Online-Journals.org

iJIM International Journal of Interactive Mobile Technologies

iJIM | eISSN: 1865-7923 | Vol. 17 No. 18 (2023) | OPEN ACCESS

https://doi.org/10.3991/ijim.v17i18.41753

PAPER

# Students' Attitudes Towards Using ChatGPT as a Learning Tool: The Case of the University of Jordan

**Aseel O. Ajlouni[1](✉), Fatima Abd-Alkareem Wahba[2], Abdallah Salem Almahaireh[3]**

[1]Arab Open University, Amman, Jordan

[2]Middle East University, Amman, Jordan

[3]The University of Jordan, Amman, Jordan

a.ajlouni@ju.edu.jo

**ABSTRACT**

This research aims to examine students' attitudes toward using ChatGPT as a learning tool using a quantitative approach with a descriptive study design. For data collection, researchers have developed attitude measures that utilize the ABC model, which encompasses three components of attitudes (affective, cognitive, and behavioral). The study was conducted among a random sample of 623 undergraduates who enrolled at the University of Jordan, consisting of 476 females and 147 males. The results of the descriptive statistics indicate that there is a high level of positive attitude toward utilizing ChatGPT as a learning tool. Furthermore, the findings confirm moderate affective and high behavioral and cognitive components of attitudes toward using ChatGPT as a learning tool among undergraduate students. A proportion of respondents (73.2%) agreed on the potential ability of ChatGPT to facilitate the learning process. In comparison, 20.7% of the study participants raised apprehensions regarding the precision of the data produced by ChatGPT, while an equivalent percentage (20.7%) reported feeling uncomfortable utilizing the platform; conversely, 14.6% of those surveyed acknowledged experiencing anxiety when unable to access ChatGPT's services. The results of this study encourage decision-makers and educators at the University of Jordan to incorporate ChatGPT into curricula and instructional practices, considering student concerns and the risk of misuse.

**KEYWORDS**

ChatGPT, learning tool, attitude, chatbot

## 1 INTRODUCTION

A chatbot is a software application that emulates human dialogue via text or voice [1]. Its primary purpose is to function as a virtual assistant, facilitating routine user activities [2]. Chatbots are categorized into two groups depending on how they were developed: rule-based and machine learning (ML)-based, and they have enormous educational potential and favorably affect students' learning and satisfaction [3–5]. Chatbots that operate on a rule-based system are designed with predetermined rules that dictate their responses to specific inquiries. However, their

Ajlouni, A.O., Wahba, F.A.-A., Almahaireh, A.S. (2023). Students' Attitudes Towards Using ChatGPT as a Learning Tool: The Case of the University of Jordan. *International Journal of Interactive Mobile Technologies (iJIM)*, 17(18), pp. 99–117. https://doi.org/10.3991/ijim.v17i18.41753

Article submitted 2023-05-27. Revision uploaded 2023-08-02. Final acceptance 2023-08-02.

ability to comprehend complex queries is restricted. In contrast, chatbots that utilize machine learning (ML) are trained on vast datasets, enabling them to acquire knowledge and respond to various prompts [6]. An example of such an ML-based chatbot is ChatGPT, created by OpenAI and made available to the public in November 2022. It is a primary linguistic model (LLM) developed using a sizable dataset [7–8].

ChatGPT has the ability to produce high-quality paragraphs and diverse research papers and effectively respond to examination inquiries; it is noteworthy that this particular aspect also contributes to the debugging process through its ability to predict, explain, correct errors, and represent knowledge [9–12]. Interacting and conversing with technology is widely regarded as a revolution and a new era [13]. The ChatGPT platform was updated in March 2023 [14] and presented as a potentially valuable educational tool. Further investigation is warranted to explore and evaluate the potential applications of ChatGPT across various academic disciplines, research endeavors, and practical settings. Recent literature has reported several studies investigating the advantages of ChatGPT in various domains, including healthcare, mathematics, language, and medical education [14–17]. Moreover, additional research endeavors have sought to enumerate the benefits and drawbacks of particular disciplines, including those within medicine [18]. Despite the well-established impact of attitudes on the acceptance, adoption, and intention to utilize technology [19–21], no empirical investigation has been conducted to examine students' attitudes toward this novel technology.

According to scholarly literature, attitude is a psychological construct encompassing an individual's emotional state directed towards goal-oriented behavior. It is characterized by the desire to attain a specific outcome [22]. Numerous studies in educational technology have demonstrated that attitude is the primary determinant of the desire to incorporate technology in the educational process. Furthermore, these studies have established a correlation between one's attitudes towards technology and one's willingness to utilize or abstain from it [23]. Nonetheless, individuals' comprehension and acceptance of technology may vary, as it can be perceived as ambiguous or menacing, consequently impacting their attitudes [24]. Hence, it is important to assess individuals attitudes towards recently developed technologies, as attitudes have an influence on their adoption [25]. Examining students' attitudes towards using ChatGPT in the realm of education is crucial. Most recent studies about ChatGPT in education have concentrated on emphasizing its potential, strengths, and limitations in particular domains [26].

