OPEN PRAXIS

University Educators Perspectives on ChatGPT: A Technology Acceptance Model-Based Study

RESEARCH ARTICLE

MUNA BARAKAT
NESREEN A. SALIM
MALIK SALLAM

*Author affiliations can be found in the back matter of this article

INTERNATIONAL COUNCIL FOR OPEN AND DISTANCE EDUCATION

ABSTRACT

Integration of ChatGPT into higher education requires assessing university educators' perspectives regarding this novel technology. This study aimed to validate a survey instrument specifically tailored to assess ChatGPT usability and acceptability among university educators based on the Technology Acceptance Model (TAM). The survey instrument comprised 40 TAM-based items in addition to items assessing participants' demographics. We used exploratory factor analysis (EFA) with principal component analysis (PCA) to assess construct validity and Cronbach's α for reliability. The final sample comprised 236 university educators, with 72% who heard of ChatGPT before the study (n = 169), of whom 76 have already used ChatGPT (45.0%). The EFA showed a significant Bartlett's test of sphericity ($p < 0.001$) and adequate Kaiser-Meyer-Olkin measure (KMO = 0.698). The six constructs inferred through EFA explained a total of 64% of the variance in the educators' attitude to ChatGPT. These constructs comprised 31 items classified into: (1) "Effectiveness" (α = 0.845), (2) "Anxiety" (α = 0.862), (3) "Technology readiness (α = 0.885), (4) Perceived usefulness (α = 0.848), (5) Social influence (α = 0.803), and (6) Perceived risk (α = 0.796). The study identified six key constructs that can be exploited for comprehensive understanding of the university educators' attitude towards ChatGPT. The novel survey instrument herein termed "Ed-TAME-ChatGPT" involved positive influencing factors such as perceived usefulness and effectiveness, positive attitude to technology, and social influence in addition to negative factors comprising anxiety and perceived risk.

CORRESPONDING AUTHOR:
Malik Sallam

Department of Pathology, Microbiology and Forensic Medicine, School of Medicine, The University of Jordan, Amman 11942, Jordan

malik.sallam@ju.edu.jo

KEYWORDS:
AI chatbots; GPT; education; technology; Technology Acceptance Model; AI usability; perceived AI risk; AI adoption in higher education

TO CITE THIS ARTICLE:
Barakat, M., Salim, N. A., & Sallam, M. (2025). University Educators Perspectives on ChatGPT: A Technology Acceptance Model-Based Study. *Open Praxis*, *17*(1), pp. 129–144. DOI: https://doi.org/10.55982/openpraxis.17.1.718

INTRODUCTION

Higher education is set for a significant transformation with the impending integration of generative artificial intelligence (AI) models as routine valuable educational tools among university students and educators (Fütterer et al., 2023; Grassini, 2023; Kamalov et al., 2023; Southworth et al., 2023). This technological revolution represents a paradigm shifting concept regarding knowledge acquisition and dissemination, especially in the domain of higher education (Alam & Mohanty, 2023; Sallam et al., 2023a).

Generative AI as exemplified by the widely used model, namely ChatGPT (OpenAI, San Francisco, CA, U.S.), can revolutionize teaching and learning methodologies in addition to its potential utility in expediting academic research (Aksoy & Kursun, 2024; Lin, 2023; Sallam, 2023). Nevertheless, it is important to fully understand the implications of integrating ChatGPT among other generative AI models in higher education from the perspective of educational institutions, university educators, and students (Dempere et al., 2023; Maphoto et al., 2024; Michel-Villarreal et al., 2023). This comes in light of the well-recognized limitations and failures of such AI models. These limitations include concerns regarding generation of biased content, inaccuracies, cybersecurity risk as well as the threats of declining critical thinking and analytical skills among students (Ahmad et al., 2023; George & Wooden, 2023; Harrer, 2023; Kooli, 2023; Lo, 2023; Ray, 2023; Sallam, 2023; Sallam et al., 2023c; Tlili et al., 2023).

On the other hand, generative AI models including ChatGPT can offer several benefits in higher education (Arif et al., 2023; Chiu, 2024; Crompton & Burke, 2023). For example, ChatGPT can help to engage students and educators in interactive, intelligent conversations while adapting to individual needs; thus, offering personalized learning experiences (Kamalov et al., 2023; Leng, 2024; M. Sallam et al., 2024; Sallam et al., 2023c). This experience allows for the generation of educational content customized to the variable students' learning speeds, styles, and interests, making education an efficient and interesting experience (Huber et al., 2024; Javaid et al., 2023; Rahman & Watanobe, 2023).

For educators, ChatGPT can be a powerful tool to organize study materials and to rapidly generate a variety of examples and explanations across different subjects (Crompton & Burke, 2024; DeCook et al., 2024; Javaid et al., 2023; Younis et al., 2024). Additionally, ChatGPT can aid educators in simplifying complex concepts for students (Javaid et al., 2023). Moreover, generative AI models including ChatGPT hold promising potential for automating and standardizing the scoring of essays, potentially enhancing the efficiency and consistency of evaluations in various educational settings (Huang et al., 2024; Mizumoto & Eguchi, 2023; Morjaria et al., 2024). Furthermore, generative AI models can facilitate the digitalization of education and enhance the pedagogical methods' efficiency and quality (García-Méndez et al., 2024; Ilieva et al., 2023; Montenegro-Rueda et al., 2023; Yu, 2024).

LITERATURE

SWOT (Strengths, Weaknesses, Opportunities, Threats) analyses and recent reviews of ChatGPT in education revealed the future trajectory of the needed research regarding ChatGPT utility in education (Faisal, 2024; Farrokhnia et al., 2023; M. Sallam et al., 2024; Zarei et al., 2024). As stated earlier, the strengths of ChatGPT can be related to enhanced learning outcomes and improved resource efficiency (Bozkurt, 2023; Farrokhnia et al., 2023). On the other hand, ChatGPT challenges include deepening the digital divide, overreliance on technology, and concerns about the quality of generated content (Farrokhnia et al., 2023; Gill et al., 2024). Opportunities provided by ChatGPT arise through innovative pedagogies, while threats include ethical issues and data privacy issues (Farrokhnia et al., 2023; Franco D'Souza et al., 2024; M. Sallam et al., 2024). Thus, the successful integration of ChatGPT in higher education mandates balancing ChatGPT benefits against its challenges (Bahar & Nadeem, 2024; Xu et al., 2024).

The integration of a novel technology in higher education necessitates understanding the perspectives of stakeholders, namely university students and educators (Gkrimpizi et al., 2023; Mishra & Koehler, 2006; Strzelecki, 2023; Veras et al., 2023; Weidener & Fischer, 2024). In particular, the educators' attitudes, concerns, and readiness to embrace novel AI technologies can influence the adoption and effective use of generative AI tools in teaching and learning environments (Luckin et al., 2022). Therefore, it is essential to assess the university educators'

perspectives on novel AI tools such as ChatGPT, which would be important for the successful implementation of these novel technologies in higher education (Adarkwah et al., 2023; Chan, 2023; Kiryakova & Angelova, 2023).

Previous studies have focused on designing, validating, and confirming the validity of a survey instrument based on the Technology Acceptance Model (TAM) among students especially in health schools (Abdaljaleel et al., 2024; Sallam et al., 2023b). These studies showed that perceived usefulness, ease of use, positive attitude towards technology, social influence, behavioral/cognitive elements, low anxiety, and minimal perceived risks were linked with positive attitudes to ChatGPT (Abdaljaleel et al., 2024; Sallam et al., 2023b). However, to the best of our knowledge very few studies have focused on university educators' perspectives on ChatGPT (Adarkwah et al., 2023; Kiryakova & Angelova, 2023; Livberber & Ayvaz, 2023). Additionally, exploration of university educators' views regarding generative AI tools such as ChatGPT is important since their attitude is key to the effective deployment of such technologies in academia (Van Wyk et al., 2023). This is particularly relevant considering the noticeable gap in studies targeting university educators' perspectives on AI adoption, which is a critical area to address.

Therefore, the aim of this study was to establish and to explore the validity of a TAM-based construct for understanding the acceptance and use of ChatGPT among academic personnel in Jordan. By establishing a survey instrument specifically tailored towards the perspectives of university educators, the implementation of ChatGPT in higher education can be guided by evidence. Such a tool can help to guide the effective and responsible integration of ChatGPT in higher education settings as well as to highlight the feared risks and concerns among university educators towards this inevitable technology. Thus, the primary research question was "What is the validity of a TAM-based construct for understanding the acceptance and use of ChatGPT among university educators in Jordan?"

