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Kuwaiti university students' acceptance of the use of GenAI in their learning: An exploration directed by a modified unified theory of acceptance and use of technology

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Abstract

The current study used a modified unified theory of acceptance and use of technology (UTAUT) to investigate higher education students' acceptance of the integration of generative artificial intelligence (GenAI) in their learning in Kuwait. The study employed a quantitative research approach, and 179 college of education students completed an online questionnaire. The results showed that most participants have an account on a GenAI application, with ChatGPT being the most common one. Students' use of GenAI for personal purposes was less frequent than for educational purposes. Students have positive perceptions of GenAI, and they have positive attitudes toward the use of GenAI for educational purposes. Students' attitudes were positively associated with their favorable perceptions of GenAI regarding performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, and privacy confidence. However, GenAI's performance expectancy and social influence were the only variables that were statistically significant predictors of Kuwaiti university students' attitudes toward using GenAI for educational purposes. Based on the results, a series of recommendations is presented for utilizing GenAI to enhance student learning.

Keywords: Kuwait, college of education students, GenAI, education, acceptance, UTAUT, unified theory of acceptance and use of technology

INTRODUCTION

Generative artificial intelligence (GenAI) technologies are not just tools; they represent a paradigm shift in education that creates dynamic, adaptive learning ecosystems, redefining how knowledge is delivered, how students engage with content, and how learning outcomes are achieved. That would move educational practice beyond traditional methods to foster student-centered environments (Bahroun et al., 2023; Jacques et al., 2024; Valenzuela et al., 2024). It has been said that

> "artificial intelligence (AI) has rapidly evolved from a speculative concept into a transformative force impacting multiple domains, with education being one of its most promising areas of influence. The potential of AI lies in creating dynamic, adaptive, and student-centered learning ecosystems that enhance the teaching and learning process" (Hari et al., 2025, p. 165).

The rise of GenAI has changed various portions of how we accomplish tasks, as it has become part of our digital ecosystem. GenAI has become one of the most influential technologies in recent years. GenAI has brought changes to the ways we conduct business, education, healthcare, media, and social interactions (Liu & Siau, 2023; Marr, 2024; Mishra et al., 2025; Shaznay, 2025). GenAI is popular among people. For instance, as of late 2024, 45% of the USA population age 18-64 uses GenAI (Bick et al., 2026). However, the spread of GenAI differs across countries and the factors that would affect user's adoption of sch technology would differ also from one country to another (Budhathoki et al., 2024; Zhao et al., 2024). GenAI have begun to supplement and replace, in some cases, traditional forms

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Contribution to the literature

- This study extends the growing body of research on GenAI adoption by examining its acceptance among college of education students in Kuwait, a population and context that remain underrepresented in the existing literature.
- The study expands the application of the unified theory of acceptance and use of technology (UTAUT) by incorporating additional factors, including self-efficacy, perceived enjoyment, and privacy confidence, to provide a more comprehensive understanding of students' acceptance of GenAI in higher education.
- The findings contribute empirical evidence from a developing-country context, highlighting the relative importance of performance expectancy and social influence in shaping students' attitudes toward the educational use of GenAI and informing future policies and practices for its integration in higher education.

of content creation and problem-solving across fields. GenAI systems can produce text, images, programming code, audio, and video.

GenAI technologies have multiple educational uses for university students, such as generating various forms of media, translation, writing assistance, creating creative media, automated interaction, support for language learning, feedback about writing, the automatic summarization of text, brainstorming ideas, and search for information (Fuller & Barnes, 2024; Gasaymeh et al., 2024). Many GenAI applications have been developed and employed to achieve specific educational goals across various academic disciplines. These applications can be categorized based on their purpose, including writing and language support tools such as ChatGPT, Gemini, GrammarlyGO, QuillBot, and Sudowrite (Fang et al., 2024; Titu et al., 2024), problem-solving tools like Wolfram Alpha, MathGPT, Symbolab, and SciSpace Copilot (Cheng, 2025; Edali et al., 2024; Makhdum et al., 2023), programming and coding assistants such as Codeium, GitHub Copilot, and Replit Ghostwriter (Lakshman & Abhinav, 2024), visual and creative content generators like DALL.E, Midjourney, Canva Magic Studio, and Runway ML (Ching & Mothi, 2025), research and study support tools including Elicit, Research Rabbit, and SciSummary (Alam et al., 2025), and educational planning tools for teachers such as Curipod, TeachMateAI, and Khanmigo (Drach et al., 2024). However, some of these apps can fit in more than one category. For instance, ChatGPT can help with writing and language support, problem-solving, programming and coding, and educational planning. Research has shown that integrating GenAI into higher education serves the interests of all stakeholders; for example, research has shown that integrating GenAI in higher education would enhance students' learning experiences (Gasaymeh & AlMohtadi, 2024) and support faculty in instructional tasks (Baytak, 2024) and assist institutions in achieving educational efficiency and innovation (Abubakar et al., 2025). Based on recent research, the integration of GenAI in higher education is expected to significantly benefit students by promoting creativity and innovation, facilitating personalized and differentiated instruction, supporting critical thinking and analysis, and improving communication, collaboration, and access to equitable educational resources (Gasaymeh et al., 2024; Šedlbauer et al., 2024).

Besides the typical advantages of integrating GenAI into universities, developing countries would benefit exceptionally from incorporating it into their educational systems. For example, the benefits encompass bridging educational resource gaps since GenAI can provide adaptive and high-quality learning resources (Nyaaba, 2024), overcoming language barriers by providing AI-powered translation tools (Zaki & Ahmed, 2024), and supporting capacity building in under-resourced institutions (Nyaaba et al., 2024).

The use of GenAI is becoming popular among university students these days. The capabilities and benefits of GenAI in education and their increasing popularity put pressure on higher education institutions and educators to officially integrate these technologies as part of their instructional approach. Educational systems can adopt GenAI through diverse forms of integration. A small-scale use of GenAI involves using GenAI to support well-established pedagogical teaching methods such as flipped learning (Gasaymeh & AlMohtadi, 2024), while another example of complex use of GenAI integration involves the use of GenAI to transform traditional classroom practices through the structured framework, which guides educators in embedding GenAI across lesson planning, student activities, formative assessments, and continuous professional development (Al-Ali et al., 2024).

