An-Najah University Journal for Research – B
Humanities
مجلة جامعة النجاح للأبحاث – ب
العلوم الإنسانية

Exploring the Predictive Factors for Undergraduate Students' Adoption and Utilization of ChatGPT

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(Type: Full Article). Received: 20th Jan. 2025, Accepted: 12nd Nov. 2025
Accepted Manuscript، In Press

Abstract: Objective: This study examines the key factors influencing the acceptance and use of ChatGPT among Middle Eastern university students. **Methodology:** The study's sample was selected through snowball sampling, with participants recruited via social media platforms and invited to complete an online survey available in both Arabic and English whose translation was validated by two professors and piloted with a small group, ultimately yielding 407 responses. **Results:** Results from structural equation modeling (SEM) indicate that students' 'Use Behavior' of ChatGPT is significantly influenced by 'Behavioral Intention' and 'Facilitating Conditions.' In contrast, 'Effort Expectancy,' 'Performance Expectancy,' 'Facilitating Conditions,' and 'Social Influence' showed no meaningful effect on 'Behavioral Intention' to use ChatGPT. The findings also showed that the gender variable did not have a substantial effect on the relationships between the model variables. **Conclusions:** The results indicate that organizational and environmental factors, such as the availability of technical support and appropriate infrastructure, play an important role in promoting students' use of artificial intelligence tools in higher education. **Recommendations:** Based on these findings, the study recommends that future research investigate ChatGPT adoption across diverse educational settings and that higher education institutions develop guidelines and strategies for the effective and responsible use of AI tools and provide targeted training programs for both students and instructors to ensure the effective, ethical, and responsible integration of such technologies in teaching and learning.

Keywords: Artificial intelligence, Higher education, ChatGPT, Technology adoption, UTAUT, SDG 4: Quality education

العوامل التنبؤية لتبني واستخدام طلبة البكالوريوس لتطبيق ChatGPT

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تاريخ التسليم: (2025/1/20)، تاريخ القبول: (2025/11/12)

الملخص: الهدف: تهدف هذه الدراسة إلى استكشاف العوامل التنبؤية التي تؤثر في تبني واستخدام طلبة البكالوريوس لتطبيق ChatGPT في التعليم الجامعي، في ظل الانتشار المتزايد لأدوات الذكاء الاصطناعي التوليدي وتأثيرها في بيئات التعلم الحديثة. **المنهجية:** اعتمدت الدراسة المنهج الكمي باستخدام استبانة ذاتية مبنية على نموذج النظرية الموحدة لقبول واستخدام التكنولوجيا ((UTAUT. شارك في الدراسة 407 طالبًا وطالبة من تخصصات أكاديمية مختلفة في عدد من الجامعات في الشرق الأوسط. وتم تحليل البيانات باستخدام نمذجة المعادلات الهيكلية ((SEM لاختبار العلاقات بين متغيرات النموذج. **النتائج:** أظهرت النتائج أن كلًا من النية السلوكية والظروف الميسرة لهما تأثير دال إحصائيًا في سلوك استخدام ChatGPT لدى الطلبة. في المقابل، لم يظهر كل من توقع الأداء وتوقع الجهد والتأثير الاجتماعي تأثيرًا ذا دلالة إحصائية في النية السلوكية لاستخدام ChatGPT. كما أظهرت النتائج أن متغير النوع لم يكن له تأثير جوهري في العلاقات بين متغيرات النموذج. **الاستنتاجات:** تشير النتائج إلى أن العوامل التنظيمية والبيئية، مثل توفر الدعم التقني والبنية التحتية المناسبة، تلعب دورًا مهمًا في تعزيز استخدام الطلبة لأدوات الذكاء الاصطناعي في التعليم العالي. **التوصيات:** توصي الدراسة الجامعات بضرورة تطوير سياسات واضحة لتنظيم استخدام أدوات الذكاء الاصطناعي، إلى جانب توفير برامج تدريبية موجهة للطلبة وأعضاء هيئة التدريس لضمان الاستخدام الفعال والأخلاقي والمسؤول لهذه التقنيات في العملية التعليمية.