METHODS

RESEARCH DESIGN AND SAMPLING GROUP

This study followed a quantitative research approach using a survey design based on the TAM (Creswell & Guetterman, 2018; Davis, 1989). The development of the survey instrument began with an extensive literature review that focused on the application of the TAM in understanding the acceptance of novel technologies by students and educators based on the original TAM framework (Al-Hattami, 2023; Antonietti et al., 2022; Cheung & Vogel, 2013; Davis, 1989; Farahat, 2012; Granić & Marangunić, 2019; Mailizar et al., 2021; Malaquias et al., 2018; Marangunić & Granić, 2015; Murillo et al., 2020; Rosli et al., 2022; Scherer et al., 2019; Venkatesh et al., 2003; Zobeidi et al., 2023). The TAM framework is widely recognized conceptual framework employed to investigate the acceptance and adoption of novel technologies by different strata of stakeholders (Al-Adwan, 2024; Gbongli et al., 2019; Gupta & Yang, 2024; Saif et al., 2024). Following the literature review, initial item development in the English language was performed by the three authors (university educators with expertise in three diverse healthcare disciplines and with previous experience in survey construction and validation).

To ensure content validity, the three authors engaged in an internal discussion with subjective evaluation of the initial survey items to assess its clarity, comprehensiveness, and relevance as well as to identify and address any potential biases or issues in the wording of the items, such as vagueness or complexity. This internal discussion led to the identification of potential domains for inclusion in the final questionnaire comprising 40 items: perceived usefulness, perceived ease of use, perceived risks, anxiety, attitude towards the technology, social influence, and effectiveness.

This was followed by forward translation into Arabic and backward translation into English of the 40 items, which were done by the three bilingual (Arabic and English) authors with minor modifications. Then, pilot testing of the items in Arabic was done to ensure clarity among four university educators who were excluded from the final analysis. Based on the feedback received, minor language modifications were made to enhance the overall clarity of the survey items. The construct validity of the scale herein termed "Ed-TAME-ChatGPT" was checked following survey distribution, using 40 TAM-based items evaluated among the respondents who used ChatGPT before the study. The minimum sample size was estimated at approximately 80 participants based on the previous guidelines of having at least two study subjects per survey item for survey validation (MacCallum et al., 1999).

DATA COLLECTION TOOLS

The finalized survey in the Arabic language was uploaded to Google Forms and distributed using a convenience sampling approach. This approach entailed utilizing popular social media platforms in Jordan including WhatsApp and Messenger to share the survey link with the professional contacts of the authors, with the request to further distribute the survey among the participants' academic acquaintances. Participation in the survey was voluntary and there was no incentive for participation.

The distribution of the survey was timed to coincide with the academic calendar in Jordan, specifically during the spring and autumn semesters. The first phase of distribution spanned from February to April 2023, aligning with the spring semester, followed by a second phase in October 2023, aligning with the autumn semester. This timing was chosen to maximize engagement with the study in order to benefit from periods of active academic involvement when academic staff are most likely to be accessible and willing to participate.

Following the informed consent, a demographic section was introduced with items to assess the following variables: (1) age; (2) sex; (3) nationality (Jordanian vs. non-Jordanian); School/College (health [medicine, dentistry, pharmacy, nursing, rehabilitation sciences, applied medical sciences, veterinary medicine, public health] vs. scientific [science, engineering, agriculture, information technology, nanotechnology, artificial intelligence] vs. humanities [Arts, Business, Sharia, Law, Islamic Studies, Physical Education, Arts, Languages, Tourism, Media, Archaeology]); (4) university [public vs. private]; (5) the highest educational degree obtained (PhD or fellowship degree vs. MSc or a specialty degree); (6) the country where the highest educational degree was attained (Jordan vs. other Arab country vs. U.S. vs. U.K. vs. Europe vs. others); and (7) rank (full professor, associate professor [grouped as "tenured"] vs. assistant professor, lecturer, lecturer assistant [grouped as "without tenure"]).

The next section involved two screening items as follows: First, "Have you heard of ChatGPT before the study?", with "yes" response required to move into the next item, while the answer of "no" resulted in survey submission. The next item was "Have you used ChatGPT before the study?" with "yes" resulting in the presentation of the full 40 TAM-based items. The final section involved the presentation of the 40 TAM-based items, with each item assessed on a 5-point Likert-scale with the following responses: strongly agree scored as 5, agree scored as 4, neutral/no opinion scored as 3, disagree scored as 2, and strongly disagree scored as 1. The scoring was reversed for the items implying negative attitude towards ChatGPT.

VALIDITY AND RELIABILITY MEASURES

The statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 26.0 (Armonk, NY, USA: IBM Corp). Exploratory factor analysis (EFA) was employed to investigate the factorial structure of the Ed-TAME-ChatGPT scale which comprised a total of the 40 items. Principal component analysis (PCA) was used as the extraction method, with oblimin rotation to determine correlations between factors. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were applied to evaluate the data appropriateness for EFA.

Subsequently, the internal consistency of the Ed-TAME-ChatGPT constructs inferred following EFA was assessed using the Cronbach's α values. Scores for each construct were computed by dividing the total scores by the number of items within that construct, yielding a score range of 1–5. The overall Ed-TAME-ChatGPT scores were computed based on the overall average of Ed-TAME-ChatGPT involving the items of each construct. The scoring classification for both the TAME-ChatGPT and its individual constructs was categorized as follows: scores ranging from 1.00 to 2.33 indicated disagreement (negative), 2.34 to 3.67 indicated a neutral position, and 3.68 to 5.00 indicated agreement (positive).

Associations between categorical variables were assessed using the χ^2 (chi-square) and the two-sided Fisher's exact (FET) tests. Univariate analyses were conducted to assess the associations between Ed-TAME-ChatGPT and the demographic variables as well as the individualized constructs with statistical significance for $p < 0.050$. For multivariate analyses, predictor variables were selected based on a p value of < 0.100 in univariate analyses. Linear regression with Analysis of Variance (ANOVA) was employed to test the significance of the regression model, and multicollinearity was assessed using the Variance Inflation Factor (VIF), with a threshold value of 3.0 indicating potential concerns.

FINDINGS

GENERAL FEATURES OF THE STUDY SAMPLE

The final sample consisted of 236 educators, of whom 169 heard of ChatGPT before the study (71.6%), with only 76 who indicated the use of ChatGPT before the study (45.0% of those who heard of ChatGPT). The vast majority of the study sample were Jordanians (98.3%), and a majority obtained their highest educational degree outside the Arab countries. The full features of the study sample are illustrated in (Table 1). The percentage of those who used ChatGPT increased significantly over the study period from 33/99 during February 2023–April 2023 (43.4%) to 43/70 during October 2023 (56.6%, $p < 0.001$, FET).

Table 1 General features of educators who participated in the study ($N = 236$).

[1] Among those who heard of ChatGPT.

VARIABLE	CATEGORY	COUNT	PERCENTAGE
Age	≤43 years	119	50.4%
	>43 years	117	49.6%
Sex	Male	137	58.1%
	Female	99	41.9%
Nationality	Jordanian	232	98.3%
	Non-Jordanian	4	1.7%
School	Health	127	53.8%
	Scientific	51	21.6%
	Humanities	58	24.6%
University	Public	150	63.6%
	Private	86	36.4%
Highest educational degree	PhD	181	76.7%
	MSc	55	23.3%
Country of highest attained degree	U.S.	37	15.7%
	U.K.	54	22.9%
	Europe	29	12.3%
	Jordan	79	33.5%
	Arab country other than Jordan	16	6.8%
	Others	12	5.1%
	Australia	4	1.7%
	Canada	5	2.1%
Country of highest attained degree	Non-Arab	141	59.7%
	Arab	95	40.3%
Rank	Professor	55	23.3%
	Associate Professor	52	22.0%
	Assistant Professor	74	31.4%
	Lecturer	36	15.3%
	Teaching assistant	19	8.1%
Academic rank	With tenure	107	45.3%
	Without tenure	129	54.7%
Have you heard of ChatGPT before the study?	Yes	169	71.6%
	No	67	28.4%
Have you used ChatGPT before the study?[1]	Yes	76	45.0%
	No	93	55.0%

FACTORABILITY OF THE CORRELATION MATRIX

The EFA was conducted on a set of 40 items to identify underlying constructs that account for the variance in the responses. Bartlett's test of sphericity was significant ($\chi^2 = 2226.833$, df = 780, $p < 0.001$), indicating the factorability of the correlation matrix. The KMO measure of sampling adequacy was 0.698, indicating that the data were suitable for factorial analysis. The scree plot showed that the optimal number of underlying factors was six based on the

eigenvalue cutoff specified at 1.5, which explained a cumulative total of 63.7% of the variance in the data as indicated in the scree plot (Figure 1).