In Kuwait, in the present study, the researcher identified a pattern of ongoing discussions among higher education faculty members regarding students' growing reliance on GenAI for academic tasks. A Kuwaiti faculty member described banning the use of GenAI for educational purposes among students as "*Resisting the inevitable*." However, Kuwait is increasingly curious about incorporating information and communication technologies to promote the quality of higher education. This interest is demonstrated by developing academic units and centers that support the use of information and communication technologies in

education. Furthermore, university administrators constantly encourage Kuwaiti faculty members to integrate information and communication technologies into their educational practice.

The popularity of GenAI among students, the anticipated benefits of GenAI, the increasing and powerful capabilities of GenAI, the determination of countries with developing economies to enhance their educational systems by integrating digital technologies, and the benefits offered by the use of GenAI in higher education in these countries emphasize that the adoption of GenAI in universities in general and countries with developing economies in particular would be valuable. However, moving beyond these widely cited benefits, there remains limited clarity on how such capabilities translate into actual student acceptance and sustained educational use.

Integrating GenAI in higher education requires a shift in teaching practice, directly affecting students' roles in higher education. Therefore, evaluating how widely university students accept the use of generative AI in their learning and identifying the factors that influence this acceptance is crucial for effective adoption of GenAI in higher education. Gaining insight into students' access to GenAI, their patterns of use, and the factors affecting their acceptance of its academic application should guide policies and practices for its integration in higher education contexts.

PREVIOUS STUDIES

Worldwide, several studies have examined GenAI usage and perceptions among university students. For instance, in Finland, Suonpää et al. (2024) conducted a study to examine undergraduate Business students' perception of using GenAI regarding the associated risks and the support they expect from lecturers. The researchers used various data collection tools, including two surveys in which 129 participants completed the first survey, and 80 completed the second. The findings indicated that many students had used GenAI in their studies. The students reported that they use these tools mainly. Students use GenAI to seek clarification on academic topics or refine their written work. Besides that, the study identifies two main categories of risks. The first concerns GenAI-generated responses, including outdated information, made-up content, and plagiarism risks. The other concerns were related to the dependency on AI. The students believed that GenAI might harm their analytical thinking abilities. Nearly half of the students were unaware of the guidelines for using GenAI. They expected lecturers to clarify whether its use was allowed and to offer guidance on proper reference. In another study conducted in Portugal, Sousa and Cardoso (2025) investigated university students' engagement and the implications of GenAI for academics. The number of participants was 132 students. The participants completed an online survey. The findings showed that most participants (97.7%) identified themselves as GenAI users, and ChatGPT was the most common type (93.8%). Students use these tools to clarify concepts, brainstorm ideas, and support assignment completion. Other typical uses included summarizing content, enhancing the quality of writing, and translation. While students recognized several benefits of GenAI, such as ease of access, time-saving, and instant feedback, they also expressed concerns about GenAI overuse limiting the growth of critical thinking skills.

In Vietnam, Ngo (2023) investigated university students' insights regarding using ChatGPT in their learning. The study followed a mixed research design in which 200 students completed a questionnaire, with 30 students participating in semi-structured interviews. The findings indicated that the students had a favorable view of ChatGPT. The reported benefits of ChatGPT included saving time, offering diverse information, delivering personalized tutoring and feedback, and enhancing writing ideas. On the other hand, the reported concerns of ChatGPT included difficulty judging source quality, citing correctly, and using language precisely. Other studies have employed various adoption models to examine university students' use of GenAI for Individual and scholarly purposes. For example, in the UAE, Sallam et al. (2024) conducted a study to examine university students' attitudes toward and usage of ChatGPT. The study employed a cross-sectional descriptive research design, in which 608 students completed an online questionnaire developed based on the technology acceptance model (TAM). The questionnaire consisted of the following dimensions: perceived usefulness, ease of use, risk, anxiety, cognitive-behavioral factors, and social influence. The findings showed that 91% of participants had heard of ChatGPT, and 85.4% had used it. In addition, the results showed that a more favorable attitude toward ChatGPT was related to three dimensions: lower perceived risk, reduced anxiety, and stronger attitudes toward technology and social influence. Regarding usage, positive engagement with ChatGPT was related to high perceived usefulness, perceived ease of use, behavior/cognitive factors, and lower perceived risk of use.

In another study conducted in Taiwan, Hsiao and Tang (2024) investigated the factors that would determine higher education learners' willingness to use GenAI-based learning tools. The study was guided by a model based on TAM and the norm activation model. The number of participants was 336, who completed an online questionnaire. Structural equation modeling was employed to test the hypotheses based on the proposed model. The results showed that perceived technological factors, including usefulness, ease of use, and enjoyment, significantly influence students' willingness to use

GenAI-powered learning tools. However, social factors that include personal and subjective norms were insignificant in influencing students' willingness to engage with GenAI-powered learning tools. In addition, the results showed that students' awareness of consequences enhanced personal norms but lowered behavioral intentions.

In another cross-country study conducted in the UK and Nepal, Budhathoki et al. (2024) examined university students' intention to adopt ChatGPT using an extended version of the UTAUT framework. A total of 239 students from Nepal and 226 students from the UK completed the questionnaire. The findings showed that students' adoption intentions in both countries were significantly influenced by performance expectancy, effort expectancy, and social influence. However, the effect of anxiety differed between the two groups, where anxiety negatively affected students' intention to use ChatGPT only in the UK, not in Nepal. In a study conducted in Australia and employing UTAUT, Honig et al. (2025) investigated undergraduate engineering students' acceptance and use of GenAI. Forty-one students completed a survey based on the UTAUT. The findings revealed that the adoption of GenAI in this educational context was primarily driven by students' belief in performance expectancy, with secondary support from effort expectancy and accessible infrastructure representing facilitating conditions. Social influence was not found to be a significant determinant.

