacy and Governance	15	4.70
TOTAL	298	100
Associates		
Teaching Staff	45	80.35
Non-teaching Staff	11	19.65
TOTAL	56	100

Data Gathering Instrument

Quantitative and qualitative data were collected using a researcher-developed survey questionnaire. The questionnaire consisted of several components: a cover letter explaining the survey's purpose, a data privacy notice outlining participants' privacy rights and the information to be gathered, a consent form, and questions regarding participants' demographic information, such as degree program for students, age range, academic roles, highest academic degree for associates. Additionally, the survey included questions about the participants' frequency of use of various AI tools, open-ended questions to gather qualitative feedback on their experiences, and UTAUT-based Likert scale questions to measure their acceptance of AI tools.

Furthermore, the survey form comprised a section aimed at understanding the use of various AI tools by students and teachers. The participants indicated the AI tools they used to generate the quantitative data. Additionally, open-ended questions were included to facilitate further exploration and capture of qualitative data. Participants responded to a 20-item Likert scale questionnaire based on the Unified Theory of Acceptance and Use of Technology (UTAUT). Derived from the dimensions of Social Influence (4 items), Facilitating Conditions (4 items), Effort Expectancy (4 items), Performance Expectancy (4 items), and Perceived Security (4 items), this questionnaire aims to explore participants' acceptance of AI tools, providing quantitative data. The reliability analysis of the UTAUT questionnaire yielded a high-reliability coefficient, with a Cronbach's alpha of 0.90. It included open-ended follow-up questions to elicit qualitative insights.

Data Gathering Procedure

After obtaining ethics approval from the institution's research office, the survey questionnaire was administered using Google Forms, with separate versions tailored to teachers and students. Questionnaires were distributed via email, which provided a link for participants to access and complete the survey. The respondents were students and faculty members. The data collection period spans July, corresponding to the academic years from 2022 to 2023.

Before proceeding with the questionnaire, participants must complete a consent form. This form provided detailed information on the potential benefits and risks of participating in the study. It also emphasizes the confidentiality of their data and specifies the duration for which the data will be retained. Notifying the researchers informed participants of their right to withdraw from the study at any time.

Data Analysis

After the data cleaning process, the quantitative data were analyzed using descriptive statistics. Demographic information and identification of AI tools were presented as percentages, providing a clear overview of the sample characteristics. The responses to the acceptance questionnaire, which was based on the UTAUT model, were analyzed using measures such as the mean and standard deviation to understand the central tendency and variability of the data. Additionally, differences in acceptance between associates and students were explored by computing ANOVA. To facilitate this analysis, the Likert-scale data were transformed using Rasch analysis, which converts categorical data into interval data, making it suitable for parametric tests such as ANOVA. The data analysis process employed WINSTEPS Version 5.2.2.0 and IBM SPSS ver. 27 software tools.

The qualitative data collected from the open-ended questions were analyzed using an open coding approach to identify codes and develop themes aligned with them, which provided further insights into the quantitative findings. This process involved systematically categorizing and organizing the qualitative data to reveal the underlying patterns and themes. Qualitative analysis was conducted using the MaxQDA Analytics Pro ver—2020 software.

A joint display integrates or mixes the results. To interpret the findings, the framework proposed by Fetters (2020) was utilized, which includes four possible combinations of fit: concordance when the findings align, expansion when the findings go beyond the initial interpretation, complementarity when the findings differ but share a central idea, and discordance when the findings conflict or contradict each other.

RESULTS AND DISCUSSION

The following sections present the results of data analysis. We begin by discussing the students' and associates' understanding of AI, followed by their usage and acceptance of different AI Tools.

Students' and Associates' Common Knowledge of Artificial Intelligence (AI)

This paper presents the results of a study that aimed to assess the understanding of AI tools among students and associates, academic staff, and faculty in the context of education. This study used quantitative and qualitative data.

Table 2 shows the joint display of the common knowledge of students with AI. The first column of the joint display table shows the quantitative results indicating whether the participants knew about AI. The second column presents the qualitative findings that reveal how well they understand AI. The last column displays meta-inference, which shows the integration or fit between the quantitative and qualitative findings.