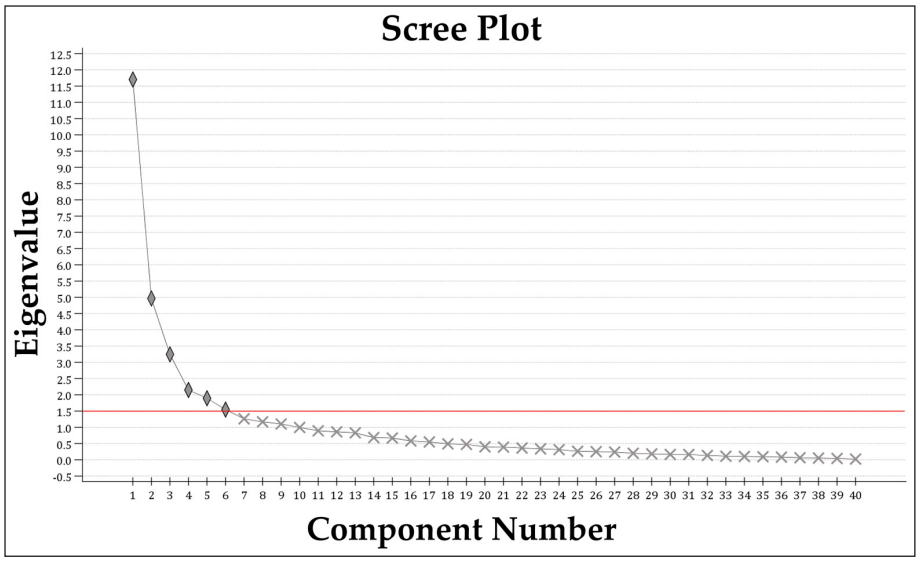
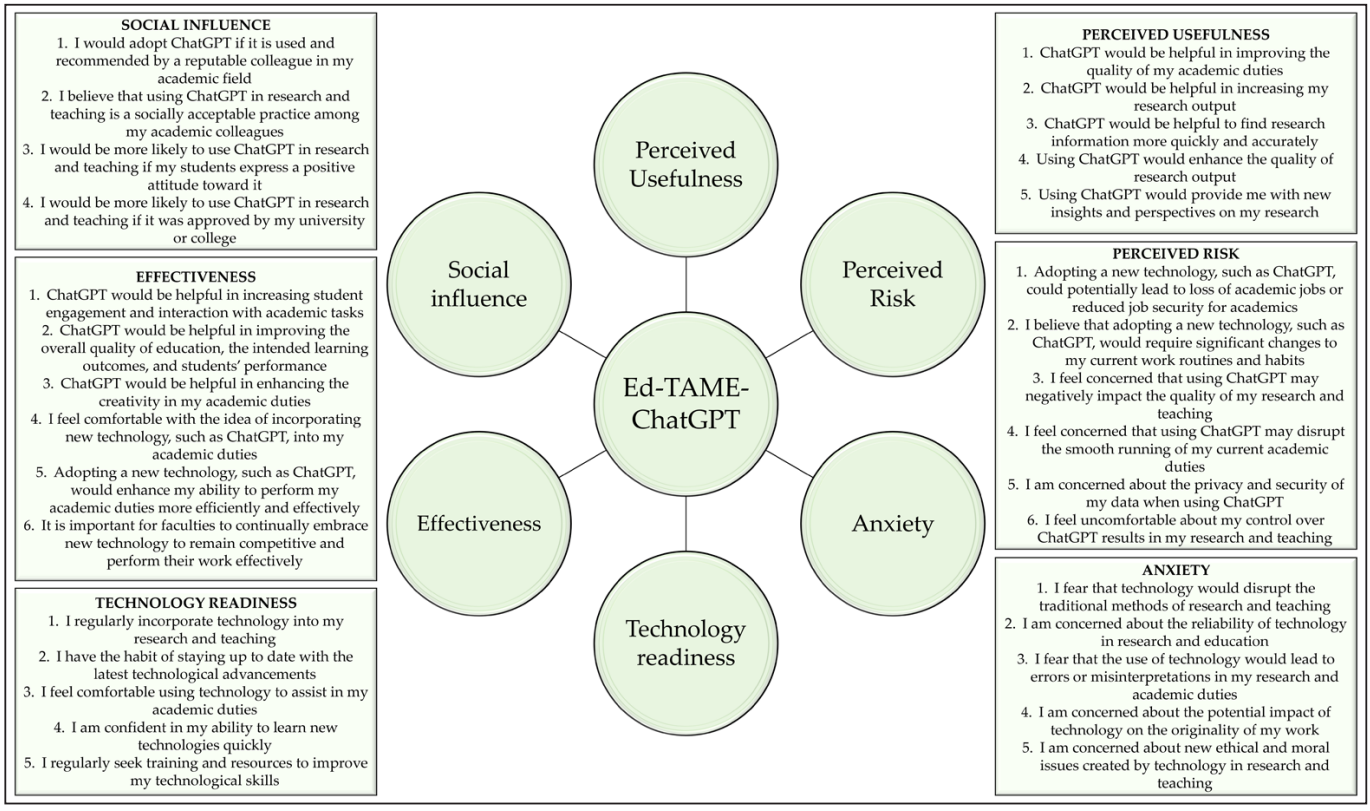


Figure 1 Scree plot representing the eigenvalues of the factors identified through principal component analysis. The red line indicated the eigenvalue cutoff specified at 1.50.

The eigenvalues for the six factors were 11.702, 4.964, 3.244, 2.148, 1.893, and 1.545, respectively. A total of 31 items out of the 40 tested items loaded significantly with absolute coefficient values > 0.50 on one of the six factors, and factor loadings ranging from absolute 0.515 to absolute 0.848.

Based on the content of the items for each factor, these factors were named as follows: Factor 1 was named "effectiveness" comprising 6 items (T3, T4, T6, T16, T17, T18) with a Cronbach α value of 0.845. Factor 2 was named "anxiety" comprising 5 items (T36, T37, T38, T39, T40) with a Cronbach α value of 0.862. Factor 3 was named "technology readiness" comprising 5 items (T31, T32, T33, T34, T35) with a Cronbach α value of 0.885. Factor 4 was termed "perceived usefulness" comprising 5 items (T1, T7, T8, T9, T10) with a Cronbach α value of 0.848. Factor 5 was termed "social influence" comprising 4 items (T22, T23, T24, T25) with a Cronbach α value of 0.803. Finally, factor 6 was termed "perceived risk" comprising 6 items (T19, T20, T26, T27, T29, T30) with a Cronbach α value of 0.796. The final educators TAME-ChatGPT (Ed-TAME-ChatGPT) validated items and constructs are illustrated in (Figure 2).

Figure 2 The final Ed-TAME-ChatGPT items and constructs.



ATTITUDES OF EDUCATORS TO CHATGPT BASED ON ED-TAME-CHATGPT AND THE DEMOGRAPH-IC/ACADEMIC VARIABLES

The overall Ed-TAME-ChatGPT score in the study sample was 3.50 ± 0.46 (range: 2.42–4.67) indicating a general neutral attitude towards ChatGPT use. Additionally, the individual Ed-TAME-ChatGPT scores fell into the positive or neutral categories (n = 27, 35.5% and n = 49, 64.5%, respectively) with complete absence of scores in the negative category. the Univariate analysis revealed that only Ed-TAME-ChatGPT constructs were significantly associated with the overall Ed-TAME ChatGPT scores (Table 2).

Table 2 Demographic, academic, and Ed-TAME-ChatGPT constructs' association with the overall Ed-TAME-ChatGPT scores.

CATEGORY	VARIABLE	TAME CATEGORIES		*p* VALUE, χ^2
		NEUTRAL	POSITIVE	
		COUNT (%)	COUNT (%)	
Age	≤43 years	31 (63.3)	18 (36.7)	0.767, 0.088
	>43 years	18 (66.7)	9 (33.3)	
Sex	Male	27 (64.3)	15 (35.7)	0.970, 0.001
	Female	22 (64.7)	12 (35.3)	
Nationality	Jordanian	49 (66.2)	25 (33.8)	0.054, 3.728
	Non-Jordanian	0 (0)	2 (100)	
School	Health	30 (65.2)	16 (34.8)	0.551, 1.192
	Scientific	14 (70.0)	6 (30.0)	
	Humanities	5 (50.0)	5 (50.0)	
University	Public	32 (69.6)	14 (30.4)	0.251, 1.319
	Private	17 (56.7)	13 (43.3)	
Education	PhD	38 (67.9)	18 (32.1)	0.302, 1.064
	MSc	11 (55.0)	9 (45.0)	
Country of highest attained degree	Non-Arab	31 (67.4)	15 (32.6)	0.510, 0.433
	Arab	18 (60.0)	12 (40.0)	
Academic rank	With tenure	26 (61.9)	16 (38.1)	0.603, 0.270
	Without tenure	23 (67.6)	11 (32.4)	
Perceived usefulness categories	Negative	4 (100)	0 (0)	<0.001, 21.776
	Neutral	22 (100)	0 (0)	
	Positive	23 (46.0)	27 (54.0)	
Effectiveness categories	Negative	4 (100)	0 (0)	<0.001, 21.091
	Neutral	24 (96.0)	1 (4.0)	
	Positive	21 (44.7)	26 (55.3)	
Social influence categories	Negative	6 (100)	0 (0)	<0.001, 22.659
	Neutral	29 (87.9)	4 (12.1)	
	Positive	14 (37.8)	23 (62.2)	
Perceived risk categories	Positive	6 (33.3)	12 (66.7)	<0.001, 15.786
	Neutral	24 (63.2)	14 (36.8)	
	Negative	19 (95.0)	1 (5.0)	
Technology readiness categories	Negative	1 (100)	0 (0)	0.048, 6.060
	Neutral	12 (92.3)	1 (7.7)	
	Positive	36 (58.1)	26 (41.9)	
Anxiety categories	Positive	8 (44.4)	10 (55.6)	0.007, 9.894
	Neutral	25 (61.0)	16 (39.0)	
	Negative	16 (94.1)	1 (5.9)	

In multivariate analysis with the variables having $p < 0.100$ in univariate analysis, the ANOVA for the regression model yielded an F statistic of 14.343 with a $p < 0.001$, indicating the model robustness. The model, with an adjusted R^2 of 0.555 and a standard error of 0.322, identified several significant predictors. Nationality (β = 0.138, $p = 0.084$), perceived usefulness (β = 0.198, $p = 0.030$), and effectiveness (β = 0.240, $p = 0.011$) positively influenced ChatGPT usage. Social influence was also a positive predictor of ChatGPT use (β = 0.260, $p = 0.004$). In contrast, perceived risk emerged as a negative predictor for ChatGPT use (β = −0.320, $p < 0.001$). On the other hand, the technology readiness construct (β = 0.108, $p = 0.236$) and anxiety construct (β = −0.104, $p = 0.245$) did not show statistically significant differences (Table 3).