In another study conducted in South Korea, Jang (2024) examined business students' intentions to use text-based GenAI t for learning. The study collected data from 239 undergraduate students using an online questionnaire developed based on extended UTAUT, integrating AI literacy as an additional influencing factor. The study highlighted that performance expectancy, AI literacy, and social influence were critical in shaping students' attitudes and behaviors toward using GenAI for authentic educational purposes. In a similar study with different independent factors, Cano and Nunez (2024) investigated factors influencing business students' adoption of GenAI, focusing on enjoyment. The study followed a descriptive research design in which 92 undergraduate students completed a questionnaire. A survey questionnaire measured five factors: perceived enjoyment, usefulness, ease of use, attitude toward GenAI, and intention to use them. The study revealed a strong positive correlation between perceived enjoyment and the intention to use GenAI in innovation-focused courses. Moreover, perceived enjoyment showed a positive association with perceived ease of use. Remarkably, perceived usefulness did not significantly affect the intention to use Gen AI.

In Kuwait, there were limited studies that examined learners' perceptions and adoption of GenAI following different approach and research methods. For instance, Alazmi and Alazmi (2025) examined university instructors and students' ethical use of GenAI. The study followed qualitative research design in which 42 students and 25 teachers participated in semi-structured interviews. The results suggest that participants demonstrate a clear awareness of how to use generative AI in ethical and responsible ways, such as avoiding plagiarism, limiting overreliance on AI, and properly acknowledging its use. At the same time, they expressed concerns about issues like fair assessment, maintaining academic integrity, and the potential negative impact of AI on learning. Additionally, participants emphasized the need for stronger support, including improving GenAI literacy and establishing clear ethical guidelines and policies to guide its use. In another study, Alenezi (2026) examined the university undergraduate students' perception and use of ChatGPT tool in calculus class. The study followed mixed research design in which a questionnaire and interviews were used as data collection tools. The result showed that most participants reported hardship in understanding ChatGPT's output related to calculus.

The previous studies can be organized based on the examined factors that were used to establish theoretical bases to explain learners' adoption and use of GenAI in higher education. Some of these studies showed that performance-related factors such as perceived usefulness and performance expectancy might play integral role in shaping students' perceptions of GenAI as GenAI tool have been perceived as valuable tools in improving their learning efficiency, abilities to generate ideas, and academic work (Honig et al., 2025; Ngo, 2023; Sallam et al., 2024; Sousa & Cardoso, 2025). The other set of factors that were identified as critical factors for students to adopt and use GenAI were related to effort-related factors that include ease of use and effort expectancy, where a positive relationship was found between the intuitive nature and minimal effort required to use GenAI and students' adoption of these tools. (Budhathoki et al., 2024; Hsiao & Tang, 2024; Sallam et al., 2024). Furthermore, the previous findings showed that motivational and affective constructs such as enjoyment and hedonic motivation play an important role in shaping positive attitudes and intentions to use GenAI, sometimes even exceeding the influence of perceived usefulness (Cano & Nunez, 2024; Hsiao & Tang, 2024). Moreover, social and normative constructs such as social influence and subjective norms demonstrate mixed effects across contexts. For instance, in some studies these factors were found to be significant predictors of students' use of GenAI (Budhathoki et al., 2024; Jang, 2024), while others reported limited influence (Honig et al., 2025; Hsiao & Tang, 2024). Add to the previous factors, risk and ethical constructs (e.g., perceived risk, plagiarism concerns, and dependency) reflect students' awareness of potential drawbacks, including misinformation, overreliance, and academic integrity issues (Ngo, 2023; Suonpää et al., 2024). Finally,

capability and contextual constructs, such as GenAI literacy, self-efficacy, and facilitating conditions, emphasize the importance of students' competencies and institutional support in enabling effective use of GenAI (Honig et al., 2025; Jang, 2024). Several studies worldwide have explored university students' use and perceptions of GenAI, focusing on ChatGPT. The above studies indicate that university students frequently use GenAI for various purposes. The previous study showed that students reported benefits and concerns when using these tools for educational purposes. Using various adoption models, the previous studies showed variation in students' acceptance of the integration of GenAI in their learning and the factors that influenced their acceptance. The previous findings indicate that GenAI adoption is a multidimensional phenomenon shaped by cognitive, motivational, social, ethical, and contextual factors. However, most of the prior studies have relied on samples drawn from business and engineering and that might limit the generalizability of their findings to students from other fields (e.g., Cano & Nunez, 2024; Honig et al., 2025; Jang, 2024; Suonpää et al., 2024). However, the use patterns of GenAI might be different from field to field. Furthermore, previous research studies have largely been conducted within specific national contexts, including Finland, Vietnam, the UAE, Taiwan, the UK, Nepal, and South Korea (Budhathoki et al., 2024; Hsiao & Tang, 2024; Jang, 2024; Ngo, 2023; Sallam et al., 2024). These studies provide valuable insights, but their findings might not be transferable across diverse educational systems. In Kuwait, Alazmi and Alazmi (2025) highlighted awareness of ethical GenAI use alongside concerns about academic integrity and the need for clearer policies and literacy. Similarly, Alenezi (2026) found that students struggled to understand ChatGPT outputs in calculus, reflecting domain-specific challenges. Accordingly, the current study extends the literature by examining GenAI adoption among college of education students in Kuwait. The current study aimed to investigate Kuwaiti college of education students' acceptance of GenAI integration in their education and the factors that may have influenced this acceptance.

THEORETICAL FRAMEWORK

The current study employed a modified version of the UTAUT model to guide the investigation of students' acceptance of the integration of GenAI in their learning and the factors that possibly influenced their acceptance. The UTAUT model (Venkatesh et al., 2003) suggests that four factors—namely, performance expectancy, effort expectancy, social influence, and facilitating conditions—determine individuals' intentions to use technology and their usage behavior. Specifically, performance expectancy, effort expectancy, and social impact are proposed to affect individuals' intentions to use technology directly. At the same time, facilitating conditions are expected to influence their usage behavior directly. In addition, the model proposed some moderate variables that would affect the four key constructs of a technology's intentions to use and usage behavior.

Performance expectancy was defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). In the context of GenAI acceptance, students' perceptions of performance expectancy relate to the degree to which they believe using GenAI applications will enhance their academic performance, help them complete tasks more quickly, increase their productivity, and improve their grades. Effort expectancy was defined as "the degree of ease associated with using the system" (Venkatesh et al., 2003, p. 450). In the context of GenAI acceptance, students' perceptions of effort expectancy relate to the degree to which students perceive GenAI applications as easy to understand, use, and become skilled at, with minimal effort required for interaction. Facilitating conditions are "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453). In the context of GenAI acceptance, students' perceptions of facilitating conditions relate to the degree to which they feel they have the necessary resources, knowledge, technological compatibility, and support systems to use GenAI effectively in their learning. Social influence is "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003, p. 451). In the context of GenAI acceptance, students' perceptions of social influence relate to the extent to which students perceive that important people around them (e.g., peers, instructors, and the university) encourage or support their use of GenAI for educational purposes.