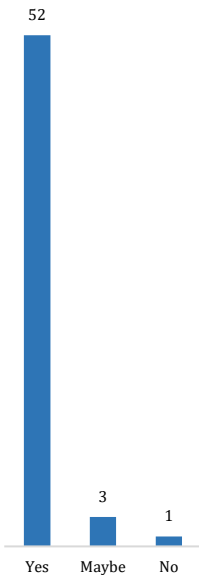
Table 2 Joint display of students' level of familiarity and understanding of AI Tools

Quantitative Findings (Students' Familiarity with AI)	Qualitative Findings (Themes of AI Understanding)	Meta-inferences								
Do you know what Artificial Intelligence is?  <table><caption>Quantitative Data: Familiarity with AI</caption><thead><tr><th>Response</th><th>Count</th></tr></thead><tbody><tr><td>Yes</td><td>267</td></tr><tr><td>No</td><td>20</td></tr><tr><td>Maybe</td><td>11</td></tr></tbody></table>	Response	Count	Yes	267	No	20	Maybe	11	Complex and rapidly evolving field <i>"It's "machine learning." Basically, the computer program can learn from the input given to it and progress its development and evolve on its own. From my limited knowledge, a lot of them use "data sets," which means the program needs to be fed from preexisting content or information." - S157</i> The tool with the potential to benefit or harm society <i>"AI also raises important questions about ethics, privacy, and how to ensure it benefits society as a whole." - S272</i> Simulation of human intelligence <i>"Simulation of human intelligence through machines — where machines can replicate and process information like humans do (excluding emotions)" -S024</i> Tool to make our lives easier <i>"It is a program that is flexible on doing tasks and can help you with anything."-S012.</i>	Expanding—The students seem to have a good grasp of the basics of AI. Their inclination to say "yes" probably comes from acknowledging that AI is a constantly evolving field. They also seem to understand its potential to benefit and harm society and see it as a simulation of human intelligence. Expanding - Some students have a more advanced understanding. Many answered "yes" because they mentioned "machine learning" and "data sets." This suggests that some students have a better understanding of AI. Expanding—However, some students struggle to define AI precisely and only describe it as a technology that simplifies how we manage our lives. Yet, that is the function of all technology, not only AI.
Response	Count									
Yes	267									
No	20									
Maybe	11									

Based on the results, quantitative analysis revealed substantial familiarity with artificial intelligence (AI) among the student population, with 267 out of 298 demonstrating awareness. However, a minority of 20 students reported unfamiliarity, and 11 expressed uncertainties. Qualitative exploration identified four primary themes in the students' understanding of AI. First, they perceived AI as a complex and dynamic field, exemplified by one student's description of machine learning in which programs learn and adapt based on input. Second, students acknowledged AI's potential for positive and negative societal impacts, highlighting ethical and privacy concerns. Third, they viewed AI as a simulation of human intelligence, primarily focusing on cognitive abilities rather than emotions. Finally, students recognized AI as a tool to facilitate their daily lives. Meta-inferences suggest that, while students possess a fundamental understanding of AI, comprehending its broader applications beyond technical domains remains challenging.

On the other hand, Table 3 displays how the associates understand AI. The first column shows their confidence in understanding AI, the second column presents how they understand AI, and the meta-inference shows the integration of the two data types.

Table 3 Joint display of associates' level of familiarity and understanding of AI Tools

Quantitative Findings (Associates' Level of Familiarity with AI)	Qualitative Findings (Themes of AI Understanding)	Meta-inferences								
Do you know what Artificial Intelligence is?  <table border="1"><thead><tr><th>Response</th><th>Count</th></tr></thead><tbody><tr><td>Yes</td><td>52</td></tr><tr><td>Maybe</td><td>3</td></tr><tr><td>No</td><td>1</td></tr></tbody></table>	Response	Count	Yes	52	Maybe	3	No	1	Simulating human intelligence <i>"Artificial Intelligence (AI) is a technology that makes machines think and learn like humans. – A017</i> Task automation and decision-making <i>"AI can aid in making everyday school and office transactions easier and workable" – A018</i> Data-driven intelligence and learning <i>"...the program needs to be trained like a person to recognize relevant stimuli that fit its processing framework and then react within certain parameters. The intelligence component comes from the sub-routines that allow the program to identify relevant stimuli from its training, and to identify relevant reactions also from its training." - A027</i> Concerns and potential risks <i>"AI can give incorrect answers, sometimes invents information but presents it as a fact. This may facilitate the creation and spread of fake news and make it hard for people to know what is actually true." – A012</i>	Expanding- Many of your associates are well-versed in the principles of AI. This is evident not only in the high number of individuals with knowledge of AI but also in the themes identified. They demonstrated a nuanced understanding of AI's core principles, such as its ability to mimic human intelligence, its potential for practical applications in automation and decision-making, its capacity to learn from data, and its potential risks, such as spreading misinformation. Discordance— Despite the majority's familiarity with AI, four responses, one "No" and three "Maybe," may indicate a lack of confidence but demonstrate familiarity with the qualitative response.
Response	Count									
Yes	52									
Maybe	3									
No	1									