MODEL	COEFFICIENTS[1]				*P* VALUE	VIF[3]
ADJUSTED R^2 = 0.555, SE = 0.322	UNSTANDARDIZED COEFFICIENTS	SE[2]	STANDARDIZED COEFFICIENTS	T STATISTIC		
ANOVA F STATISTIC = 14.343, *P* VALUE < 0.001	B		BETA			
Constant	0.787	0.392		2.009	**0.049**	
Nationality	0.413	0.236	0.138	1.753	0.084	1.047
Perceived usefulness categories	0.162	0.073	0.198	2.218	**0.030**	1.343
Effectiveness categories	0.194	0.074	0.240	2.621	**0.011**	1.414
Social influence categories	0.197	0.067	0.260	2.947	**0.004**	1.307
Perceived risk categories	−0.216	0.057	−0.320	−3.817	**<.001**	1.180
Technology readiness categories	0.120	0.100	0.108	1.195	0.236	1.367
Anxiety categories	−0.073	0.062	−0.104	−1.172	0.245	1.322

Table 3 Regression analysis of the predictors influencing ChatGPT usage.

[1]Dependent Variable: Overall Ed-TAME-ChatGPT usage score; [2]SE: Standard error; [3]VIF: Variance inflation factor. Statistically significant *P* values are highlighted in bold style.

FINDINGS AND DISCUSSION

In the present study, we explored the validity of a novel survey instrument specifically designed to assess the attitude to ChatGPT among university educators. Throughout the study period, a notable increase in ChatGPT use was observed among the participating university educators. This finding is indicative of ChatGPT's growing popularity as a tool in higher education as indicated by several recent studies (Abdaljaleel et al., 2024; Faruk et al., 2023; Ibrahim et al., 2023; Strzelecki, 2023; Tiwari et al., 2023; von Garrel & Mayer, 2023; Weidener & Fischer, 2024). The trend of increasing ChatGPT usage suggests the recognition of generative AI tools' potential as a valuable aid in teaching and learning processes. This shift can also be indicative of an impending broader transformation in educational methodologies manifested in increasing digitization and incorporation of AI in higher educational settings.

To reach reliable conclusions regarding attitudes towards ChatGPT, it is important to pursue such an aim using validated methodologies (Bubaš et al., 2024). This approach is necessary to ensure a comprehensive understanding of the motivators and barriers that could enhance or preclude the integration of generative AI tools in higher education (Xu, 2024). One popular, practical, and highly relevant framework that was used in this study is the TAM framework, with its suitable applicability to assess educators' adoption of a novel technology as shown in a meta-analysis by Scherer et al. (Scherer et al., 2019). In the current study, six constructs were identified based on the TAM framework and appeared to explain a substantial degree of the university educators' attitude towards ChatGPT use. These constructs were effectiveness, anxiety, technology readiness, perceived usefulness, social influence, and perceived risk.

The reflection on the TAM-based constructs inferred in this study suggests the relevance of psychological, social, and practical factors that would influence the adoption and integration of new technologies such as ChatGPT among university educators. Identification of these factors highlights the complex nature of AI integration into higher education, similar to issues faced with other technological advancements. For example, several factors were identified affecting the quality of distance-based online learning particularly during COVID-19 pandemic. These factors included unreliable internet availability, the lack of motivation, psychological distress, and institutional support (Akour et al., 2020; Alqudah et al., 2023; Saleem et al., 2022).

Additionally, a systematic review by Regmi & Jones highlighted the complexity of e-learning in health sciences education in terms of challenges such as poor motivation, the need for resources and relevance of information technology (IT) skills (Regmi & Jones, 2020).

Under the lens of TAM, previous studies addressing the adoption of digital education tools focused mainly on the students' perspectives (López-Sánchez et al., 2024; Saleh et al., 2022; Valencia-Arias et al., 2024). These TAM-based studies identified several constructs as relevant determinants of attitudes to novel technologies including the perceived usefulness, perceived ease of use, self-efficacy, behavioral intention, social influences, among others (Alassafi, 2022; Chahal & Rani, 2022; Saleh et al., 2022; Tawafak et al., 2023; Zobeidi et al., 2023).

In the current study, the perceived usefulness emerged as a significant predictor of attitude towards ChatGPT among the participating university educators. This result is understandable based on the previous evidence showing the higher likelihood of adopting a novel technology if it is perceived as beneficial (Al-Adwan et al., 2023; Mohammed et al., 2021; Nguyen & Simkin, 2017). A similar finding was recently shown by Wang et al. in the context of AI adoption in e-commerce (Wang et al., 2023). Usefulness in the context of generative AI tools such as ChatGPT pertains to its potential to enhance learning outcomes, to facilitate personalized education, and to streamline the tedious administrative tasks (Rejeb et al., 2024; Ruiz-Rojas et al., 2023). Thus, addressing the university educators' perceptions of ChatGPT usefulness appears critical for the acceptance and adoption of ChatGPT among this relevant group in higher education.

In this validation study, effectiveness was also elucidated as an important TAM-based construct driving attitude towards ChatGPT. This result reflects the evident impact of perceived effectiveness of a novel technology on its adoption to achieve the educational objectives. The anticipation of significant benefits from ChatGPT in enhancing student engagement and interaction with academic tasks can play a crucial role in creating a positive attitude towards ChatGPT among university educators (Yilmaz & Karaoglan Yilmaz, 2023). Additionally, participants with a positive attitude towards ChatGPT perceived it as more effective. This result suggests that a favorable view of ChatGPT is an important factor for its adoption as a valuable tool to achieve academic excellence.

In this study, social influence was identified as an important construct expected to play a significant role in shaping university educators' acceptance of ChatGPT. This construct captures the influence of peer opinions, institutional culture, and prevailing educational trends on the decision-making process regarding the adoption of novel technologies such as ChatGPT. Endorsement of ChatGPT by colleagues and the broader academic community appears to play an important role in shaping university educators' willingness to accept and utilize ChatGPT in educational settings. Therefore, it is important to recognize and consider the role of social influence in facilitating the widespread adoption of generative AI technologies in higher education. The role of perceiving AI as a social norm was revealed in a recent study by Rahiman & Kodikal among academic staff members in Asia, which further supports the identification of social influence as a relevant TAM-based construct in this study (Rahiman & Kodikal, 2024).

Technology readiness was the fourth key construct identified in this study in relation to ChatGPT usage among university educators. This construct involved the assessment of university educators' willingness and capacity to adopt and effectively use novel technological tools. Facilitating technology readiness involves providing necessary resources, training, and support. In turn, these measures would enable the university educators to confidently integrate ChatGPT into their teaching practices. A meta-analysis on the impact of technology readiness on technology use highlighted the importance of considering the motivators (optimism and innovativeness) and inhibitors (insecurity and discomfort) to further dissect this important construct (Blut & Wang, 2020).

Conversely, the barriers to ChatGPT use as identified in the current study were represented by two constructs, namely the anxiety and perceived risk. Anxiety represents a key factor in determining the hesitancy among university educators towards a novel technology. This issue could be ascribed to apprehension regarding the educators digital proficiency, as well as concerns over the potential impact of AI on conventional teaching methodologies, which was comprehensively reviewed by Hao Yu (Hadi Mogavi et al., 2023; Yu, 2024). Mitigating the educators' anxiety can be achieved through targeted training, technological support, and clear guidelines for the ethical and responsible use of ChatGPT, which could lead to its successful integration into educational practices.

Furthermore, the perception of risks associated with technological adoption, including ChatGPT appeared to play an important role in its acceptance. The perceptions of risk could stem from concerns regarding data privacy, the potential spread of misinformation, and the negative effects on students' critical thinking abilities (Dempere et al., 2023; Mijwil et al., 2023a; Ray, 2023; Sallam, 2023; M. Sallam et al., 2024). Addressing these concerns can be achieved by establishing ethical standards for ChatGPT use and advocating for transparency regarding AI tools development and training (Mijwil et al., 2023b; Stahl & Eke, 2024). The importance of perceived risks as a determinant of ChatGPT adoption and use has been recognized as a recurrent result in various recent studies among students (Abdaljaleel et al., 2024; Albayati, 2024; Jo & Bang, 2023; Menon & Shilpa, 2023; Malik Sallam et al., 2024; Sallam et al., 2023b). This highlights the central role of perceived risk as an important factor determining the attitude towards generative AI adoption in education.