الكلمات المفتاحية: الذكاء الاصطناعي، التعليم العالي، ChatGPT، تبني التكنولوجيا، UTAUT، الهدف الرابع من أهداف التنمية المستدامة: التعليم الجيد

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Introduction

ChatGPT has significantly improved AI communication approaches, bridging the gap between human-machine interactions (Raschka & Mirjalili, 2017). ChatGPT does more than answer simple inquiries—it serves a variety of functions. According to Ortiz (2024), ChatGPT's ability to engage in tasks such as essay writing, philosophical discussions, math, and coding demonstrates AI's growing capability to facilitate advanced human-machine interactions. It surpasses previous models in terms of generation capacity, language accuracy, and adaptability (Hubert *et al*., 2024). AI-driven language processing has advanced to the point where it can handle various natural language processing tasks, including text completion, translation, summarization, and question answering, without requiring task-specific fine-tuning (Shah *et al*., 2023). The progress of ChatGPT reflects ongoing efforts to test AI's ability to emulate or augment human communication, opening new frontiers in NLP and interaction (Yosifova, 2023). Most notably, ChatGPT has proven particularly effective in assisting students struggling with their assignments (Rudra, 2023).

Despite its capabilities, ChatGPT raises ethical concerns in education, including data security, algorithmic bias, and the depersonalization of learning experiences, which necessitate careful consideration for classroom use (Akgun & Greenhow, 2022). While ChatGPT can enhance learning experiences and streamline educational processes, its potential to transmit incorrect information and undermine critical thinking skills necessitates thorough examination.

Rationale for the study

The emergence of ChatGPT has generated considerable debate among scholars, with discussions centered on its potential, opportunities, and challenges (Emenike & Emenike, 2023; Strzelecki *et al*., 2024). The focus has shifted from debating whether students should use AI tools to exploring how AI tools, such as ChatGPT, are adopted and utilized. However, there is little research into the factors that influence its acceptance and use, particularly in academic settings. This study aims to contribute to the field of educational technology by examining factors that may influence the adoption of ChatGPT among undergraduate students.

Our literature review revealed a gap in research on the acceptability and usability of ChatGPT within the academic sphere in the Arab Peninsula, particularly in Saudi Arabia, where the adoption of AI tools is on the rise (Bensalem *et al*., 2024). This research aims to bridge the gap by investigating the use of ChatGPT among students in Saudi academic institutions, thereby contributing to the existing body of literature on AI-powered educational tools.

This study examines the factors that influence students' acceptance and adoption of ChatGPT, utilizing the UTAUT model proposed by Venkatesh *et al*. (2003). Performance expectancy, effort expectancy (Venkatesh *et al*., 2003), social influence (Venkatesh *et al*., 2003), and conducive conditions were found to be the four main factors that influence people's acceptance and usage of technology (Dwivedi *et al*., 2019; Venkatesh *et al*., 2003). While extensive research exists on UTAUT, re-examining this model is crucial given the rapid growth in ChatGPT users and its widespread availability, as well as the limited research on students' acceptance of this emerging technology. Therefore, this study aimed to fill this gap by employing PLS-SEM analysis of participant

data to establish the structural relationships among these constructs, thereby providing deeper insights into college students' views on ChatGPT in an educational context. The study also aims to examine the relationships among these factors—Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions—and their impact on students' Behavioral Intention and actual Use Behavior. This study is among the first to investigate the acceptance and use of ChatGPT among undergraduate students in Saudi Arabia, applying the UTAUT model and PLS-SEM to examine both the factors influencing adoption and the structural relationships among them, thereby providing new empirical insights into AI integration in higher education in the Middle East. This study is guided by the following main question:

What are the factors that may influence undergraduate students' adoption of using ChatGPT by university students in Saudi Arabia?

Literature review

The utilization of AI and ChatGPT in higher education

Lim *et al*. (2023) assert that ChatGPT has the potential to revolutionize higher education by integrating AI into various pedagogical tasks, enabling higher education institutions (HEIs) to utilize it across different systems and platforms. Based on data from students or instructors, ChatGPT can enhance student learning, provide diverse expressions, and offer personalized feedback (Hwang & Chen, 2023). According to Ivanov and Soliman (2023), ChatGPT serves as a collaborative coach, navigator, and co-designer for task-solving, curriculum development, and data analysis, as well as a study companion and motivator for learning through games. It also functions as an interactive evaluator for student work, exploring how generative AI is applied in higher education assessments and emphasizing its ability to deliver prompt feedback and enhance assessment efficiency (Khlaif *et al*., 2024).

Moreover, Automated Written Corrective Feedback (AWCF) systems can complement teacher-led feedback and support EFL learning in diverse digital contexts (Elmotri & Smaoui, 2024). Their integration into Learning Management Systems has also facilitated remote assessment and progress monitoring (Desoky & Elmotri, 2024). Research further suggests that AI-supported language learning is most effective when feedback is explicit, timely, and aligned with learners' needs and pedagogical contexts (Elmotri, Abdelwahab, *et al*., 2025; Elmotri, Harizi, *et al*., 2025). Thus, AI-based tools are best viewed as targeted pedagogical support rather than substitutes for conventional instruction.