Additionally, the UNESCO-organized International Conference has advocated for promoting the equitable use of AI applications across all industries, particularly education [27]. Notwithstanding those mentioned above, no research has investigated students' attitudes regarding the utilization of ChatGPT in education; this underscores the significance of the present study, which endeavors to examine the attitudes of undergraduate students in Jordan toward using ChatGPT as an instrument for learning. This study represents the initial investigation into a burgeoning research field that can significantly influence students' ability to adapt to and accept novel technological advancements. The ChatGPT platform exhibits promising potential in education. The results of this study provide valuable insights for decision-makers in higher education and instructors on how to improve the effectiveness of pedagogy through the integration of ChatGPT technology in educational settings. The present research endeavors to address the following inquiry clearly and deliberately:

*What is the attitude of undergraduate students at the University of Jordan regarding using ChatGPT as a learning tool?*

The following section provides an overview of the theoretical foundations and current research on integrating ChatGPT in educational settings and attitudes toward technology-based learning tools. The following section provides a description of the

study's methodology before presenting and analyzing the findings. Finally, the study concludes with recommendations for future research.

## 2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

### 2.1 ChatGPT

ChatGPT is a cutting-edge innovation that was released to the public just last year; it distinguishes itself as a powerful natural language processing tool thanks to its ability to comprehend and generate natural language indistinguishable from that of a human speaker. Additionally, it can engage in extended dialogues by soliciting information on diverse subjects and generating programming code and entries [28] [29]. The key feature that sets it apart is its capacity to generate texts that closely resemble those produced by humans, thereby simulating natural conversation [30]. Additionally, it can undertake a range of functions, including aiding in interpersonal communication and facilitating targeted information retrieval, thereby unlocking novel prospects for creativity, efficacy, and ingenuity [31] [32]. The ChatGPT platform has demonstrated its proficiency in various fields, including but not limited to education, healthcare, human-machine interaction, and scientific research, as indicated by previous studies [33].

The GPT4 model represents the most recent iteration of an expanded language model, boasting an impressive 175 billion parameters. This model was trained on a varied dataset of naturally occurring text sourced from various online outlets, including web pages, books, and scholarly articles [34]. The exploration of GPT-4's potential in various fields, including biomedical engineering branches, has been documented [35]. According to [36], GPT-4 surpasses ChatGPT and GPT-3 in terms of performance. It successfully clears the Japanese medical licensing examinations. Furthermore, according to [37], the findings indicate that GPT-4 outperforms GPT-3.5, as evidenced by an additional 11 points achieved in the Exame Nacional do Ensino Médio (ENEM), which Brazilian universities widely utilize. Furthermore, as reported by [38], GPT-4 surpasses the minimum threshold for the United States Medical Licensing Examination (USMLE) and outperforms GPT-3.5 in this assessment.

### 2.2 ChatGPT in the context of education

ChatGPT presents significant opportunities in education by facilitating the completion of homework assignments, recommending scholarly articles, and enabling students to tackle intricate tasks by providing essential information and innovative problem-solving techniques. This is achieved through the platform's capacity to generate human-like conversations [39] [40]. Within the realm of education, ChatGPT has the potential to enhance various aspects of learning, such as writing and research skills, personalized learning, learner autonomy, motivation, and engagement. Additionally, it may prove helpful in medical education and clinical decision-making [32] [41] [42].

Studies conducted in education have exhibited a range of objectives and outcomes concerning the utilization, benefits, and constraints of ChatGPT [11]. For example, Sallam's study [14] in healthcare education demonstrated that ChatGPT could facilitate scientific research, personalized learning, critical thinking, problem-based learning, and practice. The study by [43] highlighted the motivational ability of ChatGPT-based instruction and posited ChatGPT as a viable educational resource. Several researchers, however, have pointed out some of the difficulties that could arise while implementing ChatGPT in classrooms. Copyright infringement, transparency, and

plagiarism are just a few examples of the ethical, legal, and privacy problems that fall under this umbrella. Additionally, as shown by several studies [14] [38] [44], there are some concerns regarding integrating ChatGPT in education, including confidentiality, originality, validity, the possibility of false rumors, cheating, and dishonest or manipulative behavior that threaten the information's reliability and security and produce potentially hazardous or deceptive content. However, additional research [45] has suggested a set of strategies and procedures that may be used to guarantee the correct and efficient application of ChatGPT in educational contexts. In conclusion, studies have been undertaken on using ChatGPT in the classroom to evaluate its potential as a pedagogical tool. Research into their utility has looked at the pros and cons. However, further study is urgently needed to examine the psychological impact of unfavorable settings on students, such as negative attitudes that may hinder their acceptance, adaptation, and intention to utilize ChatGPT in the learning process.

## 2.3 Student's attitude in the context of innovative learning tools

According to the definition of attitude, it is a person's "psychological state of preparedness" toward a person or subject. This attitude can result in either positive or negative feelings, depending on how they have previously interacted with the person or issue [46]. According to the ABC model, attitude is a psychological construct encompassing three components: affect, behavior, and cognition. "Affect" pertains to the emotional aspect of attitude, which refers to an individual's feelings or reactions toward a particular object or concept. The term "behavior" applies to an individual's actions or conduct towards a particular object or situation, while "cognition" pertains to an individual's beliefs or perceptions regarding said object or situation [47–50].