In this study, albeit with a very small sample size, multivariate analysis showed the central role of four Ed-TAME-ChatGPT constructs (perceived risk, social influence, effectiveness, and perceived usefulness), to significantly shape the attitudes to ChatGPT use. This result needs further confirmation in future studies with larger sample sizes to enable reaching a conclusive evidence regarding the role of these factors in driving ChatGPT use among university educators.

CONCLUSION, IMPLICATIONS AND SUGGESTIONS

In an intended follow-up study, we aim to implement confirmatory factor analysis (CFA). The future follow-up study aims to rigorously test and confirm the construct validity of the factors initially identified in the "Ed-TAME-ChatGPT" instrument. In turn, this can help to ensure "Ed-TAME-ChatGPT" applicability and consistency across different contexts.

Furthermore, we call for open utilization of the "Ed-TAME-ChatGPT" survey instrument and its adoption in diverse educational settings. This call is directed to enable a more granular analysis of university educators' perceptions towards ChatGPT. This approach can facilitate a deeper understanding of the detailed mechanisms by which genAI tools such as ChatGPT can be integrated into educational systems, respecting ethical standards and enhancing instructional quality. The call for open use of "Ed-TAME-ChatGPT" aligns with the *Open Praxis* journal's commitment to open access, which will enrich the scholarly dialogue that extends across cultural and geographic divides. This is essential for mapping the variable impact of genAI tools on educational practices around the world and to identify both universal and location-specific challenges and opportunities.

This study was not without limitations, which should be considered as follows. First, the small sample size could limit the generalizability of the results. The difficulty in reaching a larger sample size could be related to the lengthy nature of this exploratory survey which would cause respondent fatigue (Jeong et al., 2023). Second, the potential for selection bias should be considered in light of the participants' recruitment approach. Utilizing a convenience sampling approach which involved the authors' professional networks may limit the representativeness of university educators included in the study. Third, data collection was restricted to a single country, namely Jordan which could introduce a cultural limitation to the study based on the expected variation in the educational systems, technological infrastructure, and cultural attitudes towards AI across different regions. Consequently, confirmation of the study findings should be considered by conducting future multinational studies using a non-probability sampling approach.

The Ed-TAME-ChatGPT survey instrument explored in this study can offer a comprehensive framework for understanding the attitude of university educators towards ChatGPT. The results highlighted the significance of considering perceptions of risks, usefulness, attitudes towards technology, along with anxiety, social influence, and effectiveness when adopting ChatGPT in higher education. The insights gained by this validated instrument is crucial for higher education institutions, academics, and educational policymakers to strategically facilitate the effective and ethical use of ChatGPT. This survey instrument can also aid to identify potential barriers that could hinder the adoption of this transformative AI technology in education. Future studies in various settings are recommended to confirm and build upon the findings of this study. This can help to further elucidate the factors that would influence the successful adoption of ChatGPT in different higher educational settings, which would be essential to the advancement of AI-enhanced learning.

DATA ACCESSIBILITY STATEMENT

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

ETHICS AND CONSENT

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (IRB) at the Faculty of Pharmacy, Applied Science Private University (Approval number: 2023-PHA-4, on 24 January 2023).

An electronic informed consent was obtained from all subjects in-volved in the study.

ACKNOWLEDGEMENTS

The authors would like to thank Nada Atawneh for help in data collection.

COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS (CRediT)

Conceptualization: Malik Sallam; Data curation: Muna Barakat, Nesreen A. Salim, Malik Sallam; Formal analysis: MALIK SALLAM; Investigation: Muna Barakat and Malik Sallam; Methodology: Muna Barakat, Nesreen A. Salim, Malik Sallam; Visualization: Malik Sallam; Project administration: Muna Barakat, Malik Sallam; Supervision: Muna Barakat, Malik Sallam; Writing – original draft: Malik Sallam; Writing – review & editing: Muna Barakat, Nesreen A. Salim, Malik Sallam; All authors contributed to the article and approved the submitted version.

AUTHOR AFFILIATIONS

Muna Barakat orcid.org/0000-0002-7966-1172
Applied Science Private University, Jordan

Nesreen A. Salim orcid.org/0000-0002-5355-2269
The University of Jordan, Jordan

Malik Sallam orcid.org/0000-0002-0165-9670
The University of Jordan, Jordan

REFERENCES

Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., Mohammed, A. H., Hassan, B. A. R., Wayyes, A. M., Farhan, S. S., Khatib, S. E., Rahal, M., Sahban, A., Abdelaziz, D. H., Mansour, N. O., AlZayer, R., Khalil, R., Fekih-Romdhane, F., Hallit, R., ... Sallam, M. (2024). A multinational study on the factors influencing university students' attitudes and usage of ChatGPT. *Scientific Reports*, *14*(1), 1983. https://doi.org/10.1038/s41598-024-52549-8

Adarkwah, M. A., Amponsah, S., van Wyk, M. M., Huang, R., Tlili, A., Shehata, B., Metwally, A. H. S., & **Wang, H.** (2023). Awareness and acceptance of ChatGPT as a generative conversational AI for transforming education by Ghanaian academics: A two-phase study. *Journal of Applied Learning and Teaching*, *6*(2). https://doi.org/10.37074/jalt.2023.6.2.26

Ahmad, S. F., Han, H., Alam, M. M., Rehmat, M. K., Irshad, M., Arraño-Muñoz, M., & **Ariza-Montes, A.** (2023). Impact of artificial intelligence on human loss in decision making, laziness and safety in education. *Humanities and Social Sciences Communications*, *10*(1), 311. https://doi.org/10.1057/s41599-023-01787-8

Akour, A., Al-Tammemi, A. B., Barakat, M., Kanj, R., Fakhouri, H. N., Malkawi, A., & **Musleh, G.** (2020). The Impact of the COVID-19 Pandemic and Emergency Distance Teaching on the Psychological Status of University Teachers: A Cross-Sectional Study in Jordan. *Am J Trop Med Hyg*, *103*(6), 2391–2399. https://doi.org/10.4269/ajtmh.20-0877

Aksoy, D. A., & **Kursun, E.** (2024). Behind the Scenes: A Critical Perspective on GenAI and Open Educational Practices [Article]. *Open Praxis*, *16*(3), 457–470. https://doi.org/10.55982/openpraxis.16.3.674

Al-Adwan, A. S. (2024). The Government Metaverse: Charting the Coordinates of Citizen Acceptance. *Telematics and Informatics*, *88*, 102109. https://doi.org/10.1016/j.tele.2024.102109

Al-Adwan, A. S., Li, N., Al-Adwan, A., Abbasi, G. A., Albelbisi, N. A., & **Habibi, A.** (2023). "Extending the Technology Acceptance Model (TAM) to Predict University Students' Intentions to Use Metaverse-Based Learning Platforms". *Education and Information Technologies*, *28*(11), 15381–15413. https://doi.org/10.1007/s10639-023-11816-3

Al-Hattami, H. M. (2023). Understanding perceptions of academics toward technology acceptance in accounting education. *Heliyon*, *9*(1), e13141. https://doi.org/10.1016/j.heliyon.2023.e13141

Alam, A., & **Mohanty, A.** (2023). Educational technology: Exploring the convergence of technology and pedagogy through mobility, interactivity, AI, and learning tools. *Cogent Engineering*, *10*(2), 2283282. https://doi.org/10.1080/23311916.2023.2283282

Alassafi, M. O. (2022). E-learning intention material using TAM: A case study. *Mater Today Proc*, *61*, 873–877. https://doi.org/10.1016/j.matpr.2021.09.457

Albayati, H. (2024). Investigating undergraduate students' perceptions and awareness of using ChatGPT as a regular assistance tool: A user acceptance perspective study. *Computers and Education: Artificial Intelligence*, *6*, 100203. https://doi.org/10.1016/j.caeai.2024.100203

Alqudah, I., Barakat, M., Muflih, S. M., & **Alqudah, A.** (2023). Undergraduates' perceptions and attitudes towards online learning at Jordanian universities during COVID-19. *Interactive Learning Environments*, *31*(9), 5781–5798. https://doi.org/10.1080/10494820.2021.2018617

Antonietti, C., Cattaneo, A., & **Amenduni, F.** (2022). Can teachers' digital competence influence technology acceptance in vocational education? *Computers in Human Behavior*, *132*, 107266. https://doi.org/10.1016/j.chb.2022.107266

Arif, T. B., Munaf, U., & **Ul-Haque, I.** (2023). The future of medical education and research: Is ChatGPT a blessing or blight in disguise? *Med Educ Online*, *28*(1), 2181052. https://doi.org/10.1080/10872981.2023.2181052