However, the use of ChatGPT in universities raises significant ethical issues and challenges (Lund *et al*., 2023). Plagiarism and cheating are becoming increasingly common, a significant concern for many institutions and educators. Cotton *et al*. (2024) and Perkins (2023) highlight concerns regarding the efficacy of current plagiarism detection systems regarding content generated by ChatGPT. Moreover, Hamamra *et al*. (2024) stated that while ChatGPT can enhance personalized learning and engagement, its use in higher education also raises concerns about academic integrity, over-reliance, and the need for students to critically evaluate and adapt AI-generated content.

ChatGPT's lack of regulation and cognitive bias issues raise concerns about its rapid expansion, particularly in the absence of adequate risk assessment and protocol sharing (Kasneci *et al*., 2023; Lund & Wang, 2023). In terms of privacy (Dwivedi *et al*., 2019), accessibility (Venkatesh *et al*., 2016), and

commercialization (Dwivedi *et al*., 2019; Rogers, 2003), AI technologies in higher education require thorough examination and regulation to ensure equity and fairness (Rudolph *et al*., 2023). Recent studies suggest that teachers' confidence in using AI can be enhanced through knowledge and experience, and that workshops on AI-powered evaluation and tool utilization can improve this understanding (Nazaretsky *et al*., 2022).

AI-driven AWCF tools such as ChatGPT have shown considerable potential for enhancing EFL writing through personalized and responsive feedback. Research indicates that ChatGPT can improve linguistic accuracy and support self-regulated learning (Alanazi *et al*., 2025), while its use in ESP writing contexts has been associated with improvements in writing performance, language use, and higher-order skills (Elmotri, Abdelwahab, *et al*., 2025). However, effective implementation also depends on adequate technological infrastructure, teacher preparedness, and appropriate ethical and institutional support. Thus, the value of AI-driven AWCF lies not only in its feedback capabilities but also in the conditions that enable its effective pedagogical use.

Acceptance of ChatGPT and Behavioral Intentions among Students

The UTAUT framework can help clarify students' acceptance and behavioral intentions (BI) for ChatGPT in the classroom. According to Magsamen-Conrad *et al*. (2015), expectations of performance (PE), effort (EE), social influence (SI), and enabling conditions (FCs) are critical determinants of consumers' acceptance and usage habits. A model's effectiveness in improving learning experiences affects students' BIs. They are more likely to incorporate it into their learning activities. Factors influencing this perception include intuitiveness, user interface quality, and overall experience (Venkatesh *et al*., 2003). Social Influence considers how teachers and classmates affect students' perceptions of ChatGPT. According to research, positive word-of-mouth about using ChatGPT in the classroom is likely to have a ripple effect, improving the BI of other students. The accessibility, tools, training, and institutional support essential for practical use is evaluated by facilitating conditions (FCs).

People are becoming more reliant on technology for their day-to-day chores, making the topic of technology adoption and use more prominent (Dwivedi *et al*., 2019; Venkatesh *et al*., 2016). Venkatesh *et al*. (2003) developed the UTAUT, a noteworthy theory for predicting technology adoption, by integrating eight previous models of IT acceptance. Yu *et al*. (2021) describe UTAUT as a theory of ideas and user experiences to understand information system acceptance. The model encompasses components such as performance expectancy (PE), effort expectancy (EP), SI (Venkatesh *et al*., 2003), and facilitating conditions (FC), all of which influence people's behavioral intention to adopt and use technology in higher education (Venkatesh *et al*., 2012). Factors such as gender, age, and experience are considered moderating variables in the UTAUT framework.

Studies on smartphone usage in higher education often examine the UTAUT model as a framework for understanding technology adoption, particularly in Google Learning, e-learning platforms, LMSs, and collaborative Web 2.0 apps (Strzelecki *et al*., 2024). The original UTAUT hypothesis includes four moderators. UTAUT2 retained three moderating features—gender, age, and experience—and removed one (voluntary usage). According to Dwivedi *et al*. (2019), previous UTAUT/UTAUT2 research often used only a subset of the model and failed to account for all its modifiers. They suggest that

performance expectancy, particularly the belief that ChatGPT enhances job performance, has a positive influence on behavioral intention, with system familiarity being a crucial factor. Venkatesh *et al*. (2023) found that students' satisfaction with the system is crucial for effective use of ChatGPT. Their study examines the effects of EE related to ChatGPT's AI chat system—its ease of use, lack of interruptions, and low demand for student effort (Venkatesh *et al*., 2023). The study suggests that SI, FC, and PE affect behavioral intentions (BE), with gender and study level impacting social influence. Facilitating conditions, such as an administrative framework, can significantly affect the accessibility and user experience of AI chat (Strzelecki *et al*., 2024).