Attitudes are commonly shaped through direct exposure, emulation, incentivization, and social learning. According to research [51], students' attitudes toward technology have an impact on their socio-emotional development. Attitude is a variable psychological structure rather than a static state. The examination of attitudes is deemed a significant determinant due to its impact on the adoption of technology, particularly in the realm of education, and it has the potential to impede its efficacy as a pedagogical instrument [23]. Therefore, it is imperative to create an assessment tool that can examine students' attitudes towards a novel technological resource that holds promise in the field of education, given the significant influence of attitude on the adoption of technology. Consequently, the scholars developed sophisticated measures to evaluate the attitudes of both students and educators regarding innovative pedagogical instruments, i.e., attitudes toward computers, robots, chatbots, and artificial intelligence (AI) applications [52–56].

## 2.4 Previous studies

The literature on attitudes towards ChatGPT in education is generally lacking; there are two studies that have been conducted to examine public attitudes towards ChatGPT and another one to investigate teachers' attitudes, so we relate to the previous studies that have investigated students' attitudes towards chatbots and artificial intelligence, which also lack in the literature. The first example of the studies conducted in the field of public attitudes towards ChatGPT is the study of [57] that adopted natural language processing approaches utilizing sentiment analysis and topic modeling methods to Twitter's data. The study's findings revealed that the overall attitude is largely neutral to positive, where the number of positive tweets about

ChatGPT exceeds the number of negative tweets, although there is a higher count of tweets with neutral sentiments compared to both positive and negative ones. Similarly, [58] conducted a study to recognize concerns and attitudes towards using ChatGPT in education. The study utilized BERT-based sentiment and topic modeling techniques, and the natural language processing tools were used to explore a total of 247,484 tweets that were posted from December 1, 2022, to March 31, 2023. The sentiment analysis revealed that Twitter users have positive attitudes towards ChatGPT in education. While in Pakistan, [59] conducted qualitative research to investigate teachers' attitudes towards using ChatGPT. The study utilized semi-structured interviews and comprised 20 faculty members from a private university. The findings revealed that the faculty members had negative attitudes towards ChatGPT and had some concerns, including cheating and plagiarism.

Previous studies that have investigated teachers' or students' attitudes towards AI or chatbots were a little varied in their results, populations, and methodologies. For example, in German, [60] conducted a study to investigate medical students' attitudes towards using chatbots and AI in medicine. The study adopted mixed methods, utilizing standardized quantitative questionnaires and qualitative analysis of group discussions. The study comprised 12 medical students, and the findings revealed that the basic attitudes towards the utilization of AI were positive among students, as they had some concerns regarding using it, including data protection. Furthermore, in Kenya, Bii and his colleagues [61] conducted a study that aimed to investigate teachers' attitudes towards utilizing chatbots in the teaching and learning processes. The study adopted a quasi-experimental design, and the sample comprised 10 teachers from a public boy's boarding school and a public girl's boarding school. The results revealed that teachers have positive attitudes towards using chatbots in teaching. Similarly, Shanqeeti [62] conducted a descriptive study in the Kingdom of Saudi Arabia (KSA) to investigate teachers' attitudes towards using interactive chatbots in teaching students with special needs. The study sample comprised 150 teachers (103 male and 48 female). The finding revealed that those teachers had a moderate degree of attitudes toward and use of interactive chatbots in teaching students with special needs, as well as a medium degree of challenges that they faced while using them.

In Jordan, [63] conducted a descriptive study to explore the attitudes towards AI and machine learning among medical students. The data were collected using a validated questionnaire from 900 medical students from six universities, and the descriptive analysis demonstrated that the majority of the students believed in the significance of AI in the field of medicine and the benefits of AI education in the medical career. Also, [64] conducted a systematic review to explore healthcare students' attitudes towards AI. The study includes 38 studies from PubMed, Embase, Scopus, and Web of Science databases. The result of the analysis revealed that the healthcare students had positive attitudes towards AI in the medicine field.

Based on the above literature, there is a pressing need to investigate students' attitudes towards utilizing ChatGPT in education. Therefore, this study aims to address the gap in the literature regarding attitudes toward ChatGPT as a learning tool across diverse academic disciplines.

# 3 METHODOLOGY

## 3.1 Design, participants, and procedures

The research employed a quantitative research methodology utilizing a descriptive design to examine undergraduate students' attitudes regarding using ChatGPT as

a learning tool at the University of Jordan. The employment of descriptive quantitative design is a suitable method for exploring a variable within a specific population and obtaining data about it [65] [66]. The survey method using questionnaires is an appropriate method for a descriptive study, specifically when the researcher is concerned with attitudes, as indicated by previous research [65]. Therefore, a descriptive quantitative study was performed, and the data were collected via an online questionnaire in May 2023, during the second academic semester of the 2022–2023 academic years. The researcher adopted a random sampling technique to ensure the unbiased selection of the sample [67]. Before the beginning of the study, the necessary consent was obtained from both the institutional board at the University of Jordan and the participants involved. In addition, the distribution of a questionnaire hyperlink to 690 students was requested by utilizing various platforms, including Microsoft Teams, email, and Moodle. The data was gathered over three weeks. 623 questionnaires were returned, with a response rate of 90%.