The current study employed other factors to examine students' acceptance of integrating GenAI into their education. These factors were privacy, confidence, self-efficacy, and perceived enjoyment. Privacy refers to students' sense of control, safety, and trust regarding how their personal information is handled using GenAI. The privacy confidence factor was adopted from similar factors related to the perceptions of GenAI that include trust factor that reflects a belief that the AI system is reliable and acts in the users' best interest (Huynh, 2024) and privacy and security compliance factor that demonstrates the importance of ensuring adherence to privacy and security requirements helps guarantee that GenAI systems remain compliant with relevant standards, thereby fostering user trust (Baig & Yadegaridehkordi, 2025). The privacy confidence factor is crucial when evaluating users' perceptions of GenAI since privacy is a significant concern in adoption of AI. The use of GenAI might involve providing personal or

sensitive information through prompts. Such unique nature of such technology raises the importance of making perceived control over data and confidence in privacy protection as an important determinant of acceptance of such technology. There is an overlap between privacy confidence and other factors such as trust and anxiety, as these constructs collectively capture users' beliefs about system reliability, data protection, and the extent to which the system acts in the users' best interest. Therefore, privacy confidence was adopted to capture this nuanced dimension, aligning with emerging literature emphasizing privacy assurance as a key driver of user adoption in AI-powered systems (Guo et al., 2026).

The other factor was self-efficacy, which has been widely used to extend various TAM (Al-Haderi, 2013; Kundu et al., 2021; Poh & Lee, 2025). Self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, 1997). In the context of GenAI acceptance, students' self-efficacy is related to the confidence in their ability to complete educational tasks using GenAI independently, even in the presence of obstacles or limited guidance. Social cognitive theory highlights the importance of an individual's self-efficacy in shaping their behavior (Bandura, 1993). Considering the self-efficacy factor is crucial when evaluating users' perceptions of GenAI, as it reflects their belief in their ability to effectively use the technology, which significantly influences adoption, engagement, and sustained use. Another factor that might affect individuals' acceptance of technology is perceived enjoyment. Perceived enjoyment has been frequently used to extend different TAM (Chao, 2019; Sarosa, 2019). Perceived enjoyment was defined as the extent to which the activity of using technology is perceived to be enjoyable and interesting, apart from any performance consequences that may be anticipated (Davis et al., 1992). In the context of GenAI acceptance, students' perceived enjoyment is related to the extent to which students find using GenAI intrinsically enjoyable and entertaining, regardless of its practical utility in their studies. Considering the perceived enjoyment factor is crucial when evaluating users' perceptions of GenAI because it significantly influences their intrinsic motivation, engagement, and willingness to adopt and consistently use the technology.

The current study examined Kuwaiti university students' acceptance of the integration of GenAI in their learning. Students' attitudes toward integrating GenAI were used as a proximal indicator of acceptance. Given the exploratory nature of GenAI use, attitudes were treated as an early indicator of readiness to adopt. However, as they do not fully capture core UTAUT model outcomes (behavioral intention and use), the findings are framed as predictors of attitudes rather than a full test of UTAUT. Students' attitudes toward using technology are strong predictors of both acceptance and actual usage of that technology (Davis, 1986; Venkatesh, 2000). Attitude was defined as "a person's general favorableness or unfavorableness toward some stimulus object" (Fishbein & Ajzen, 1975, p. 216). In the context of GenAI acceptance, students' attitudes are related to their overall feelings and evaluations of using GenAI in their learning process.

In addition, the study explored the potential impact of the four core constructs of the UTAUT model—performance expectancy, effort expectancy, social influence, and facilitating conditions—alongside self-efficacy and perceived enjoyment on students' acceptance of the integration of GenAI in their learning. Since GenAI are not yet officially integrated into the formal learning environments of Kuwaiti universities, understanding students' attitudes toward their use in education, along with the factors that may influence those attitudes, is essential for informing future strategies I terms of practice and policies aimed at leveraging GenAI to support university students' learning.

The factors investigated in this study that may affect students' acceptance of the integration of GenAI can be categorized into three groups. The first group, Technological Factors, includes performance expectancy, effort expectancy, and privacy confidence—factors that reflect users' perceptions of the technology's features and usability. The second group, User Engagement, involves self-efficacy and enjoyment, which relate to students' internal capacity and emotional engagement with technology. The third group, Social Context, comprises social influence and facilitating conditions, capturing the external support and environmental factors that may impact students' willingness to adopt GenAI in their learning. **Figure 1** shows the conceptual model in this paper in terms of the proposed factors influencing attitude toward using GenAI.

METHODOLOGY

The current study employed a quantitative approach. Data were collected from the students using an electronic cross-sectional questionnaire. The questionnaire gathered data on Kuwaiti university students' acceptance of GenAI integration into their learning.

Instruments

The method of data collection in the current study was a questionnaire. The first part of the questionnaire consisted of questions regarding students' demographic variables, including gender, major, and academic year. In addition, it included questions related to participants' use of GenAI. The second part of the questionnaire consisted of items designed to collect data regarding