Finally, researchers have demonstrated that students' behavioral intentions regarding ChatGPT in educational contexts can be better understood through the UTAUT paradigm (e.g., Sobaih *et al*., 2024; Strzelecki *et al*., 2024).

Theoretical foundation

The UTAUT, developed by Venkatesh *et al*. (2003), is one of the most influential frameworks for predicting how individuals accept and use new technologies. The UTAUT model is widely regarded as a dependable framework for assessing technology adoption in higher education. Researchers frequently use it to examine users' intentions and early stages of technology use (Nikolopoulou *et al*., 2021), including applications for AI tools (e.g., Acosta-Enriquez *et al*., 2024; Menon & Shilpa, 2023; Sobaih *et al*., 2024; Strzelecki & ElArabawy, 2024). Venkatesh *et al*. (2003) found that four variables—"Performance expectancy," "Effort expectancy," "Facilitating conditions (FC)," and "Social influence" (SI)—were influencing users' adoption and use behaviors (Magsamen-Conrad *et al*., 2015). Furthermore, the UTAUT model includes individual characteristics that serve as moderators for these primary dimensions, including gender, age, and experience. PE is defined as the extent to which a person believes that using a specific technology will boost their productivity at work (Venkatesh *et al*., 2003).

In other words, this model was selected because it offers stronger predictive power than earlier technology acceptance models and has been widely validated across diverse educational contexts. Its ability to integrate multiple dimensions of technology adoption and account for moderating factors such as gender and age makes it especially appropriate for investigating emerging technologies like ChatGPT in higher education. Moreover, its recent extensions to AI-related studies confirm its suitability for capturing students' intentions and actual use behaviors regarding generative AI tools.

In this study, PE refers to undergraduate students' views on whether ChatGPT can assist them in completing assignments and enhancing their learning experiences. In light of this, we present the following hypothesis:

H1. PE has a significant influence on participants' BI to utilize ChatGPT, and this effect is gender-moderated.

"Effort Expectancy" refers to a user's assessment of a technology's ease of use (Venkatesh *et al*., 2012). Venkatesh (2022) argues that this factor directly affects an individual's intention to use AI tools, including ChatGPT. Previous studies have revealed that when students expect less effort in utilizing ChatGPT, they are more likely to incorporate it into their educational routine (Shaengchart *et al*., 2023). In light of this, we present the following hypothesis:

H2. EE *significantly affects students' BI to use ChatGPT,* and this effect is gender-moderated.

The "Facilitating Conditions" element refers to the degree to which someone believes that the tools and assistance needed to use a technology effectively are readily accessible (Venkatesh *et al*., 2003). In the original UTAUT, facilitating conditions are theorized to influence use behavior directly rather than through behavioral intention, because the availability of resources and support enables actual use of a technology (Venkatesh *et al*., 2003). Prior studies have likewise indicated that perceptions of available training and institutional support for integrating ChatGPT into the classroom can shape students' actual use of it (Ivanov & Soliman, 2023; Sobaih *et al*., 2024; Strzelecki, 2023; Strzelecki & ElArabawy, 2024). In light of this, we present the following hypothesis:

H3. Facilitating conditions have a significant positive effect on students' use behavior (UB) of ChatGPT.

SI is related to the degree to which someone believes that others anticipate them using ChatGPT (Venkatesh *et al*., 2003). Students surrounded by individuals who advocate for using ChatGPT in education are more likely to have their Behavioral Intention (BI) influenced (Menon & Shilpa, 2023). In light of this, we present the following hypothesis:

H4. Social influence has a significant effect on participants' BI to use ChatGPT, and this effect is gender-moderated.

One of the most important factors in the acceptance and use of the technology is the correlation between ChatGPT and actual usage. BI was described by Venkatesh *et al*. (2003) as the readiness and willingness of people to engage with a specific technology. The way technology is used is directly influenced by this aim (Terblanche & Kidd, 2022). Several studies (Menon & Shilpa, 2023) have demonstrated that students are more likely to use ChatGPT when they express a positive Behavioral Intention toward it, indicating that they are prepared to incorporate it into their tasks or routines. In light of this, we present the following hypothesis:

H5. *The behavioral intention will have a significant positive influence on students' use of ChatGPT.*

Figure 1 presents an overview of every relationship in the research conceptual framework.