The analysis of the associates' self-perceived knowledge of AI revealed a high degree of familiarity, with 52 out of 56 demonstrating engagement with the concept. Only four individuals exhibited uncertainty or unfamiliarity. Further qualitative exploration illuminated four key themes in the associates' understanding of AI. First, they perceived AI as a technology mimicking human intelligence, empowering machines to "think" and learn in a human-like fashion. Second, they recognized its practical applications in automating tasks, augmenting decision-making, and streamlining everyday operations. Third, they grasped AI's data-driven nature of AI, necessitating training for recognizing relevant stimuli and reacting within established parameters. Finally, concerns arose regarding the potential risks associated with AI, particularly the dissemination of misinformation. Although the associates' general familiarity with AI was evident, nuances remained. Some associates expressed limitations in confidently discussing and describing AI on their own.

Students' and Associates' Usage of AI Tools

This part of the study presents how students and associates use AI tools in everyday tasks. We presented each available AI tool and asked respondents about the frequency of usage of the predetermined AI tools and how they used them.

Table 4 is also a joint display that presents students' usage of AI tools. The first column displays the quantitative results, indicating the frequency of predetermined AI tools to aid their academic tasks. The second column presents the qualitative results, demonstrating how they used the tools and sample responses. The third column shows the integration between quantitative and qualitative results.

Table 4 Joint display of students' frequency and usage of AI tools

Quantitative Findings (AI Tools and Frequency of Usage)	Qualitative Findings (Themes of AI Tools Usage)	Meta-inference
Legend: - I use it everyday - I use it twice to thrice a week - I use it once a week - I use it only if the need arises - I know this tool but I don't use it - I don't know this tool	Writing and editing assistance <i>"I use the AI tools for proofreading my works such as essays, paragraphs, and narratives."- S033</i> Problem-solving and conceptualization <i>"I use Chatgpt for generating ideas, and lately I've been relying on it to do my assignments."- S043</i> Language learning and translation <i>"I use it mainly for academic help or to translate a foreign language word I don't understand." - S021</i> Lack of a clear need <i>"I have heard of it like Bard and Duolingo, but the need to use it is still not coming to me." - S028</i> Preference for human-generated work <i>"Yes, I am familiar with them; however, I do not use them because I usually prefer doing and learning things my own way." - S041</i> Lack of trust or confidence <i>"They said Bing uses unreliable articles and for Chatgpt, it is just that a lot of people I follow on Twitter disagree with it." - S091</i>	Concordance—According to the students' feedback, the most used AI-powered tools are Grammarly, Quillbot, Google Translate, and Duolingo. These tools are used primarily for writing and editing assistance, language learning, and translation. Some students also use ChatGPT for problem-solving and conceptualization purposes. Expanding - On the other hand, many students are unfamiliar with most of the AI tools available or are aware of them but do not use them. According to their qualitative responses, the reasons for this are that they do not see a need to use them, they still prefer to do their tasks manually, and they do not fully trust the accuracy of AI-generated outputs.

The joint display presents the usage of various AI tools that include quantitative and qualitative data with meta-inferences. The quantitative section shows the diverse range of AI tools used, such as Quillbot, Speechify, Grammarly, and ChatGPT, along with their usage frequencies. Many students are unaware of AI tools, while others know about them but do not use them. The qualitative data, enriched by students' quotes, delves into the thematic nuances of AI utilization, encompassing tasks such as writing assistance, language learning, problem-solving, and conceptualization. Notably, some users prefer human-generated work or harbor reservations regarding the accuracy of specific tools. The meta-inferences effectively combine these findings and highlight students' general receptiveness to AI tools while acknowledging the persistence of manual task preferences due to concerns regarding accuracy and control.