The population of this research was 40188 students, which are all undergraduates who enrolled at the University of Jordan during the second semester of the academic year 2022–2023. The research sample comprised 623 undergraduate students (476 females and 147 males). The participants included in the study were randomly selected, and all of them expressed their willingness to participate in the research. Thus, the sample size utilized in this study was appropriate and sufficient for achieving the research objectives. The appropriate minimum sample size was determined by applying Thompson's [68] equation with a confidence level of 95% and a margin of error of 5%. Table 1 presents an overview of the demographic characteristics of the participants.

**Table 1.** The demographic characteristics of the respondents

| No | Characteristics | | F | P |
|---|---|---|---|---|
| 1 | Gender | Male | 147 | 23.6% |
| | | Female | 476 | 76.4% |
| 2 | Major | Humanities | 318 | 51% |
| | | Scientific | 305 | 49% |
| 3 | GPA | Excellent | 118 | 18.9% |
| | | Very good | 308 | 49.4% |
| | | Good | 165 | 26.5% |
| | | Poor | 32 | 5.1% |
| 4 | School Year | First | 202 | 32.4% |
| | | Second | 163 | 26.2% |
| | | Third | 193 | 31% |
| | | Fourth | 58 | 9.3% |
| | | Fifth | 5 | 0.8% |
| | | Sixth | 2 | 0.3% |
| 5 | Technological Skills | Beginner | 312 | 50.1% |
| | | Intermediate | 214 | 34.3% |
| | | Advanced | 67 | 10.8% |

*Note: F: frequencies, P: percentage.*

623 students responded to the questionnaire, with 76.4% of them identifying as female and 23.6% as male. The participants were drawn from diverse academic disciplines, with 49% representing scientific fields and 51% representing the humanities. The respondents' cumulative average spanned a range from poor to excellent. The study revealed that the respondents were predominantly first-year students, accounting for 32.4% of the sample. Second, third, and fourth-year students represented 26.2%, 31%, and 9.3% of the sample, respectively. In contrast, fifth- and sixth-year students constituted a minority, comprising only 0.8% and 0.3% of the sample, respectively. This distribution can be attributed to the fact that most of the majors offered by the university are designed to be completed within four years. The study found that most respondents, precisely 50.1%, possessed rudimentary technological skills, indicating a beginner level of proficiency. Meanwhile, 34.3% and 10.8% of the participants demonstrated intermediate and advanced technological skills, respectively.

## 3.2 Study instrument

A study was conducted utilizing a web-based, self-administered questionnaire to examine the attitudes of undergraduate students towards utilizing ChatGPT as a learning tool. The authors of this study utilized the ABC model of attitude and extant literature. It was used to examine students' attitudes toward the utilization of innovative technologies, such as chatbots, robots, and computers, in the context of learning to develop the study instrument [54] [69–73].

The questionnaire comprised a total of 27 items, which were categorized into two distinct sections: the first includes five items (1–5) for collecting demographic data. The second includes the attitudes towards using ChatGPT (ATUC) scale, which was employed to evaluate undergraduate students' attitudes toward ChatGPT as a learning tool. The completion of the ATUC scale required approximately 30 minutes. The ATUC comprised 22 items (6–26) that were distributed across three subscales: a) the affects subscale (comprising seven items, 6–12), b) the cognitive subscale (comprising eight items, 13–20), and c) the behavioral subscale (comprising seven items, 21–27). The ATUC scale employed a 5-point Likert scale ranging from level 1, which represents "strongly disagree," to level 5, which represents "strongly agree." The results indicate that the mean values of the ATUC scale fell within the range of 1.0–2.33, indicating a low level of positive attitudes towards the utilization of ChatGPT as a learning tool. Scores ranging from 2.34 to 3.66 indicated moderately positive attitudes towards using ChatGPT as a learning tool. Conversely, scores ranging from 3.67 to 5.0 indicated highly positive attitudes towards using ChatGPT as a learning tool.

**Psychometrics properties of the ATUC:** The content validity of the ATUC was assessed by ten experts from various Jordanian universities who specialize in curriculum and instruction, educational psychology, instructional technology, and computer science. Additionally, a pilot study was conducted with 80 undergraduate students from the study population and outside the study sample to ensure internal validity and reliability. The ATUC was administered on the pilot sample ($n = 80$), and analysis found that the Pearson correlation coefficients for each item of the ATUC scale and the overall ATUC score fell within the range of 0.48 to 0.83 and were all deemed statistically significant at $p < 0.05$. Further the Pearson correlation coefficients for each item of the ATUC scale and the overall score for the belonging subscale are higher than 0.48, as shown in Table 2.