Bahar, G., & **Nadeem, F.** (2024). From Chat bots to Virtual Tutors: An Overview of Chat GPT's Role in the Future of Education. *Archives of Pharmacy Practice*, *15*(2), 43–52. https://doi.org/10.51847/TOuppjEDSX

Blut, M., & **Wang, C.** (2020). Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage. *Journal of the Academy of Marketing Science*, *48*(4), 649–669. https://doi.org/10.1007/s11747-019-00680-8

Bozkurt, A. (2023). Unleashing the Potential of Generative AI, Conversational Agents and Chatbots in Educational Praxis: A Systematic Review and Bibliometric Analysis of GenAI in Education [Article]. *Open Praxis*, *15*(4), 261–270. https://doi.org/10.55982/openpraxis.15.4.609

Bubaš, G., Čižmešija, A., & **Kovačić, A.** (2024). Development of an Assessment Scale for Measurement of Usability and User Experience Characteristics of Bing Chat Conversational AI. *Future Internet*, *16*(1), 4. https://doi.org/10.3390/fi16010004

Chahal, J., & **Rani, N.** (2022). Exploring the acceptance for e-learning among higher education students in India: combining technology acceptance model with external variables. *Journal of Computing in Higher Education*, *34*(3), 844–867. https://doi.org/10.1007/s12528-022-09327-0

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education*, *20*(1), 38. https://doi.org/10.1186/s41239-023-00408-3

Cheung, R., & **Vogel, D.** (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers & Education*, *63*, 160–175. https://doi.org/10.1016/j.compedu.2012.12.003

Chiu, T. K. F. (2024). Future research recommendations for transforming higher education with generative AI. *Computers and Education: Artificial Intelligence*, *6*, 100197. https://doi.org/10.1016/j.caeai.2023.100197

Creswell, J., & **Guetterman, T.** (2018). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research, 6th Edition*.

Crompton, H., & **Burke, D.** (2023). Artificial intelligence in higher education: the state of the field. *International Journal of Educational Technology in Higher Education*, *20*(1), 22. https://doi.org/10.1186/s41239-023-00392-8

Crompton, H., & **Burke, D.** (2024). The Educational Affordances and Challenges of ChatGPT: State of the Field. *TechTrends*, *68*(2), 380–392. https://doi.org/10.1007/s11528-024-00939-0

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

DeCook, R., Muffly, B. T., Mahmood, S., Holland, C. T., Ayeni, A. M., Ast, M. P., Bolognese, M. P., Guild, G. N., III, Sheth, N. P., Pean, C. A., & **Premkumar, A.** (2024). AI-Generated Graduate Medical Education Content for Total Joint Arthroplasty: Comparing ChatGPT Against Orthopaedic Fellows. *Arthroplasty Today*, *27*, 101412. https://doi.org/10.1016/j.artd.2024.101412

Dempere, J., Modugu, K., Hesham, A., & **Ramasamy, L. K.** (2023). The impact of ChatGPT on higher education [Systematic Review]. *Frontiers in Education*, *8*, 1206936. https://doi.org/10.3389/feduc.2023.1206936

Faisal, E. (2024). Unlock the potential for Saudi Arabian higher education: a systematic review of the benefits of ChatGPT [Original Research]. *Frontiers in Education*, *9*, 1325601. https://doi.org/10.3389/feduc.2024.1325601

Farahat, T. (2012). Applying the Technology Acceptance Model to Online Learning in the Egyptian Universities. *Procedia – Social and Behavioral Sciences*, *64*, 95–104. https://doi.org/10.1016/j.sbspro.2012.11.012

Farrokhnia, M., Banihashem, S. K., Noroozi, O., & **Wals, A.** (2023). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*, 1–15. https://doi.org/10.1080/14703297.2023.2195846

Faruk, L., Rohan, R., Nin, U., & **Pal, D.** (2023). University Students' Acceptance and Usage of Generative AI (ChatGPT) from a Psycho-Technical Perspective. *IAIT 2023: 13th International Conference on Advances in Information Technology*. https://doi.org/10.1145/3628454.3629552

Franco D'Souza, R., Mathew, M., Louis Palatty, P., & **Surapaneni, K. M.** (2024). Teaching humanism with humanoid: evaluating the potential of ChatGPT-4 as a pedagogical tool in bioethics education using validated clinical case vignettes. *International Journal of Ethics Education*. https://doi.org/10.1007/s40889-024-00190-4

Fütterer, T., Fischer, C., Alekseeva, A., Chen, X., Tate, T., Warschauer, M., & **Gerjets, P.** (2023). ChatGPT in education: global reactions to AI innovations. *Scientific Reports*, *13*(1), 15310. https://doi.org/10.1038/s41598-023-42227-6

García-Méndez, S., de Arriba-Pérez, F., & **Somoza-López, M. d. C.** (2024). A Review on the Use of Large Language Models as Virtual Tutors. *Science & Education*. https://doi.org/10.1007/s11191-024-00530-2

Gbongli, K., Xu, Y., & **Amedjonekou, K. M.** (2019). Extended Technology Acceptance Model to Predict Mobile-Based Money Acceptance and Sustainability: A Multi-Analytical Structural Equation Modeling and Neural Network Approach. *Sustainability*, *11*(13), 3639. https://doi.org/10.3390/su11133639

George, B., & **Wooden, O.** (2023). Managing the Strategic Transformation of Higher Education through Artificial Intelligence. *Administrative Sciences*, *13*(9), 196. https://doi.org/10.3390/admsci13090196

Gill, S. S., Xu, M., Patros, P., Wu, H., Kaur, R., Kaur, K., Fuller, S., Singh, M., Arora, P., Parlikad, A. K., Stankovski, V., Abraham, A., Ghosh, S. K., Lutfiyya, H., Kanhere, S. S., Bahsoon, R., Rana, O., Dustdar, S., Sakellariou, R., … Buyya, R. (2024). Transformative effects of ChatGPT on modern education: Emerging Era of AI Chatbots. *Internet of Things and Cyber-Physical Systems*, 4, 19–23. https://doi.org/10.1016/j.iotcps.2023.06.002

Gkrimpizi, T., Peristeras, V., & **Magnisalis, I.** (2023). Classification of Barriers to Digital Transformation in Higher Education Institutions: Systematic Literature Review. *Education Sciences*, *13*(7), 746. https://doi.org/10.3390/educsci13070746

Granić, A., & **Marangunić, N.** (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, *50*(5), 2572–2593. https://doi.org/10.1111/bjet.12864

Grassini, S. (2023). Shaping the Future of Education: Exploring the Potential and Consequences of AI and ChatGPT in Educational Settings. *Education Sciences*, *13*(7), 692. https://doi.org/10.3390/educsci13070692

Gupta, V., & **Yang, H.** (2024). Study protocol for factors influencing the adoption of ChatGPT technology by startups: Perceptions and attitudes of entrepreneurs. *PLoS One*, *19*(2), e0298427. https://doi.org/10.1371/journal.pone.0298427

Hadi Mogavi, R., Deng, C., Kim, J., Zhou, P., Kwon, Y. D., Metwally, A., Tlili, A., Bassanelli, S., Bucchiarone, A., Gujar, S., Nacke, L., & **Hui, P.** (2023). Exploring User Perspectives on ChatGPT: Applications, Perceptions, and Implications for AI-Integrated Education. *arXiv*. https://doi.org/10.48550/arXiv.2305.13114

Harrer, S. (2023). Attention is not all you need: the complicated case of ethically using large language models in healthcare and medicine. *eBioMedicine*, *90*, 104512. https://doi.org/10.1016/j.ebiom.2023.104512

Huang, C.-W., Coleman, M., Gachago, D., & **Van Belle, J.-P.** (2024, 2024//). *Using ChatGPT to Encourage Critical AI Literacy Skills and for Assessment in Higher Education*. ICT Education, Cham. https://doi.org/10.1007/978-3-031-48536-7_8

Huber, S. E., Kiili, K., Nebel, S., Ryan, R. M., Sailer, M., & **Ninaus, M.** (2024). Leveraging the Potential of Large Language Models in Education Through Playful and Game-Based Learning. *Educational Psychology Review*, *36*(1), 25. https://doi.org/10.1007/s10648-024-09868-z

Ibrahim, H., Liu, F., Asim, R., Battu, B., Benabderrahmane, S., Alhafni, B., Adnan, W., Alhanai, T., AlShebli, B., Baghdadi, R., Bélanger, J. J., Beretta, E., Celik, K., Chaqfeh, M., Daqaq, M. F., Bernoussi, Z. E., Fougnie, D., Garcia de Soto, B., Gandolfi, A., … Zaki, Y. (2023). Perception, performance, and detectability of conversational artificial intelligence across 32 university courses. *Sci Rep*, *13*(1), 12187. https://doi.org/10.1038/s41598-023-38964-3

Ilieva, G., Yankova, T., Klisarova-Belcheva, S., Dimitrov, A., Bratkov, M., & **Angelov, D.** (2023). Effects of Generative Chatbots in Higher Education. *Information*, *14*(9), 492. https://doi.org/10.3390/info14090492