Table 5 presents the joint display for the associates' usage of AI tools. The first column shows the frequency of usage of the pre-identified AI tools available, while the second column shows the themes of how the associates use AI tools. Lastly, the meta-inference shows how the identified themes are supported by or expanded by the frequency.

Table 5 Joint display of associates' frequency and usage of AI tools

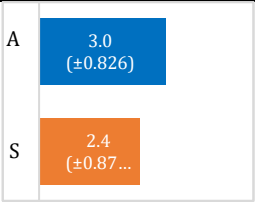
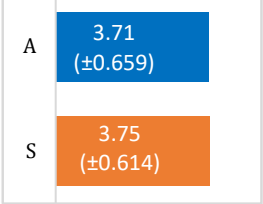
Quantitative Findings (AI Tools and Frequency of Usage)	Qualitative Findings (Themes of AI Tools Usage)	Meta-inference
Legend: - I use it everyday - I use it twice to thrice a week - I use it once a week - I use it only if the need arises - I know this tool but I don't use it - I don't know this tool	Grammar and language assistance <i>"...the sole purpose of it is for correction of grammar and sentence construction for email correspondence." – A021</i> Content generation <i>"I normally use it to get different ideas when I sometimes encounter a creative block." – A045</i> Exploration of pedagogy <i>"...also explores different suggested exercises I can do in the classroom to be able to diversify my teaching methodologies." – A045</i> Lack of a clear need <i>"I may be aware of AI tools, but I choose not to use them due to reasons like not needing them." – A017</i> Lack of knowledge <i>"Some of the tools are not familiar to me that is why I have not used them." – A044</i> Ethical and trust issues <i>"I don't believe in using AI tools specifically if they exist to replicate existing works. I believe it's theft and cheating to do so." – A046</i>	Concordance— Grammarly and Google Translate are frequently used AI tools. Associates use these tools to check the grammar of their written work, such as emails. On the other hand, some users rely on ChatGPT, Bing, and Bard to generate content, explore new ideas related to their task, and discover alternative teaching techniques. Expanding—Some of the AI tools presented to the associates were unfamiliar, while some were known, but they had no intention of using them. The primary reason is the lack of a clear need to use these AI tools, leading to insufficient knowledge of how to use such AI tools. Additionally, some associates have ethical concerns regarding using AI tools, making it difficult to trust them.

The analysis showed that associates were using different AI tools. Quantitative data indicated that many associates were using translation and grammar tools like Google Translate and Grammarly, while Bing and Bard were less popular but still known to some. Qualitative information revealed that people used these tools for various reasons, including language support, content creation, and pedagogical exploration. However, there were hindrances to the broader adoption of AI tools, such as unclear needs, lack of knowledge, and ethical concerns. Despite Grammarly's popularity, associates were looking for specific features in other tools, showing the need for clearer purposes. While some AI tools were recognized, they were not being used much because associates were unfamiliar with how to use them, did not see a clear reason to use them, or had concerns about trust.

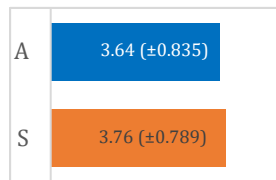
Students' and Associates' Acceptance of AI Tools

The section detailing the acceptance of associates and students in utilizing AI tools is presented in Table 6 and consists of four columns. The first column presents the quantitative findings, showing the levels of acceptance for both associates and students, along with the F and p values, to determine whether there was a significant difference in their perceptions of each UTAUT construct. The second column highlights the selected themes and their responses to qualitative findings. The third column displays the meta-inference resulting from the quantitative and qualitative findings.