**Table 2.** The Pearson correlation coefficients for each item of ATUC with the overall score of ATUC scale and overall score for the belonging subscale

| Subscale | Item No. | PCC with Overall ATUC Score | PCC with Overall Affective Subscale Score | PCC with Overall Cognitive Subscale Score | PCC with Overall Behavioral Subscale Score |
|---|---|---|---|---|---|
| Affective | 6 | 0.698* | 0.825* | | |
| | 7 | 0.665* | 0.773* | | |
| | 8 | 0.744* | 0.866* | | |
| | 9 | 0.795* | 0.859* | | |
| | 10 | 0.807* | 0.836* | | |
| | 11 | 0.633* | 0.674* | | |
| | 12 | 0.729* | 0.751* | | |
| Cognitive | 13 | 0.493* | | 0.493* | |
| | 14 | 0.752* | | 0.752* | |
| | 15 | 0.769* | | 0.769* | |
| | 16 | 0.481* | | 0.581* | |
| | 17 | 0.745* | | 0.806* | |
| | 18 | 0.768* | | 0.821* | |
| | 19 | 0.788* | | 0.832* | |
| | 20 | 0.718* | | 0.753* | |
| Behavioral | 21 | 0.801* | | | 0.827* |
| | 22 | 0.765* | | | 0.839* |
| | 23 | 0.749* | | | 0.832* |
| | 24 | 0.832* | | | 0.857* |
| | 25 | 0.813* | | | 0.874* |
| | 26 | 0.803* | | | 0.848* |
| | 27 | 0.775* | | | 0.805* |

*Note:* PCC: Pearson correlation coefficients, *significant at $p < 0.05$.

As well, researchers extracted the inter-sub-scale correlations of ATUC; they were significantly correlated for all pairs of ATUC's subscales, and all the inter-scale correlations were in an acceptable range, as shown in Table 3.

**Table 3.** Intersubscale correlations of ATUC

| Subscale | Affective | Cognitive | Behavioral |
|---|---|---|---|
| **Affective** | 1 | 0.688** | – |
| **Cognitive** | – | 1 | 0.792** |
| **Behavioral** | 0.790** | – | 1 |
| **ATUC overall score** | 0.913** | 0.886** | 0.945** |

*Note:* **significant at $p < 0.01$.

Also, researchers confirmed the reliability of the scale by utilizing internal consistency. The Cronbach's alpha coefficients were computed for the affective subscale, cognitive subscale, behavioral subscale, and total scale, as shown in Table 4. These values indicate that ATUC is a valid and reliable measure.

**Table 4.** Cronbach's alphas for ATUC scale

| Subscale | Cronbach's Alphas |
|---|---|
| Affective | 0.86 |
| Cognitive | 0.92 |
| Behavioral | 0.92 |
| **Total scale** | 0.96 |

These above values indicate that ATUC is a valid and reliable measure that can be used to collect data for the study phenomenon.

### 3.3 Data analysis

Descriptive statistics, such as means, standard deviations, frequencies, and percentages, were utilized to investigate undergraduate students' attitudes regarding employing ChatGPT as a learning tool in responding to the study questions. The statistical analysis was conducted utilizing SPSS software, version 23.

## 4 RESULTS AND DISCUSSION

To address the study question, SQ1: What is the attitude of undergraduate students at the University of Jordan regarding using ChatGPT as a learning tool? Descriptive statistics were extracted, i.e., means, standard deviations, frequencies, and percentages of the responses of the study sample on the ATUC measure and their subscales, namely the affective, cognitive, and behavioral subscales.

Table 5 displays that the average score of attitudes toward ChatGPT as a learning tool among undergraduates at the University of Jordan is 3.74. This score suggests that the students held positive attitudes towards utilizing ChatGPT as a learning tool. Furthermore, there was a variation observed in the average scores of the three attitude components toward ChatGPT among the undergraduate participants. The results indicate that the mean score for the affective attitude component is 3.65, indicating a moderate level. The affective component represents the emotional response towards an attitude object, i.e., liking or disliking [50]. In contrast, the cognitive component has a mean score of 3.77, and the behavioral component of attitude among undergraduates is 3.81, which is considered high. Cognitive components are an estimation of the entity that refers to the assessment of an individual's opinion, i.e., belief or disbelief about the object [50]. The cognitive and affective components of attitude play a significant role in determining behavioral intention, which serves as the immediate motivating factor for actual behavior [74].

**Table 5.** Descriptive statistics of undergraduates responding to ATUC

| ATUC Subscale | Mean | Std. Deviation | Level |
|---|---|---|---|
| Affective | 3.65 | 1.10 | Moderate |
| Cognitive | 3.77 | 1.00 | High |
| Behavioral | 3.81 | 1.01 | High |
| **Total** | 3.74 | 1.03 | High |

Table 6 showed that the average score for the affective component of attitudes towards using ChatGPT as a learning tool among undergraduate students at the University of Jordan was 3.65, indicating a moderately positive level. This implies that the students had moderately positive emotions towards ChatGPT as a learning tool. As evidenced by the data presented in Table 6, the affective subscale responses of the undergraduates were moderately averaged, except for items 6, 7, and 8, which were highly averaged. The responses indicate that undergraduate students exhibit positive attitudes towards acquiring knowledge about ChatGPT; they feel comfortable and enjoy using it in the context of their academic pursuits. [43] indicates the motivational ability of ChatGPT. Moreover, concerning item 9, it was reported that 20.7% of the participants disagreed that they feel at ease employing ChatGPT in their educational endeavors. This implies that particular participants may require additional instruction or assistance to effectively utilize ChatGPT for educational purposes. Providing guidance may increase their comfort level and improve their overall platform perception.