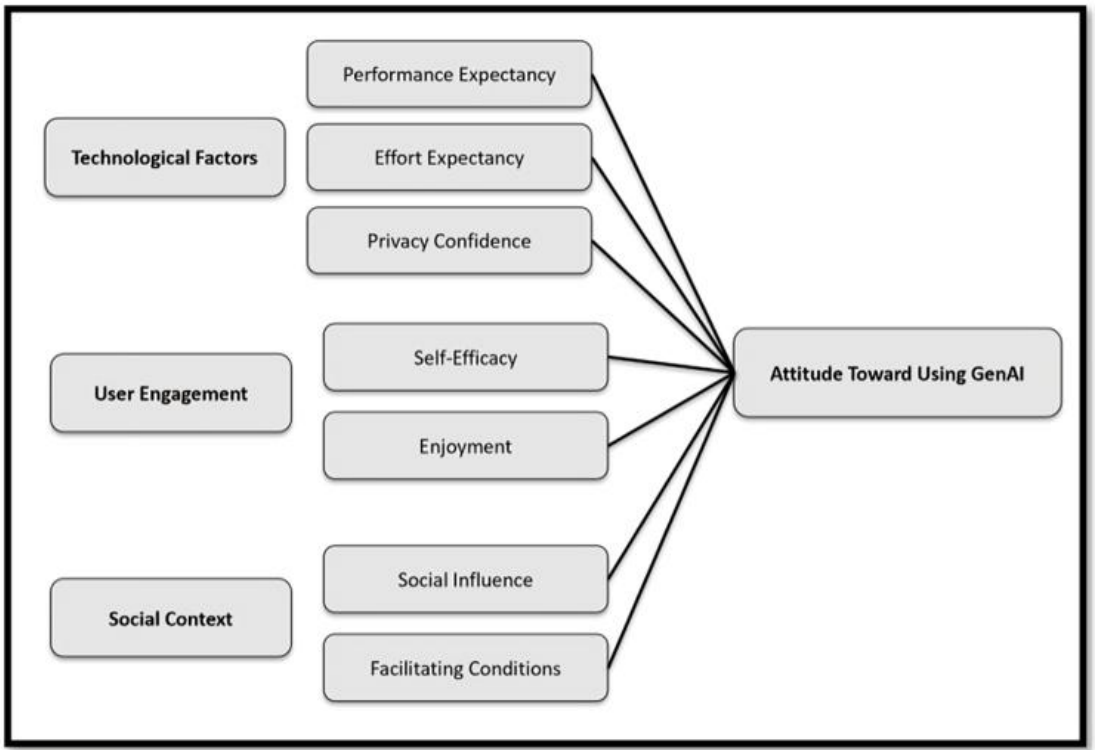

Figure 1. Conceptual model: Factors influencing attitude toward using GenAI (the author's own elaboration)

Table 1. Summary of reliability analysis

Scale	N	α	ω
Performance expectancy	4	0.896	0.898
Effort expectancy	4	0.881	0.881
Social influence	4	0.727	0.731
Facilitating conditions	4	0.757	0.776
Self-efficacy	4	0.741	0.748
Enjoyment	3	0.869	0.872
Privacy confidence	4	0.824	0.847
Attitude toward using GenAI	3	0.866	0.874

Note. N: Number of items

participants' perceptions of eight key variables. Responses were measured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with higher scores indicating stronger agreement. These variables included: performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, privacy confidence, and attitude toward using GenAI. The scales were developed based on reviewing previous studies.

The instrument's validity was evaluated by a panel of experts who serve as faculty members in a college of education at a Kuwaiti university. The group of experts reviewed the questionnaire instrument for suitability and consistency. In addition, to establish construct validity, an exploratory factor analysis was conducted using principal axis factoring with Varimax rotation. The Kaiser-Meyer-Olkin measure was 0.925, which is significantly above the recommended threshold of 0.60 and indicates excellent sampling adequacy. Bartlett's test of sphericity was significant (χ^2 = 3,622.7, $p < .001$), confirming that the data were suitable for factor analysis. The analysis extracted eight distinct factors with eigenvalues greater than 1.0 (matching the theoretical constructs), collectively explaining 74.6% of the total variance. All items exhibited strong primary loadings on their respective constructs (ranging from .45 to .86). Most items showed no significant cross-loadings, confirming the convergent and discriminant validity of the scales for this sample. Although a separate pilot study was not conducted due to feasibility constraints following the commencement of data collection, the instrument underwent expert review and extensive psychometric evaluation to ensure its validity and reliability.

Cronbach's alpha (a) and McDonald's omega (ω) variables were computed for each scale in the questionnaire to verify the reliability of the questionnaire instrument. The values of a and ω were high, indicating strong internal consistency and suitability for the study. **Table 1** presents the results of the reliability analysis of the questionnaire instrument.

Participants

The sample study was undergraduate students enrolled in various courses at a college of basic education. The researchers contacted several faculty members at the college, requesting their support in having their students participate in the study. Faculty members who agreed to participate posted the questionnaire link on their respective learning management systems, inviting all students in their classes to participate. Students who provided their consent were invited to complete the questionnaire promptly. A total of 179 students were invited to

Table 2. Frequency distribution of participants' demographic characteristics, including gender, age, major, and academic year

Variable	Category	F	P (%)
Gender	Male	8	4.50
	Female	171	95.50
Age	18-20	97	54.20
	21-25	65	36.30
	26-30	3	1.70
	31-35	8	4.50
	36-40	2	1.10
	40+	4	2.20
Major	Educational technology	61	34.08
	Home economics	37	20.67
	Computer science	19	10.61
	Islamic education	15	8.38
	English language	10	5.59
	Physical education	9	5.03
	Arabic language	7	3.91
	Electrical education	5	2.79
	Science education	5	2.79
	Math education	4	2.23
	Art education	3	1.68
	Music education	2	1.12
	Missing	2	1.12
Academic year	1	72	40.20
	2	40	22.30
	3	45	25.10
	4	18	10.10
	5	4	2.20

Note. F: Frequency & P: Percentage

participate in the study, and all 179 students completed the questionnaire. Therefore, no cases were excluded from the analysis, and no missing data were identified in any of the study variables, that was due to the use of electronic questionnaire that all items are required. **Table 2** displays the frequency distribution of the participants' demographic characteristics, such as gender, age, major, and academic year.

Table 2 shows that most participants (95.5%; n = 171) were female students the reason for that is the actual enrollment patterns within colleges of education in Arab world as the college of basic education in Kuwait is characterized by a clear female majority. Therefore, the sample is considered representative of the accessible population from which it was drawn. Regarding age, most participants (90.5%; n = 162) were between 18 and 25, representing the typical age for undergraduate students. Only a small portion of participants were older, with 1.7% aged 26-30, 4.5% aged 31-35, 1.1% aged 36-40, and 2.2% above 40 years. Regarding academic majors, the most represented field is educational technology (34.08%), followed by home economics (20.67%) and computer science (10.61%). Other fields were also represented in smaller proportions.