Table 6 Joint display of students' and associates' acceptance of AI Tools

Quantitative Findings	UTAUT Constructs	Quantitative Findings
Social Influence (SI)		
 F=1.942 P=0.164 Not Significantly Different	Perceived Utility <i>Some see them as beneficial for personalized education and efficiency. – A017</i> Academic Integrity Issues <i>Others think AI learning is terrible as the results are not always accurate, and some consider it cheating when explicitly referring to generative AI, such as ChatGPT. I do not experience pressure from them to use AI, but Grammarly is the only AI I use, which I see teachers commonly recommend to students. – S017</i>	Concordance—Students and associates perceive the degree to which their social circles influence their use of AI as neutral. This indicates that others' opinions on AI do not significantly influence them. Associates have a slightly higher SI score, as they have been exposed to the benefits of AI tools through discussions with fellow associates. In contrast, students have a slightly lower SI value, which may be attributed to the academic integrity concerns associated with using AI tools. Expanding—However, there is a special case when teachers may influence students' decisions to utilize AI in their academic tasks. It is always a norm to trust teachers, especially in class.
Facilitating Conditions (FC)		
 F=0.306 P=0.581 Not Significantly Different	Institutional Support <i>NO, other AI sites are blocked by network administrators. – A021</i> <i>.... using the technology optimally entails a cost (for subscription, hardware, software, or internet connectivity). If needed, I believe that the College will allocate resources judiciously. – A040</i> Resource Accessibility <i>I have all the necessary access to AI tools, free or paid. I have a laptop, a cellphone, and an iPad. I have good internet at home and have an above-average level of digital literacy. – S021</i>	Concordance — Both groups acknowledge the availability of the required resources and support to utilize AI efficiently. Nevertheless, associates report a slightly lower level of FC, which could be attributed to the fact that some AI tool websites are inaccessible on the school's internet network, and there is no provision for subscription to AI tools. On the other hand, students perceive they have all the necessary resources to access the AI tools they use or need.

Effort Expectancy (EE)



F=0.090 P=0764
Not Significantly Different

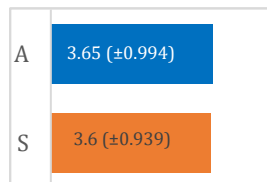
Ease of Use

It would be easy to use AI tools if it has few features and does not take time to explore different areas. I think it might take a few minutes to learn how to use AI. - A047

If I'll rate it from 1-10, I would say 9/10. I think for people my age, it will just take minutes to learn how to use AI tools for learning. - S040

Concordance — Both students and associates typically find AI user-friendly and accessible to learn. Some respondents, associates, and students, are confident to become proficient in the AI tool within minutes.

Performance Expectancy (PE)



F=11.945 P=<0.001
Significantly Different

Aid in Teaching

Yes, AI tools can help the academic community to engage in effective teaching. - A012

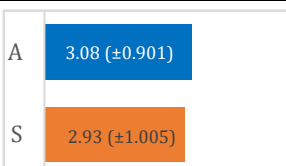
I'm assuming it will help me teach more effectively - A023

Effectiveness in Learning

I do use Duolingo sometimes, and I was able to pick up different words from the language I was learning. Thus, I do think that some AI tools can positively affect my academic performance as I memorize those words and phrases. - S007

Complementarity—Even though there is a statistically significant difference between the students' and associates' levels in PE, the difference is not large. Practically, both students and associates believe AI will be advantageous and enhance their performance. Nevertheless, associates anticipate more substantial advantages and consider AI more useful than students for boosting their performance, productivity, and overall learning experience. Associates perceive a greater potential in employing AI tools to facilitate effective teaching. Conversely, students may restrict the utilization of AI tools for language learning.

Perceived Security (PS)



F=0.666 P=0.415
Not Significantly Different

Lack of Trust in the Developers

I cannot guarantee the safety of my personal information, and that's why we need to be careful when choosing AI tools. - A021

No, I do not think that my personal information is protected because I have seen reports wherein these AI tools scrap data from their users without the user's consent and feed it to enhance the performance of the AI. - S065

Depends on the Data Being Shared

I think that is dependent on how much of my personal information these tools are actually gathering. So far, I feel safe. - S018

Expanding — Both students and associates hold a neutral view of the security provided by AI tools. Associates tend to distrust the developers of these tools, particularly regarding the unauthorized use of personal information. Additionally, some students emphasized that the level of security risk depends on the extent and nature of the data shared with the AI developers. This demonstrates an understanding of the security challenges associated with using AI tools.

Note. A = Associates, S = Students

The joint display shows how students and associates accepted AI tools in their academic tasks. The findings showed they generally had the same level of acceptance as AI tools. They felt neutral about whether their social circles influenced their opinions on AI, with

associates being slightly more convinced by the idea of the utility of AI tools. Both teachers and students agreed that the necessary resources were available to use AI tools effectively, although teachers reported some institutional limitations. They also found AI tools to be user-friendly and easy to learn. There is a shared belief that AI could improve educational outcomes, with associates expecting it to be particularly helpful for teaching and students finding it useful for language learning. Security concerns were neutral overall. However, associates distrusted AI developers regarding data privacy. Students' trust varied depending on the information shared.