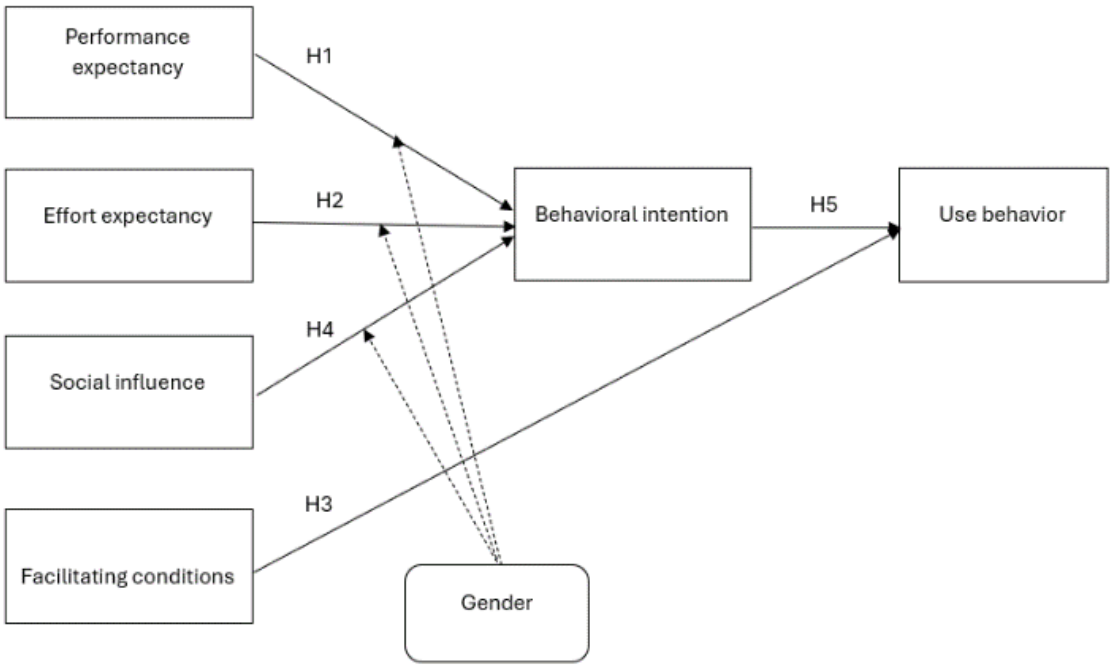

Figure (1): Proposed model.

Method

Participants and procedures

This study focused on university students in Saudi Arabia who were familiar with and utilized ChatGPT for their coursework. During the spring 2024 semester, data were gathered using a snowball sampling technique. This technique was chosen because the target population is difficult to access directly, and no comprehensive list of participants exists. Using referrals from initial participants facilitated trust, improved access, and enabled efficient data collection. Although not statistically representative, this method is well-suited for exploratory research and generates rich, in-depth insights. Following Ting *et al*. (2025), "snowball sampling … is widely recognized as an effective technique for accessing hard-to-reach populations and enhancing participation through social connections" (p. 2).

Using Google Forms, an online survey was constructed, and participants had access to an Arabic version since some felt more at ease answering in their native language. Two professors specializing in translation verified the accuracy of the translation. In a pilot study with a comparable small sample, prospective participants were sent a survey link via Facebook, Twitter, and WhatsApp. Of the 407 replies collected, 70% of participants identified as female. Only 11 of the 407 participants (2.7%) were graduate students, limiting the generalizability of the findings to this group. Future research should use more balanced samples across academic levels to examine differences in ChatGPT use and intentions.

Table (1): Demographic Details of Participants (N = 407).

Variable	Frequency	Percentage
Gender		
Male	122	30.0
Female	285	70.0
Age		
18–21	216	53.1
22–25	145	35.6
26 and above	46	11.3
Year of Study		
1st year	119	29.2
2nd year	65	16.0
3rd year	86	21.1
4th year	126	31.0
Graduate	11	2.7
Discipline		
Arts and Humanities	177	43.5
Math and Science	115	28.3
Engineering	50	12.3
Others	65	16.0

Instrument

The following factors are included in the measuring scale, which was adapted from the instrument of Venkatesh *et al*. (2012), as shown in Appendix A: "PE," "Effort Expectancy," "SI" (triumphal goods), "FC," and "BI." PE was measured using four items; EE, SI, FC, and BI were measured using three, four, and four items, respectively. A five-point Likert scale was used to rate each construct, with 1 denoting "strongly disagree" and 5 denoting "strongly agree". The seven-point rating system of Strzelecki (2023) was also used to evaluate the construct UB. The response possibilities were: "several times a day," "once a day," "several times a week," "once a week," "several times a month," "once a month," and "never." The validity and reliability criteria were applied to all variables, indicating that the scale consistently demonstrates reliability in gauging students' adoption of ChatGPT in higher education. The average variance extracted (AVE) was greater than 0.5, and the reliability coefficients, including Cronbach's alpha and composite reliability, were all above 0.7.