In addition, the results of items 10, 11, and 12 indicate that a mere 15% of undergraduate participants agree or strongly agree with the statement that they experience annoyance while using ChatGPT due to the lack of human interaction. In addition, a notable proportion of participants, precisely 20.7%, expressed agreement or strong agreement that they feel concerned about utilizing ChatGPT to accomplish their academic tasks. This attitude is due to the potential for ChatGPT to generate imprecise outcomes. The above concerns are in line with the study findings by [14] that demonstrated concern regarding the incorrect and inaccurate information that ChatGPT could generate.

Moreover, 14.6% of participants agree or strongly agree with experiencing nervousness in the absence of ChatGPT service. This suggests a dependence on ChatGPT technology, potentially leading to addictive behavior. Feeling anxiety and nervousness in the absence of technological tools are symptoms of technological tool addiction that hinder individuals from concentrating on their work or learning [75]. Further, users of contemporary technologies could demonstrate high levels of emotional dependency on a modern technological tool, causing technological addiction, which is an excessive and extreme use of technology involving non-human interactions [76]. Thus, there is a pressing need to address and prevent ChatGPT addiction among these individuals. The affective components of the attitude of these undergraduate students toward ChatGPT was shaped by their emotions concerning its use as a tool for learning. The findings of this study suggest that decision-makers and educators must address the concerns of students effectively. By raising awareness and by providing guidance on using ChatGPT as a learning tool, this can be achieved.

**Table 6.** Descriptive statistics for undergraduates responding on the affective subscale of ATUC

| Statements | SD | D | N | A | SA | M ± STD |
|---|---|---|---|---|---|---|
| **6.** I like learning about ChatGPT. | 6.3 | 5.9 | 16.9 | 39.8 | 31.1 | 3.84 ± 1.12 |
| **7.** I enjoy using ChatGPT in the learning process. | 6.7 | 7.4 | 21.0 | 39.8 | 25.0 | 3.69 ± 1.13 |
| **8.** I feel comfortable using ChatGPT in the learning process. | 4.0 | 5.0 | 20.5 | 43.0 | 27.4 | 3.85 ± 1.01 |
| **9.** I feel at ease employing ChatGPT in the learning tasks. | 8.0 | 12.7 | 23.9 | 35.0 | 20.4 | 3.47 ± 1.18 |
| **10.** I feel annoyed to use ChatGPT because there is no human interaction. | 23.9 | 33.1 | 28.1 | 11.1 | 3.9 | 3.62 ± 1.08 |
| **11.** I feel concerned about using ChatGPT in doing schoolwork because it may generate inaccurate results. | 20.1 | 30.8 | 28.4 | 14.1 | 6.6 | 3.44 ± 1.15 |
| **12.** I feel nervous if I can't access ChatGPT services. | 22.5 | 34.5 | 28.4 | 11.1 | 3.5 | 3.61 ± 1.06 |
| Total | | | | | | 3.65 ± 1.10 |

*Notes:* SD: strongly disagree; D: disagree; N: neutral; A: agree; SA: strongly agree; M: mean; STD: standard deviation.

Additionally, it was found that undergraduate students exhibited a high level of cognitive component (m = 3.77), which suggests favorable and confident attitudes towards ChatGPT and its potential to facilitate the learning process. The cognitive component of attitude pertains to the cognitive processes involved in an individual's attitudes towards a psychological object, including beliefs and thoughts regarding technology [74]. Table 7 displays the results, indicating that the participants rated the cognitive subscale items highly, except for items 16 and 17, which are related to the perceived impact of ChatGPT on academic self-confidence and writing skills, respectively. The results indicate a moderate level of agreement among respondents, with over 60% expressing that ChatGPT has the potential to improve their academic self-confidence and writing skills. This is in line with the results of previous studies that found that chatbots increase students' self-confidence and improve writing skills [42] [77]. In addition, the study revealed a high level of agreement among participants concerning the potential of ChatGPT in facilitating the learning process, as evidenced by 73.2% of students agreeing. Most students agreed that the skills for employing ChatGPT in learning are necessary, make the learning process easier and the learning experience better, satisfy their learning needs, support their lifelong learning, promote their evaluation and higher-order skills, and foster creativity. These strong positive beliefs about using ChatGPT in a learning process contribute to their high positive level on the cognitive subscale of the ATUC. As well, this result is in line with findings from previous studies that highlighted the potential of ChatGPT in education [14] [38] [42] [44].