Javaid, M., Haleem, A., Singh, R. P., Khan, S., & **Khan, I. H.** (2023). Unlocking the opportunities through ChatGPT Tool towards ameliorating the education system. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, *3*(2), 100115. https://doi.org/10.1016/j.tbench.2023.100115

Jeong, D., Aggarwal, S., Robinson, J., Kumar, N., Spearot, A., & **Park, D. S.** (2023). Exhaustive or exhausting? Evidence on respondent fatigue in long surveys. *Journal of Development Economics*, *161*, 102992. https://doi.org/10.1016/j.jdeveco.2022.102992

Jo, H., & **Bang, Y.** (2023). Analyzing ChatGPT adoption drivers with the TOEK framework. *Scientific Reports*, *13*(1), 22606. https://doi.org/10.1038/s41598-023-49710-0

Kamalov, F., Santandreu Calonge, D., & **Gurrib, I.** (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability*, *15*(16), 12451. https://doi.org/10.3390/su151612451

Kiryakova, G., & **Angelova, N.** (2023). ChatGPT—A Challenging Tool for the University Professors in Their Teaching Practice. *Education Sciences*, *13*(10), 1056. https://doi.org/10.3390/educsci13101056

Kooli, C. (2023). Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions. *Sustainability*, *15*(7), 5614. https://doi.org/10.3390/su15075614

Leng, L. (2024). Challenge, integration, and change: ChatGPT and future anatomical education. *Med Educ Online*, *29*(1), 2304973. https://doi.org/10.1080/10872981.2024.2304973

Lin, Z. (2023). Why and how to embrace AI such as ChatGPT in your academic life. *R Soc Open Sci*, *10*(8), 230658. https://doi.org/10.1098/rsos.230658

Livberber, T., & **Ayvaz, S.** (2023). The impact of Artificial Intelligence in academia: Views of Turkish academics on ChatGPT. *Heliyon*, *9*(9), e19688. https://doi.org/10.1016/j.heliyon.2023.e19688

Lo, C. K. (2023). What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Education Sciences*, *13*(4), 410. https://doi.org/10.3390/educsci13040410

López-Sánchez, J. A., Patiño-Vanegas, J. C., Valencia-Arias, A., & **Rojas Coronel, A. M.** (2024). Model of adoption of virtual tools by university students in the context of an emerging economy [Original Research]. *Frontiers in Education*, *9*, 1167294. https://doi.org/10.3389/feduc.2024.1167294

Luckin, R., Cukurova, M., Kent, C., & **du Boulay, B.** (2022). Empowering educators to be AI-ready. *Computers and Education: Artificial Intelligence*, *3*, 100076. https://doi.org/10.1016/j.caeai.2022.100076

MacCallum, R., Widaman, K., Zhang, S., & **Hong, S.** (1999). Sample Size in Factor Analysis. *Psychological Methods – PSYCHOL METHODS*, 4, 84–99. https://doi.org/10.1037/1082-989X.4.1.84

Mailizar, M., Almanthari, A., & **Maulina, S.** (2021). Examining Teachers' Behavioral Intention to Use E-learning in Teaching of Mathematics: An Extended TAM Model. *Contemporary Educational Technology*, *13*, ep298. https://doi.org/10.30935/cedtech/9709

Malaquias, R. F., Malaquias, F. F. O., & **Hwang, Y.** (2018). Understanding technology acceptance features in learning through a serious game. *Computers in Human Behavior*, *87*, 395–402. https://doi.org/10.1016/j.chb.2018.06.008

Maphoto, K. B., Sevnarayan, K., Mohale, N. E., Suliman, Z., Ntsopi, T. J., & **Mokoena, D.** (2024). Advancing Students' Academic Excellence in Distance Education: Exploring the Potential of Generative AI Integration to Improve Academic Writing Skills [Article]. *Open Praxis*, *16*(2), 142–159. https://doi.org/10.55982/openpraxis.16.2.649

Marangunić, N., & **Granić, A.** (2015). Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, *14*(1), 81–95. https://doi.org/10.1007/s10209-014-0348-1

Menon, D., & **Shilpa, K.** (2023). "Chatting with ChatGPT": Analyzing the factors influencing users' intention to Use the Open AI's ChatGPT using the UTAUT model. *Heliyon*, *9*(11), e20962. https://doi.org/10.1016/j.heliyon.2023.e20962

Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & **Gerardou, F. S.** (2023). Challenges and Opportunities of Generative AI for Higher Education as Explained by ChatGPT. *Education Sciences*, *13*(9), 856. https://doi.org/10.3390/educsci13090856

Mijwil, M., Aljanabi, M., & **Chatgpt.** (2023a). Towards Artificial Intelligence-Based Cybersecurity: The Practices and ChatGPT Generated Ways to Combat Cybercrime. *Iraqi Journal for Computer Science and Mathematics*, *4*, 65–70. https://doi.org/10.52866/ijcsm.2023.01.01.0019

Mijwil, M., Hiran, K., Doshi, R., Dadhich, M., Al-Mistarehi, A.-H., & **Bala, I.** (2023b). ChatGPT and the Future of Academic Integrity in the Artificial Intelligence Era: A New Frontier. *Al-Salam Journal for Engineering and Technology*, *2*, 116–127. https://doi.org/10.55145/ajest.2023.02.02.015

Mishra, P., & **Koehler, M. J.** (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, *108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mizumoto, A., & **Eguchi, M.** (2023). Exploring the potential of using an AI language model for automated essay scoring. *Research Methods in Applied Linguistics*, *2*(2), 100050. https://doi.org/10.1016/j.rmal.2023.100050

Mohammed, B., Mohammad Amin, K., & **Rawad, H.** (2021). Embracing Technological Change in Higher Education. In W. Lee & W. Sharon (Eds.), *Higher Education* (pp. Ch. 12). IntechOpen. https://doi.org/10.5772/intechopen.100431

Montenegro-Rueda, M., Fernández-Cerero, J., Fernández-Batanero, J. M., & **López-Meneses, E.** (2023). Impact of the Implementation of ChatGPT in Education: A Systematic Review. *Computers*, *12*(8), 153. https://doi.org/10.3390/computers12080153

Morjaria, L., Burns, L., Bracken, K., Levinson, A. J., Ngo, Q. N., Lee, M., & **Sibbald, M.** (2024). Examining the Efficacy of ChatGPT in Marking Short-Answer Assessments in an Undergraduate Medical Program. *International Medical Education*, *3*(1), 32–43. https://doi.org/10.3390/ime3010004

Murillo, G. G., Novoa-Hernández, P., & **Rodríguez, R. S.** (2020). Technology Acceptance Model and Moodle: A systematic mapping study. *Information Development*, *37*(4), 617–632. https://doi.org/10.1177/0266666920959367

Nguyen, B., & **Simkin, L.** (2017). The Internet of Things (IoT) and marketing: the state of play, future trends and the implications for marketing. *Journal of Marketing Management*, *33*(1–2), 1–6. https://doi.org/10.1080/0267257X.2016.1257542

Rahiman, H. U., & **Kodikal, R.** (2024). Revolutionizing education: Artificial intelligence empowered learning in higher education. *Cogent Education*, *11*(1), 2293431. https://doi.org/10.1080/2331186X.2023.2293431

Rahman, M. M., & **Watanobe, Y.** (2023). ChatGPT for Education and Research: Opportunities, Threats, and Strategies. *Applied Sciences*, *13*(9), 5783. https://doi.org/10.3390/app13095783

Ray, P. P. (2023). ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope. *Internet of Things and Cyber-Physical Systems*, *3*, 121–154. https://doi.org/10.1016/j.iotcps.2023.04.003

Regmi, K., & **Jones, L.** (2020). A systematic review of the factors – enablers and barriers – affecting e-learning in health sciences education. *BMC Medical Education*, *20*(1), 91. https://doi.org/10.1186/s12909-020-02007-6

Rejeb, A., Rejeb, K., Appolloni, A., Treiblmaier, H., & **Iranmanesh, M.** (2024). Exploring the impact of ChatGPT on education: A web mining and machine learning approach. *The International Journal of Management Education*, *22*(1), 100932. https://doi.org/10.1016/j.ijme.2024.100932

Rosli, M. S., Saleh, N. S., Md. Ali, A., Abu Bakar, S., & **Mohd Tahir, L.** (2022). A Systematic Review of the Technology Acceptance Model for the Sustainability of Higher Education during the COVID-19 Pandemic and Identified Research Gaps. *Sustainability*, *14*(18), 11389. https://doi.org/10.3390/su141811389

Ruiz-Rojas, L. I., Acosta-Vargas, P., De-Moreta-Llovet, J., & **Gonzalez-Rodriguez, M.** (2023). Empowering Education with Generative Artificial Intelligence Tools: Approach with an Instructional Design Matrix. *Sustainability*, *15*(15), 11524. https://doi.org/10.3390/su151511524

Saif, N., Khan, S. U., Shaheen, I., Alotaibi, F. A., Alnfiai, M. M., & **Arif, M.** (2024). Chat-GPT; validating Technology Acceptance Model (TAM) in education sector via ubiquitous learning mechanism. *Computers in Human Behavior*, *154*, 108097. https://doi.org/10.1016/j.chb.2023.108097