Data analysis

We employed Partial Least Squares Structural Equation Modeling (PLS-SEM) for path analysis using the SmartPLS 4 software (Hair *et al*., 2019; Pinto & Assaker, 2015).

Table (2): Description of Measurement Scale and Factor Loadings.

Construct	Item number	Loading
Performance expectancy	PE1	0.865
	PE2	0.906
	PE3	0.880
	PE4	0.845
Effort expectancy	EE1	0.866
	EE2	0.895
	EE3	0.900
	EE4	0.832
Social influence	SI1	0.895
	SI2	0.911
	SI3	0.884
Facilitating conditions	FC1	0.867
	FC2	0.881
	FC3	0.862
	FC4	0.752
Behavioral Intention	BI1	0.892
	BI2	0.892
	BI3	0.930
Use Behavior	UB1	1.000

Results

We computed the psychometric properties of the constructs using Cronbach's α, average variance extracted (AVE), and composite reliabilities (CRs) to assess the measurement model. Strong convergent validity was indicated by standardized loadings of 0.7 or higher for every item on the scale. Additionally, every Cronbach's α and CR score above the minimum criterion of 0.7, indicating that the items and constructs exhibit internal consistency (refer to Table 2). All constructs' AVE readings were higher than the suggested cutoff point of 0.5, as suggested by Fornell and Larcker (1981). Convergent validity was satisfactory, as every AVE achieved a value of 0.5 or higher.

We prove discriminant validity using the method proposed by Fornell and Larcker (see Table 3). Furthermore, the Heterotrait-Monotrait (HTMT) ratio of association, more reliable than Fornell and Larcker's approach, was used to evaluate discriminant validity. Values of HTMT greater than 0.9 suggest possible problems with discriminant validity. Nevertheless, as can be shown in Table 4, every HTMT ratio was below the 0.9 cutoff, indicating discriminant validity.

Table (3): Reliability and validity values of constructs.

Construct	Cronbach's α	CR	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
Performance expectancy	0.897	0.96	0.897	0.928	0.764
Effort expectancy	0.897	0.97	0.901	0.928	0.764
Facilitating Conditions	0.862	0.97	0.871	0.907	0.709
Social influence	0.878	0.96	0.879	0.925	0.804
Behavioral intention	0.903	0.97			0.838

Table (4): Discriminant validity.

	BI	EE	FC	PE	SI	UB
BI	0.898					
EE	0.679	0.874				
FC	0.715	0.76	0.842			
PE	0.789	0.778	0.743	0.874		
SI	0.683	0.609	0.676	0.694	0.896	
UB	0.522	0.531	0.505	0.581	0.516	1

The bootstrapped R^2 values showed that PE, EE, SI, and FC combined accounted for 30% of the variance in BI. Furthermore, PE, EE, SI, FC, and BI accounted for 68% of the variance in ChatGPT usage (see Figure 2).

Hypotheses H1, H2, and H4 were not supported, whereas H3 (FC → UB) and H5 (BI → UB) were supported (see Table 5).

Table 5 illustrates the findings of the moderating effect analysis, which indicated that gender had no statistically significant influence on the correlations between the dependent and predictor variables evaluated.

Table (5): Results of Path Analysis.

Hypothesis	Path	Path coefficient	f^2 effect size	*P value*	Decision
H1	PE → BI	0.470	0.211	0.135	No
H2	EE → BI	0.036	0.001	0.949	No
H3	FC → UB	0.270	0.051	0.002	Yes
H4	SI → BI	0.198	0.056	0.786	No
H5	BI → UB	0.329	0.076	<0.001	Yes