**Table 7.** Descriptive statistics for undergraduates responding on cognitive subscale of ATUC

| Statements | SD | D | N | A | SA | M ± SD |
|---|---|---|---|---|---|---|
| **13.** The skills of Employing ChatGPT in learning are necessary for students. | 2.6 | 4.7 | 15.1 | 39.2 | 38.5 | 4.6 ± 0.98 |
| **14.** ChatGPT makes the learning process easier. | 3.0 | 5.3 | 18.5 | 44.5 | 28.7 | 3.91 ± 0.98 |
| **15.** ChatGPT makes the learning experience better. | 2.9 | 7.1 | 20.5 | 44.0 | 25.5 | 3.82 ± 0.99 |
| **16.** ChatGPT enhances academic self-confidence. | 4.2 | 9.1 | 26.5 | 39.2 | 21.0 | 3.64 ± 1.04 |
| **17.** ChatGPT develops writing skills. | 4.7 | 10.6 | 22.0 | 41.9 | 20.9 | 3.64 ± 1.07 |
| **18.** ChatGPT satisfies my individual learning needs. | 2.9 | 6.9 | 20.5 | 45.3 | 24.4 | 3.81 ± 0.98 |
| **19.** ChatGPT supports lifelong learning. | 4.0 | 5.9 | 21.8 | 44.1 | 24.1 | 3.78 ± 1.01 |
| **20.** ChatGPT improves higher-order skills, i.e. Evaluation and creativity | 3.9 | 6.7 | 21.0 | 45.6 | 22.8 | 3.77 ± 1.00 |
| Total | | | | | | 3.77 ± 1.00 |

Similarly, it was found that undergraduate students exhibited a high level of behavioral component (m = 3.81) in their attitudes towards ChatGPT. It indicates their inclination towards utilizing the platform as a tool for their educational pursuits, where public acceptance is influenced by behavioral factors [78]. Further, the behavioral component of attitudes encompasses an individual's reaction and response, i.e., whether it is favorable or unfavorable to do something concerning the attitude objects [50]. Table 8 displays the results of the behavioral subscale items, demonstrating that the majority of student respondents provided high average ratings. Except for item 23 (regarding the use of ChatGPT as a tutor), approximately 15% of respondents expressed disagreement with the notion of using ChatGPT as a tutor. This may be attributed to various factors, such as the need for more proficiency or knowledge in utilizing ChatGPT, concerns regarding the accuracy of generated data, and limitations associated with ChatGPT, such as the absence of human interaction. However, further research is required to explore these factors in greater

depth. Nevertheless, the majority of participants agree that they would utilize ChatGPT to attain their learning goals, employing it as a pedagogical tool for exercising, practicing, exam readiness, summarizing and analyzing educational content, keeping abreast of its advancements, and apprising their friends and colleagues of ChatGPT's advantageous academic proficiencies.

Undergraduate students hold a positive intent to use ChatGPT in their learning, which could be attributed to their solid belief regarding the advantages of utilizing ChatGPT in education and their exhibition of favorable emotion regarding ChatGPT technology since behavioral intention is a direct result of the affective and cognitive components of attitude [74], as well as prior research findings suggesting that individuals' behavior is positively impacted by their perceived benefits [79].

**Table 8.** Descriptive statistics for undergraduates responding on the behavioral subscale of ATUC

| Statements | SD | D | N | A | SA | M ± SD |
|---|---|---|---|---|---|---|
| **21.** I would follow the improvements in ChatGPT. | 3.2 | 6.7 | 18.1 | 43.0 | 28.9 | 3.88 ± 1.01 |
| **22.** I would inform friends and colleagues about the benefits of employing ChatGPT in the learning process. | 3.4 | 6.6 | 16.4 | 46.5 | 27.1 | 3.87 ± 0.99 |
| **23.** I would use ChatGPT as a tutor. | 5.5 | 10.4 | 22.8 | 37.7 | 23.6 | 3.64 ± 1.11 |
| **24.** I would use ChatGPT as an educational resource. | 4.0 | 4.8 | 19.7 | 44.3 | 27.1 | 3.86 ± 1.00 |
| **25.** I would use ChatGPT for exercising, practicing and exam preparation. | 3.2 | 7.5 | 20.5 | 44.3 | 24.4 | 3.79 ± 1.00 |
| **26.** I would use ChatGPT for summarizing and analyzing the educational material. | 2.6 | 5.1 | 20.4 | 44.1 | 27.8 | 3.89 ± 0.95 |
| **27.** I would keep using ChatGPT to achieve my learning goals. | 3.5 | 7.5 | 20.7 | 43.2 | 25.0 | 3.79 ± 1.02 |
| Total | | | | | | 3.81 ± 1.01 |

The results also illustrate that undergraduate students at the University of Jordan exhibit high positive attitudes towards ChatGPT as a learning tool (m = 3.74). This finding could be attributed to the various pedagogical benefits the students perceive to be associated with the ChatGPT platform. Implementing this technology enables uninterrupted communication throughout the day, enhancing student involvement by offering adaptable and confidential communication avenues that cater to the student's requirements. Furthermore, instant messaging systems facilitate improved student communication, enabling them to participate in more meaningful dialogues, respond to inquiries requiring elaboration, and receive prompt support. In addition, it has been reported that chatbots allow students to access information and enhance their communication skills through practice and refinement [26] [41] [44] [80].