Regarding academic standing, most participants were in their early academic years of study, with 40.2% in their first year and 25.1% in their third year, followed by 22.3% in the second year. Only 10.1% are in their fourth year, and 2.2% are in the fifth year.

Study Settings and Procedure

Data were collected during the second semester of the 2024/2025 academic year from multiple classes within the college of basic education at a university in Kuwait using an online questionnaire developed through Google Forms. Classes were selected based on their instructors' approval to participate in the study. The use of GenAI was not a requirement in these courses. Instructors who agreed to have their classes participate in the survey shared the questionnaire link through their respective learning management systems. Participation was voluntary for the students and informed consent was obtained from all participants prior to data collection. All respondents were adults, and no sensitive or personally identifiable information was collected, ensuring anonymity. Given the nature of the study and the use of anonymous survey data from adult participants, formal IRB approval was not required in this context. Data were securely stored and used solely for research purposes.

Data Analysis

Students' questionnaire responses were analyzed using the IBM SPSS statistics version 15. Two types of statistical analyses were used to analyze the responses. This includes descriptive analysis and inferential statistics. The analysis involved calculating frequency distributions, means (Ms), and standard deviations (SDs). Frequency distributions were used to summarize students' demographic information and their usage of GenAI. Ms and SDs were computed for each of the eight scales in the questionnaire: performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, privacy confidence, and attitude toward using GenAI. The inferential statistical methods employed included correlation and regression analyses. Pearson's product-moment correlation coefficients were calculated to assess the direction and strength of the relationships among the key variables measured by the questionnaire scales. Regression analysis was performed to explore the relationships between students' acceptance of GenAI integration in their learning—reflected in their attitudes toward its use—and several predictive factors: performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, perceived enjoyment, and privacy confidence. All inferential statistical tests were conducted as two-tailed tests with a significance level set at $a = 0.05$.

Table 3. Students' access to and use of GenAI applications

Question	Response	F	P (%)
Do you have an account on any GenAI application (e.g., ChatGPT)?	Yes	129	82.1
	No	50	27.9
Which GenAI applications do you have an account on?	ChatGPT	109	60.8
	Google Gemini	21	11.7
	DeepSeek	3	1.6
	Microsoft Copilot	2	1.1
On average, how often do you use GenAI applications for personal purposes?	Low use (includes never, once a month)	92	51.4
	Moderate use (includes several times a month, once a week, several times a week)	72	40.3
	High use (includes once a day, several times a day, once an hour, several times an hour, all the time)	15	8.3
On average, how often do you use GenAI applications for educational purposes?	Low use (includes never, once a month)	73	40.8
	Moderate use (includes several times a month, once a week, several times a week)	89	49.7
	High use (includes once a day, several times a day, once an hour, several times an hour, all the time)	17	9.5

Note. F: Frequency & P: Percentage

RESULTS AND DISCUSSION

Students' Access to and Use of GenAI Applications

Regarding students' access to and use of GenAI applications, the results showed that most participants (72.1%) have an account on a GenAI application, with ChatGPT being the most widely used (60.8%). While personal use of GenAI was primarily low to moderate (91.7%), educational use shows slightly higher engagement, with nearly 50% using it at a moderate level and 9.5% at a high level (**Table 3**). Kuwaiti students' access to and use of GenAI applications were less intensive compared to studies such as Ngo (2023), which found that most students used ChatGPT regularly for academic support tasks; Budhathoki et al. (2024), which found strong behavioral intention to use ChatGPT in both Nepal and the UK; and Sousa and Cardoso (2025), which found that 97.7% of students used GenAI tools. However, popularity of ChatGPT among participants aligned with the findings of Sousa and Cardoso (2025).

Participants' Perceptions and Acceptance of Employing GenAI for Educational Purposes

Students' perceptions and acceptance of using GenAI for educational purposes were assessed through eight scales included in the questionnaire: performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, privacy confidence, and attitude toward using GenAI (**Table 4**).

Participants showed the highest positive responses on the performance expectancy scale (M = 4.25, SD = 0.74). The privacy confidence scale received the lowest level of agreement from participants (M = 3.37, SD = 0.85). Participants perceived GenAI to be an easy-to-use tool; participants responded positively to the effort expectancy scale (M = 4.02, SD = .77). Close to the participants' score in effort expectancy was students' perceived enjoyment of using GenAI (M = 3.97, SD = 0.80), showing that participants tend to enjoy using GenAI. They indicated agreement that the presence of facilitating conditions was necessary for them to use GenAI in their education (M = 3.78, SD = .70). Participants expressed confidence in their ability to use GenAI effectively in their learning, as reflected in their positive responses to the self-efficacy scale (M = 3.83, SD = 0.70). However, students held perceptions ranging from neutral to positive regarding social pressure to use GenAI in their education (M = 3.51, SD = 0.75). The participants had positive attitudes toward using GenAI for educational purposes (M = 3.98, SD = 0.85). Students' positive attitudes suggest they would accept using GenAI for educational purposes.

Table 4. Descriptive statistics of participants' responses to the scales assessing perceptions and acceptance of GenAI use for educational purposes

Scale	M	SD
Performance expectancy	4.25	.74
Effort expectancy	4.02	.77
Social influence	3.51	.75
Facilitating conditions	3.78	.70
Self-efficacy	3.83	.70
Enjoyment	3.97	.80
Privacy confidence	3.37	.85
Attitude	3.98	.85

Based on the previous categorization of the examined factors, the results showed that the students were highly technologically ready to use GenAI in their education, particularly regarding usefulness and ease of use. However, privacy concerns were a notable limitation. Regarding user engagement, the students reported confidence and enjoyment in using GenAI. However, regarding social context, the results presented mixed findings, where institutional support was valued, but social influence was not a strong motivator.