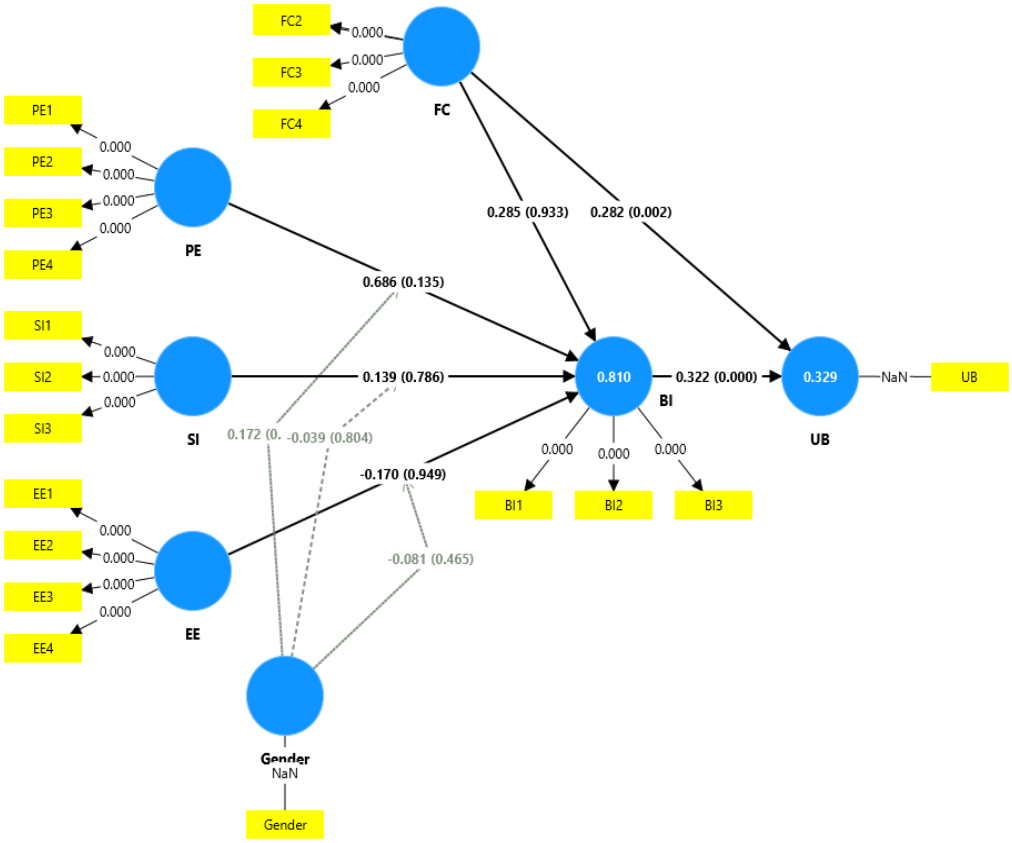

Figure (2): Results of the proposed model.

Discussion

This research investigated the underlying factors that predict university students' acceptance and use of ChatGPT. Results of SEM reveal that 'Behavioral intention' significantly influences 'Use behavior,' confirming H5. This outcome agrees with the conclusions of Sobaih *et al*. (2024) and Strzelecki and ElArabawy (2024). In addition, 'Facilitating conditions' were also predictors of use behavior, confirming H3. This result supports the findings of Strzelecki and ElArabawy (2024), who found that "Facilitating conditions" significantly influenced how Polish and Egyptian students used technology. This suggests that what encourages students to use ChatGPT is its user-friendliness and accessibility for a wide range of tasks. Other factors that facilitate easy use of ChatGPT include access via various interfaces, such as web browsers and mobile applications, which provide flexibility in user interaction.

Even though each of the items of the constructs of 'EE, PE, FC, and SI had a loading above the required value of 0.7, they still did not have a significant effect on BI. Hypothesis H2 was rejected because EE was not a predictor of BI. Similar results were reported by Strzelecki and ElArabawy (2024) with the Egyptian sample. However, they contradicted the findings reported by the same study with the Polish sample and in an earlier study by Strzelecki (2023).

In contrast to the results published in earlier research (Sobaih *et al*., 2024; Strzelecki, 2023;

Strzelecki & ElArabawy, 2024), PE was not a factor in determining BI, rejecting hypothesis H1. It should be noted that 'Facilitating conditions' did not significantly predict BI; however, this path was not hypothesized. Consistent with the original UTAUT (Venkatesh *et al*., 2003), H3 posited a direct effect of facilitating conditions on use behavior (FC → UB), which was supported, as discussed above. The non-significant FC → BI path nonetheless differs from some previous studies (e.g., Sobaih *et al*., 2024). Finally, 'Social Influence' did not significantly influence BI, rejecting H4. This outcome was unexpected given that Saudi students are classified as belonging to a collective culture, which suggests that people's behavioral intentions are greatly influenced by their friends, families, and coworkers (Sobaih *et al*., 2024).