Understanding the usage of AI tools by primary stakeholders is key to maximizing the benefits of AI in education. This study shows that students and associates understand AI's potential and limitations, using it for analysis, translation, and learning tasks. Associates focused on exploring the use of content creation and teaching strategies. This implies that AI has the potential to significantly transform education by enabling personalized learning experiences, automating administrative tasks, and enhancing instructional quality (Chen et al., 2020). Research indicates that AI is crucial for the future of higher education, emphasizing its importance and impact on the sector (Zawacki-Richter et al., 2019). AI can revolutionize teaching and learning by making it more engaging, efficient, and tailored to individual needs (Harry, 2023). Leveraging AI through AI chatbots can provide innovative capabilities that benefit educators and professionals from different fields (Ishaaq & Sohail, 2023).

The results highlight the diverse ways students and associates utilize AI tools. Students frequently use tools like Quillbot, Speechify, Grammarly, and ChatGPT, demonstrating their engagement with AI for enhancing writing, facilitating research, and improving comprehension. On the other hand, Associates primarily utilize Google Translate and Grammarly, focusing on refining communication and ensuring clarity in their work. These findings underscore AI's potential to address specific educational needs and suggest that AI tools can be seamlessly integrated into various academic tasks to improve efficiency and productivity (Jayavardhini, 2024; Wiredu et al., 2024). By understanding the specific applications of these tools, educators can better leverage their potential to enhance the learning experience and create more engaging and effective educational practices.

The study revealed that students and associates generally accept AI tools in education, with high scores in facilitating conditions, effort expectancy, and performance expectancy, whereas social influence and perceived security are viewed neutrally. These shared beliefs among stakeholders about accepting AI tools in education can foster a unified approach, reduce resistance, enhance utilization, promote collaboration, and drive continuous improvement. This also shows that the UTAUT provides a comprehensive framework for analyzing the factors influencing technology adoption in educational settings, such as AI tools. By integrating elements from various IT acceptance models, UTAUT offers a holistic approach to understanding how individuals perceive and utilize technology (Venkatesh et al., 2016). Studies have applied UTAUT in educational contexts to investigate the determinants of technology adoption among students, highlighting its effectiveness in examining the factors influencing student acceptance of digital platforms and services (VanDerSchaaf et al., 2023). The model helped identify the factors that were more important for users of the technology, AI tools, in this study.

Among the different aspects explored in this study, associates and students had ethical concerns regarding using AI tools. It is crucial to ensure the ethical integration of AI tools in

education and address data privacy, algorithmic transparency, and academic integrity. Data privacy concerns are paramount, as AI tools often collect and analyze student data. Educational institutions must prioritize protecting this information and ensure compliance with relevant privacy regulations (Farrelly & Baker, 2023). Algorithmic transparency ensures fairness, accountability, and trust in AI systems used for educational decision-making. Educators can identify and mitigate potential biases that may disadvantage certain student groups by understanding how algorithms work and what data they use (George & Wooden, 2023). Academic integrity remains a critical concern with the increasing use of AI tools for writing and research, forcing educators to rethink their assessment (Fowler, 2023; Wiredu et al., 2024).

As such, clear guidelines and policies are needed to educate students and associates about ethical AI use. Fostering a culture of responsible AI use requires open discussions about these ethical considerations and developing comprehensive training programs that address data privacy, algorithmic transparency, and academic integrity. By considering frameworks such as the Extended Privacy Calculus Model by Dinev and Hart (2006) and the AI4People Ethical Framework (Floridi et al., 2018), educational leaders can navigate the complexities of AI integration. Ensuring that AI technologies are used ethically, as suggested by Lannon et al. (2021), involves maximizing benefits, safeguarding privacy, and minimizing risks. Moreover, as highlighted by Zhai and Nehm (2023), focusing on effective AI integration in classrooms, teacher education, and developing adaptable AI systems is crucial for addressing ethical concerns and promoting responsible AI use in educational settings.