Table 5. Bivariate correlations between perceptions and attitudes toward the use of GenAI for educational purposes

	Attitude	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Self-efficacy	Enjoyment	Privacy confidence
Attitude	1							
Performance expectancy	0.755*	1						
Effort expectancy	0.630*	.665*	1					
Social influence	0.629*	.551*	0.522*	1				
Facilitating conditions	0.616*	0.577*	0.653*	0.599*	1			
Self-efficacy	0.570*	0.570*	0.640*	0.562*	0.694*	1		
Enjoyment	0.568*	0.561*	0.660*	0.542*	0.690*	0.690*	1	
Privacy confidence	0.503*	0.441*	0.366*	0.593*	0.517*	0.423*	0.479*	1

Note. *p < .01

Table 6. Summary of the standard regression model

Model	R	R^2	Adjusted R^2	Standard error
1	0.81	0.66	0.65	0.50

Table 7. Multiple regression results for the dependent variable (students' attitudes toward using GenAI for educational purposes)

Model		Sum of squares	df	Mean square	F	Significance
1	Regression	84.08	7	12.01	47.30	0.00
	Residual	43.42	171	.25		
	Total	127.49	178			

Note. Predictors: (Constant), performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, and privacy confidence & Dependent variable: Students' attitudes

Students' positive perceptions and attitudes toward using GenAI for educational purposes may be attributed to earlier findings indicating that most participants were already familiar with GenAI tools and had experience using GenAI for personal and academic purposes. Universities should leverage this acceptance by formally incorporating GenAI to enhance teaching and learning processes. Students' positive perceptions of and attitudes toward the use of GenAI in their learning in terms of high-rated performance expectancy, effort expectancy, enjoyment, self-efficacy, and attitudes toward GenAI align with the findings of similar studies (Sallam et al., 2024; Sousa & Cardoso, 2025). The lowest-rated factor was privacy confidence, reflecting student concerns about data safety and responsible use, which aligns with the results of Suonpää et al. (2024), who identified risks such as misinformation, plagiarism, and unclear reporting guidelines.

Associations Between Participants' Perceptions and Their Acceptance of GenAI for Educational Use

To examine the strength of association among the variables examined, which include performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, and privacy confidence, and their acceptance of the use of GenAI for educational purposes measured through their attitudes toward the use of GenAI for educational purposes, Pearson's product-moment correlation coefficients were computed (**Table 5**). However, assumptions were assessed prior to computing Pearson's product-moment correlation coefficients. These assumptions were normality, linearity, and the absence of extreme outliers (Stevens, 1990). Normality was checked through skewness and kurtosis, the results showed that all variables of skewness and kurtosis fall within the acceptable ranges for normality (skewness ranged from -0.935 to 0.077, and kurtosis ranged from -0.943 to 1.045). Performance expectancy shows the highest negative skewness but remains within safe limits for parametric testing. Extreme outliers using interquartile range method and Boxplots, the results suggested that extreme values are not a significant concern in this analysis. The linearity was assessed using a Pairplot (scatter plot matrix). The scatter plots indicate generally linear relationships among the constructs.

Table 5 indicates that the correlation tests revealed significant and positive relationships among all examined pairs of variables. Students' attitudes toward using GenAI for educational purposes are strongly influenced by performance expectancy (r = 0.755) and effort expectancy (r = 0.630). However, to measure predictability of the value of the dependent variable (students' attitudes toward the use of use of GenAI for educational purposes) based on independent variables (performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, and privacy confidence), regression analysis was conducted (**Table 6** and **Table 7**).

The multiple linear regression analyses used a direct method of entry. However, before conducting the regression, more assumptions rather than normality, linearity, and the absence of extreme outliers, that were checked earlier, were verified that include lack of

Table 8. Coefficient estimates from the standard regression model

	B	Standard error	Beta	t	Significance
(Constant)	-0.38	0.25		-1.530	0.127
Performance expectancy	0.54	0.07	0.47	7.280	0.000
Effort expectancy	0.11	0.08	0.10	1.440	0.152
Social influence	0.22	0.07	0.19	3.000	0.003
Facilitating conditions	0.12	0.09	0.10	1.370	0.171
Self-efficacy	0.02	0.09	0.01	0.200	0.842
Enjoyment	0.02	0.08	0.02	0.205	0.838
Privacy confidence	0.08	0.06	0.08	10.33	0.185

multicollinearity and homoscedasticity (Stevens, 1990). For homoscedasticity, visual inspection of scatter plots and residual plots confirmed that the relationships between predictors and the dependent variable (attitude) were linear and that variances remained consistent across levels of the predictors. For the multicollinearity, it was assessed using variance inflation factors (VIF). All VIF values were well below the threshold of 5.0, indicating no significant multicollinearity between the correlated predictors. All statistical tests were conducted at a significance level of α = .05. The results indicate that the independent variables included in this study explained 65% of the variance in students' attitudes toward using GenAI for educational purposes. The test statistics were significant at the 0.05 significance level ($F [7, 171] = 47.30$; $p = 0.00$).

Table 8 presents the standardized beta coefficients, which compare the relative strength of each independent variable's effect on the dependent variable. The results indicated that there are only two independent variables: performance expectancy (beta = .47; p = 0.00) and social influence (beta = .19; p = .003). Both variables were individually significant predictors of students' attitudes toward using GenAI for educational purposes and exerted the most decisive influence on those attitudes. Results indicated that performance expectancy and social influence were the two most important factors that significantly predicted students' attitudes toward using GenAI for educational purposes. The other five independent variables made minor contributions to predicting students' attitudes toward using GenAI for educational purposes. This indicates that students' increased belief that using GenAI will help them achieve better performance in their education, and the support or social influence of those around them, significantly contributes to enhancing their positive attitudes toward adopting GenAI for educational purposes.