Recent Palestinian scholarship offers a critical comparative perspective that can deepen the discussion of ChatGPT adoption in Saudi higher education. Hamamra, Khlaif, and colleagues highlight the promise and precarity of AI integration, emphasizing both the opportunities for pedagogical innovation and the risks of dependency and inequity (Alhur *et al*., 2025; Hamamra, Khlaif, & Mayaleh, 2025). Their phenomenological analyses of educators' lived experiences demonstrate how institutional pressures and cultural contexts shape AI acceptance, often diverging from UTAUT's assumptions (Hamamra, Khlaif, Mayaleh, *et al*., 2025). Complementing these insights, Ayyoub *et al*. (2025) extend the UTAUT framework to account for contextual drivers of acceptance, while Khlaif *et al*. (2025) highlight technostress as an underexplored barrier to the sustainable use of AI. Taken together, these studies underscore the necessity of situating quantitative models, such as those employed in the present Saudi study, within broader qualitative and regional accounts of educators' and students' experiences. Doing so would not only strengthen the cross-cultural validity of the findings but also provide a richer understanding of how generative AI reshapes higher education across the Arab world.

The potential moderating effect of gender was incorporated into the model. Prior studies suggest that gender does not significantly influence the relationships between predictors and participants' Behavioral Intention (BI) or Use Behavior (UB) (Dwivedi *et al*., 2021; Venkatesh *et al*., 2003). In our study, however, female students demonstrated slightly higher BI toward using ChatGPT compared to male students, particularly regarding Effort Expectancy (EE) and Social Influence (SI). This indicates that female students may perceive ChatGPT as easier to use and are more receptive to social encouragement when engaging with AI tools. These observations align with previous research on gender differences in technology adoption (Sobaih *et al*., 2024; Strzelecki, 2023; Strzelecki & ElArabawy, 2024), suggesting that adopting gender-sensitive strategies could enhance student engagement and the effective use of ChatGPT in higher education settings.

Implications

This study enhanced our understanding of the variables that may influence the adoption of ChatGPT in tertiary education. More specifically, it was found that FC played a crucial role in enhancing students' use of ChatGPT. Therefore, policymakers need to devise clear policies that ensure the appropriate use of AI tools. Students should be informed about how to use ChatGPT and the restrictions. University officials must provide students with easy access to such tools, especially the paid versions, as enhanced features can help students complete their assignments and enhance their learning. Training programs for students and faculty may help raise awareness of policies and best practices for integrating AI-

powered tools into the educational system. In this regard, Strzelecki and ElArabawy (2024) argue that the UTAUT framework should be expanded in the AI context to include training on the ethical utilization of AI tools.

Limitations

This study has several limitations that we must acknowledge. First, we collected data mostly from undergraduate students. Only 11 graduate students participated in the study. Thus, it may not be possible to generalize the findings to all student populations. Future studies may consider involving an equal number of undergraduate and graduate students to gain a comprehensive understanding of students' intentions and use of ChatGPT. Second, in this study, we only used self-reported measures, which are susceptible to response bias and may not accurately reflect users' actual actions and experiences. Collecting additional qualitative data through interviews could provide a more comprehensive understanding of students' adoption and use of ChatGPT. Furthermore, this study investigated the moderating effect of only one variable, namely gender. Other studies should explore other factors, such as major and year of study.

Conclusion

The primary goal of this research is to investigate the underlying elements that influence university students' acceptance and use of ChatGPT at the tertiary level. The findings revealed that BI and FC have a strong influence on students' UBs for ChatGPT. Examining how students use ChatGPT is still a relatively new area of study. Scholars should consider exploring factors that affect students' use of ChatGPT across different educational contexts and diverse student populations. Furthermore, the paper highlights implications for researchers and higher education institutions, encouraging future initiatives to promote the effective integration and use of ChatGPT.

Disclosure Statement

- **Ethical approval and consent to participate:** Participation in this study was voluntary. Informed consent was obtained from all participants prior to data collection, and the study followed standard ethical guidelines for research involving human participants.
- **Availability of data and materials:** The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.
- **Author contribution:** Conceptualization and research design: Elias Bensalem and Bilel Elmotri. Data collection: Elias Bensalem, Bilel Elmotri, Radhia Harizi, Amel Boujlida, and Hamida Riahi. Data analysis: Elias Bensalem. Methodology and validation: Bilel Elmotri and Zuheir N. Khlaif. Writing – original draft: Elias Bensalem and Bilel Elmotri. Writing – review and editing: All authors read and approved the final manuscript.
- **Conflict of interest:** The authors declare that they have no conflict of interest. They have no relevant or material financial interests that relate to the research described in this paper.
- **Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.
- **Acknowledgments:** The authors would like to thank all students who participated in this study for their valuable contributions.
- **Regarding thesis derivation:** This manuscript is not derived from a master's or doctoral thesis.

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