In addition to the ethical considerations mentioned above, it is important to address the potential adverse effects of AI on intellectual development. While AI tools can enhance learning experiences and provide valuable support, over-reliance on these tools may hinder the development of critical thinking, problem-solving, and analytical skills (Eden et al., 2024). To mitigate these risks, educators should strive for balanced AI integration, providing opportunities for students to engage in independent learning and develop their cognitive abilities (Molek, 2023). Strategies such as promoting active learning, encouraging critical evaluation of AI-generated content, and fostering collaborative problem-solving can help ensure that AI tools complement and enhance, rather than replace, human intelligence in education.

With AI rapidly transforming various aspects of our lives, education is no exception. It is important to view AI as a collaborator rather than a replacement for human intelligence (Zawacki-Richter et al., 2019). To effectively leverage AI, educators must become proficient in integrating it into their teaching. Simultaneously, students should articulate their learning needs to best use AI tools (Rajaei, 2023). AI's ethical and responsible use is key to maximizing its potential to enhance learning experiences and achieve educational goals (Zawacki-Richter et al., 2019). This collaborative approach promotes efficient feedback loops by utilizing data-driven assessments from AI tools, providing students with timely and tailored support (Rajaei, 2023). As we explore AI's potential in education, it is crucial to consider an "ethics of care" perspective, ensuring that algorithmic decision-making within these applications is implemented responsibly.

Overall, our study uniquely examines the perspectives of both students and associates within a single institution. This approach allows for a nuanced understanding of the factors influencing AI adoption across different stakeholder groups. Furthermore, our findings challenge the traditional notion that social influence is dominant in technology acceptance (e.g.,

Cioc et al., 2023; Svendsen et al., 2013; Yu & Xiaozhi, 2019), suggesting that other factors, such as performance expectancy and facilitating conditions, maybe more critical in the context of AI in academia. The neutral stance on perceived security and concerns about data privacy and algorithmic bias underscores the need for transparent AI governance and ethical guidelines in educational settings. The qualitative insights further enrich our understanding by revealing the diverse ways AI tools are utilized and the specific challenges and concerns that users encounter. By combining quantitative and qualitative data, our study provides a comprehensive and contextually grounded perspective on AI acceptance in academia, contributing to growing knowledge.

CONCLUSIONS

The findings of this study offer several practical recommendations for educators and policymakers. First, educational institutions should prioritize developing and implementing comprehensive training programs and workshops to enhance AI literacy among students and associates. These programs should focus on the technical aspects of AI tools, their ethical implications, potential biases, and strategies for responsible use. Second, institutions should ensure accessibility to AI tools by providing adequate infrastructure, technical support, and financial resources, particularly for those from disadvantaged backgrounds. Third, fostering a culture of responsible AI use is crucial. This can be achieved by developing clear guidelines and policies that address issues such as data privacy, algorithmic transparency, and academic integrity. Additionally, it's essential to discuss the potential adverse effects of AI on intellectual development and implement strategies to mitigate these risks. Finally, policymakers should consider incorporating AI ethics and literacy into the curriculum at all levels of education to prepare future generations for the challenges and opportunities of an AI-driven world. By proactively addressing these recommendations, we can harness the potential of AI to transform education while mitigating its potential risks and ensuring equitable access and ethical use.

While this study offers valuable insights into the acceptance and utilization of AI tools in academia, it is essential to acknowledge its limitations. The single institution setting and the convenience sampling method may limit the generalizability of the findings to other educational contexts. Future research could employ a more diverse sample across multiple institutions and regions to enhance the external validity of the results. Additionally, the cross-sectional design captures a snapshot of AI acceptance at a specific point in time. Longitudinal studies could provide a more nuanced understanding of how perceptions and usage patterns evolve as AI technologies advance and become more integrated into educational practices. The study also primarily focused on the UTAUT model to examine AI acceptance. Future research could explore the applicability of other theoretical frameworks, such as the Technology Acceptance Model (TAM) by Davis (1989) and its other extensions, or the Diffusion of Innovations Theory by Rogers (1962, 1971, 1983, 1995, 2010), to better understand the factors influencing AI adoption in academia.

Furthermore, while insightful, the qualitative data analysis could be further enhanced by employing more rigorous qualitative methods, such as grounded theory or phenomenology, to delve deeper into the lived experiences of students and associates using AI tools. Finally, future research could investigate the long-term impact of AI tools on learning outcomes,

teaching practices, and the overall educational landscape. By addressing these limitations and exploring these future research directions, we can contribute to a more nuanced and comprehensive understanding of the complex interplay between AI, education, and society.

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