Other factors, including performance expectancy, facilitating conditions, self-efficacy, enjoyment, and privacy confidence, did not show statistical significance, indicating that their predictive ability in this context was limited or indirect. This may be because students may have become so comfortable using GenAI tools such as ChatGPT that ease of use, enjoyment, or privacy concerns are secondary to perceived benefits and social support. While students who do not use GenAI may have limited awareness or understanding of its functionalities, leading to uncertainty or skepticism that reduces the influence of these factors. Instead, their perceptions may be shaped more by external influences, such as peer attitudes or institutional policies, rather than personal experiences with the tool. These findings highlight the importance of focusing awareness or training programs on demonstrating the practical benefits of using GenAI and fostering a supportive social environment by highlighting positive experiences of peers or colleagues in the user's environment, to foster adoption of such technology. GenAI tools such as ChatGPT are designed with highly intuitive, conversational interfaces that minimize the cognitive and technical effort required for use, while also being widely accessible with minimal infrastructural requirements. Consequently, factors such as ease of use and available support may be taken for granted, functioning as baseline expectations rather than distinguishing determinants, which reduces variability and leads to potential ceiling effects. Furthermore, large percentage of the participants were from instructional technology-related majors and they likely possesses high levels of digital literacy, prior exposure, and AI self-efficacy, making these factors less influential in shaping behavioral intention. In such contexts, students tend to be more performance- and outcome-oriented, which may diminish the role of enjoyment as a motivator, while privacy confidence may remain limited in influence if users either inherently trust the technology or perceive privacy risks as less relevant in academic settings. These findings provide selective support for the UTAUT framework (Venkatesh et al., 2003), while the significance of performance expectancy and social influence aligns with UTAUT's core constructs, the lack of significance for effort expectancy and facilitating conditions suggests that these may play a lesser role in shaping students' attitudes in the context of GenAI. The findings regarding identifying performance expectancy as a key determinant of GenAI adoption aligned with findings of previous studies (Budhathoki et al., 2024; Honig et al., 2025; Jang, 2024). However, the findings regarding identifying social influence as a key determinant of GenAI adoption aligned with the findings of previous studies. For instance, Jang (2024) found that encouragement from peers, instructors, and institutional norms significantly shaped students'

attitudes toward GenAI. In addition, such findings contrasted with previous studies that found limited social influence on students' adoption of GenAI (Honig et al., 2025; Hsiao & Tang, 2024). Such variation might be attributed to cultural factors. Furthermore, while the current study found other factors, including effort expectancy, enjoyment, and self-efficacy, contributed only minor predictive value, some prior studies found that perceived enjoyment had a more substantial influence than usefulness (Cano & Nunez, 2024). These discrepancies highlight the context-specific nature of GenAI adoption.

Limitations of the Study

As in any other research study, the current study has some limitations. One of these limitations is related to the gender imbalance, where despite contextual justification of such imbalance in the sample, this imbalance may limit the generalizability of the findings to the broader Kuwaiti university student population, particularly male students. Another threat generalizability of the findings was related to the sample size, although the sample size met established statistical guidelines for multiple regression (Tabachnick & Fidell, 1996), larger samples are generally preferable to reduce the risk of overfitting and improve the generalizability of the findings. In addition, the findings of the current study are based on responses from students in the college of education only from single institution in Kuwait. Furthermore, the way of recruiting participants in the current study may introduce selection bias. As a result, the findings should be interpreted with caution in terms of representativeness of the sample. Due to the exploratory nature of GenAI use, attitudes were used as an early proxy for adoption; however, they do not fully capture core UTAUT model outcomes (behavioral intention and use), so findings should be interpreted as predictors of attitudes rather than a full UTAUT test. Another limitation of this study is related to the study's procedure that participants were recruited from multiple classes, suggesting a nested data structure (students within classes), yet class-level identifiers were not retained. Thus, analyses assumed independence and could not account for clustering effects.

CONCLUSION AND RECOMMENDATIONS

Most Kuwaiti university students have GenAI accounts, with ChatGPT being the most common type of GenAI among students. The majority of students use GenAI applications for personal and educational purposes. Students have positive attitudes toward the use of GenAI for educational purposes. Students' attitudes were positively associated with their favorable perceptions of GenAI regarding performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, enjoyment, and privacy confidence. However, only performance expectancy and social influence emerged as significant statistical predictors of Kuwaiti university students' acceptance of using GenAI for educational purposes. The findings provide partial support for the assumptions of the UTAUT model, indicating that individuals' acceptance of technology is primarily driven by their perceptions of usefulness that was measured through performance expectancy and positive social influence, while other factors such as facilitating conditions and effort expectancy appear to play a limited or non-significant role in predicting acceptance in this context. The results offer selective support for the cross-cultural validity of the UTAUT model, as only two of its core factors significantly influenced students' acceptance of using GenAI for educational purposes.

The current study's findings can help practitioners enhance technology implementation in higher education, particularly using GenAI. Faculty members may find practical value and implications regarding integrating GenAI into their instructional practices in the study's results. Higher education practitioners are encouraged to incorporate GenAI in ways that effectively support student learning. However, based on the findings of the current study that college of education students in were already familiar with GenAI and showed high performance expectancy and positive attitudes, instructors should focus on embedding GenAI in performance-oriented academic tasks such as assignments, feedback, and problem-solving activities that clearly show its learning benefits. Also, since social influence significantly predicted attitudes, peer demonstrations, instructor modeling, and institution support should be emphasized. The participants reported relatively low privacy confidence, and that require from the faculty members and initiation's administrators provide students with clear ethical guidelines and data privacy awareness in the course design that integrate GenAI. Also, the implementation of GenAI should also be accompanied by initiatives aimed at shaping the perceptions of individuals who may influence students' attitudes and behaviors toward their use in academic settings. Future research could build on the findings of this study by employing extended versions of the UTAUT model to explore additional factors that may influence students' acceptance of GenAI integration in their learning. Identifying such factors would contribute to designing and implementing GenAI in higher education. Future studies should include larger and more diverse samples representing a wide range of demographic characteristics to improve generalizability of the results. Future research is recommended to include more participants and more diverse and gender-balanced samples across multiple academic fields and institutions. Also, future studies are recommended to employ more rigorous sampling strategies, such as

random or stratified sampling across multiple institutions and disciplines, to reduce selection bias and enhance the representativeness and generalizability of the findings. Also, future studies should incorporate behavioral intention and actual use to better align with core UTAUT model outcomes, as attitudes alone provide only a partial indication of technology acceptance.

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Ethical statement: Ethical considerations were carefully observed throughout the study. Data were collected through an anonymous online questionnaire administered to adult university students. Participation was entirely voluntary, and informed consent was obtained from the participants prior to completing questionnaire. No personally identifiable or sensitive information was collected, and all responses were kept confidential and used solely for research purposes. Data were stored securely and reported only in aggregate form to protect participants' privacy. Formal ethics committee approval was not required because this study involved anonymous survey responses from consenting adult participants, posed minimal risk, and did not collect sensitive data or involve any intervention, clinical procedures, or vulnerable populations.

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