Saleem, F., Alnasrallah, W., Malik, M. I., & **Ur Rehman, S.** (2022). Factors Affecting the Quality of Online Learning During COVID-19: Evidence From a Developing Economy. *Frontiers in Education*, *7*, 847571. https://doi.org/10.3389/feduc.2022.847571

Saleh, S. S., Nat, M., & **Aqel, M.** (2022). Sustainable Adoption of E-Learning from the TAM Perspective. *Sustainability*, *14*(6), 3690. https://doi.org/10.3390/su14063690

Sallam, M. (2023). ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns. *Healthcare (Basel)*, *11*(6), 887. https://doi.org/10.3390/healthcare11060887

Sallam, M., Al-Farajat, A., & **Egger, J.** (2024). Envisioning the Future of ChatGPT in Healthcare: Insights and Recommendations from a Systematic Identification of Influential Research and a Call for Papers. *Jordan Medical Journal*, *58*(1). https://doi.org/10.35516/jmj.v58i1.2285

Sallam, M., Elsayed, W., Al-Shorbagy, M., Barakat, M., EL Khatib, S., Ghach, W., Alwan, N., Hallit, S., & **Malaeb, D.** (2024). ChatGPT Usage and Attitudes are Driven by Perceptions of Usefulness, Ease of Use, Risks, and Psycho-Social Impact: A Study among University Students in the UAE. *Research Square*. https://doi.org/10.21203/rs.3.rs-3905717/v1

Sallam, M., Salim, N. A., Al-Tammemi, A. B., Barakat, M., Fayyad, D., Hallit, S., Harapan, H., Hallit, R., & **Mahafzah, A.** (2023a). ChatGPT Output Regarding Compulsory Vaccination and COVID-19 Vaccine Conspiracy: A Descriptive Study at the Outset of a Paradigm Shift in Online Search for Information. *Cureus*, *15*(2), e35029. https://doi.org/10.7759/cureus.35029

Sallam, M., Salim, N. A., Barakat, M., Al-Mahzoum, K., Al-Tammemi, A. B., Malaeb, D., Hallit, R., & **Hallit, S.** (2023b). Assessing Health Students' Attitudes and Usage of ChatGPT in Jordan: Validation Study. *JMIR Med Educ*, *9*, e48254. https://doi.org/10.2196/48254

Sallam, M., Salim, N. A., Barakat, M., & **Al-Tammemi, A. B.** (2023c). ChatGPT applications in medical, dental, pharmacy, and public health education: A descriptive study highlighting the advantages and limitations [Article]. *Narra J*, *3*(1), e103, Article e103. https://doi.org/10.52225/narra.v3i1.103

Scherer, R., Siddiq, F., & **Tondeur, J.** (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, *128*, 13–35. https://doi.org/10.1016/j.compedu.2018.09.009

Southworth, J., Migliaccio, K., Glover, J., Glover, J. N., Reed, D., McCarty, C., Brendemuhl, J., & **Thomas, A.** (2023). Developing a model for AI Across the curriculum: Transforming the higher education

landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence*, 4, 100127. https://doi.org/10.1016/j.caeai.2023.100127

Stahl, B. C., & **Eke, D.** (2024). The ethics of ChatGPT – Exploring the ethical issues of an emerging technology. *International Journal of Information Management*, *74*, 102700. https://doi.org/10.1016/j.ijinfomgt.2023.102700

Strzelecki, A. (2023). Students' Acceptance of ChatGPT in Higher Education: An Extended Unified Theory of Acceptance and Use of Technology. *Innovative Higher Education*. https://doi.org/10.1007/s10755-023-09686-1

Tawafak, R. M., Al-Rahmi, W. M., Almogren, A. S., Al Adwan, M. N., Safori, A., Attar, R. W., & **Habes, M.** (2023). Analysis of E-Learning System Use Using Combined TAM and ECT Factors. *Sustainability*, *15*(14), 11100. https://doi.org/10.3390/su151411100

Tiwari, C. K., Bhat, M. A., Khan, S. T., Subramaniam, R., & **Khan, M. A. I.** (2023). What drives students toward ChatGPT? An investigation of the factors influencing adoption and usage of ChatGPT. *Interactive Technology and Smart Education*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ITSE-04-2023-0061

Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & **Agyemang, B.** (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, *10*(1), 15. https://doi.org/10.1186/s40561-023-00237-x

Valencia-Arias, A., Cardona-Acevedo, S., Gómez-Molina, S., Vélez Holguín, R. M., & **Valencia, J.** (2024). Adoption of mobile learning in the university context: Systematic literature review. *PLoS One*, *19*(6), e0304116. https://doi.org/10.1371/journal.pone.0304116

Van Wyk, M. M., Adarkwah, M. A., & **Amponsah, S.** (2023). Why All the Hype about ChatGPT? Academics' Views of a Chat-based Conversational Learning Strategy at an Open Distance e-Learning Institution [Article]. *Open Praxis*, *15*(3), 214–255. https://doi.org/10.55982/openpraxis.15.3.563

Venkatesh, V., Morris, M. G., Davis, G. B., & **Davis, F. D.** (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Veras, M., Dyer, J. O., Rooney, M., Barros Silva, P. G., Rutherford, D., & **Kairy, D.** (2023). Usability and Efficacy of Artificial Intelligence Chatbots (ChatGPT) for Health Sciences Students: Protocol for a Crossover Randomized Controlled Trial. *JMIR Res Protoc*, *12*, e51873. https://doi.org/10.2196/51873

von Garrel, J., & **Mayer, J.** (2023). Artificial Intelligence in studies—use of ChatGPT and AI-based tools among students in Germany. *Humanities and Social Sciences Communications*, *10*(1), 799. https://doi.org/10.1057/s41599-023-02304-7

Wang, C., Ahmad, S. F., Bani Ahmad Ayassrah, A. Y. A., Awwad, E. M., Irshad, M., Ali, Y. A., Al-Razgan, M., Khan, Y., & **Han, H.** (2023). An empirical evaluation of technology acceptance model for Artificial Intelligence in E-commerce. *Heliyon*, *9*(8), e18349. https://doi.org/10.1016/j.heliyon.2023.e18349

Weidener, L., & **Fischer, M.** (2024). Artificial Intelligence in Medicine: Cross-Sectional Study Among Medical Students on Application, Education, and Ethical Aspects. *JMIR Med Educ*, *10*, e51247. https://doi.org/10.2196/51247

Xu, C. (2024). A Systematic Review of the Potential Influencing Factors for ChatGPT-Assisted Education. *International Journal of Technology-Enhanced Education (IJTEE)*, *3*(1), 1–19. https://doi.org/10.4018/IJTEE.339189

Xu, X., Chen, Y., & **Miao, J.** (2024). Opportunities, challenges, and future directions of large language models, including ChatGPT in medical education: a systematic scoping review. *J Educ Eval Health Prof*, *21*, 6. https://doi.org/10.3352/jeehp.2024.21.6

Yilmaz, R., & **Karaoglan Yilmaz, F. G.** (2023). The effect of generative artificial intelligence (AI)-based tool use on students' computational thinking skills, programming self-efficacy and motivation. *Computers and Education: Artificial Intelligence*, 4, 100147. https://doi.org/10.1016/j.caeai.2023.100147

Younis, H. A., Eisa, T. A., Nasser, M., Sahib, T. M., Noor, A. A., Alyasiri, O. M., Salisu, S., Hayder, I. M., & **Younis, H. A.** (2024). A Systematic Review and Meta-Analysis of Artificial Intelligence Tools in Medicine and Healthcare: Applications, Considerations, Limitations, Motivation and Challenges. *Diagnostics*, *14*(1), 109. https://doi.org/10.3390/diagnostics14010109

Yu, H. (2024). The application and challenges of ChatGPT in educational transformation: New demands for teachers' roles. *Heliyon*, *10*(2), e24289. https://doi.org/10.1016/j.heliyon.2024.e24289

Zarei, M., Zarei, M., Hamzehzadeh, S., Shakeri Bavil Oliyaei, S., & **Hosseini, M.** (2024). ChatGPT, a Friend or a Foe in Medical Education: A Review of Strengths, Challenges, and Opportunities [Review Article]. *Shiraz E-Med J*, *25*(6), e145840. https://doi.org/10.5812/semj-145840

Zobeidi, T., Homayoon, S. B., Yazdanpanah, M., Komendantova, N., & **Warner, L. A.** (2023). Employing the TAM in predicting the use of online learning during and beyond the COVID-19 pandemic. *Front Psychol*, *14*, 1104653. https://doi.org/10.3389/fpsyg.2023.1104653

TO CITE THIS ARTICLE:
Barakat, M., Salim, N. A., & Sallam, M. (2025). University Educators Perspectives on ChatGPT: A Technology Acceptance Model-Based Study. *Open Praxis*, *17*(1), pp. 129–144. DOI: https://doi.org/10.55982/openpraxis.17.1.718

Submitted: 21 June 2024
Accepted: 06 November 2024
Published: 15 April 2025