Students' attitudes towards ChatGPT as a learning tool were not the focus of all of the research. So this limited the ability to compare this study's findings with previous studies, so we relate them to previous studies that involved chatbots or AI. However, the result of positive attitudes towards ChatGPT as a learning tool among undergraduate students is consistent with the study's finding [58], which revealed that Twitter users have positive attitudes towards ChatGPT in education. Also, it is in line with the previous studies by [60] and [64] that have demonstrated positive attitudes towards using AI among medical and healthcare students. Furthermore, the findings of this investigation are connsistent with a study conducted in Jordan by [63], which found that medical students believe in the significance of AI in the field of medicine. Moreover, research [61] found that the attitude among teachers' towards

utilizing chatbots in the teaching and learning process was positive. However, the study result of high positive attitudes towards ChatGPT among undergraduates is partly in conflict with some related previous studies, such as [57], which found the overall attitudes towards ChatGPT among Twitter users are largely neutral to positive, and [62], which revealed a moderate degree of teachers' attitudes towards utilizing ChatGPT in special needs education. Also, the study result is contrary to [59], in which faculty members had negative attitudes towards ChatGPT. These conflicting results could be attributed to several reasons, the most important of which is the variation in the target population and culture of the previous studies. These studies have been conducted in several countries, such as Pakistan, Germany, Jordan, and others. Additionally, some studies have investigated different variables, such as students' attitudes, teachers' attitudes, or Twitter users' attitudes. Furthermore, some studies have examined attitudes towards artificial intelligence or chatbots. Also, scholars have indicated that attitudes are influenced by cultural factors [81], and attitudes towards using information technology could change over time [82].

The present investigation highlights the necessity of preserving and advancing favorable attitudes towards ChatGPT technology to facilitate its adoption as a viable learning tool. Nonetheless, this underscores the need for particular students to receive additional education to alter their concerns about ChatGPT utilization. Furthermore, the findings emphasize the significance of conducting further comprehensive investigations to inspect students' affective dispositions concerning their anxiety experience in the absence of ChatGPT services. This sentiment may suggest the potentiality of technology addiction and reliance. This underscores the need for additional research, specifically in addiction and technophile. The latter encompasses not only a favorable disposition toward technology but also dependence and technological reputation, as previously noted [25]. Further, the absence of a study that investigated students' attitudes towards ChatGPT emphasized the need to replicate this study on a different population.

## 5 CONCLUSIONS

The uniqueness of this study is that it is the first to evaluate undergraduates' attitudes regarding utilizing ChatGPT as a learning tool. The researchers developed a measure based on the ABC model of the attitude's components, including emotional, cognitive, and behavioral variables forming the attitude. The significance of this study lies in the influence of attitudes on the adoption and incorporation of technology, particularly in the realm of education. The present descriptive study design using a quantitative approach was carried out in Jordan during the second semester of the academic year 2022–2023, encompassing a total of 623 undergraduate students who were enrolled at the University of Jordan.

The study's findings indicate that ChatGPT is perceived as a valuable learning tool, with participants exhibiting predominantly positive attitudes toward its use. Specifically, the results suggest that the affective component of attitudes was moderately positive, while the cognitive and behavioral components were highly positive. Furthermore, a significant proportion of undergraduate students (73.2%) agreed on the potential of ChatGPT to enhance the learning experience. Nonetheless, some participants expressed reservations regarding the precision of the data produced by ChatGPT, with a percentage of 20.7%. Similarly, an equivalent percentage (20.7%) reported feeling difficulty utilizing ChatGPT for educational purposes.

Conversely, a fraction of the respondents reported experiencing anxiety in the event of the unavailability of ChatGPT services, with 14.6%. The discoveries above aid decision-makers at the Ministry of Higher Education and educators at the University of Jordan in devising protocols and strategies for incorporating ChatGPT into the curriculum and instructional framework, as well as in taking measures to tackle student concerns and the potential for ChatGPT to be misused. One potential strategy for promoting the effective use of ChatGPT as an educational tool is to organize workshops and training sessions. These events could enhance the literacy and awareness of undergraduate students regarding the benefits and best practices associated with ChatGPT.

The research encountered certain limitations regarding the study population. Initially, it should be noted that the research solely comprised undergraduate students enrolled at one public university in the metropolitan area of Jordan's capital city. Furthermore, the study exclusively included a sample size of 623 undergraduate students. The constraints above imply that educational researchers should undertake similar investigations across diverse cohorts and explore additional physiological concerns like addiction.

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## 7 AUTHORS

**Aseel O. Ajlouni** is an Assistant Professor of Educational Technology in the Faculty of Education Studies at Arab Open University in Jordan. She earned her PhD in Educational Technology from the University of Jordan, Jordan in 2020. She has published several research papers on integrating technology in the classroom, online teaching and learning.

**Fatima Abd-Alkareem Wahba** is an Assistant Professor in the Education Technology department at Middle East University in Jordan. Her research interests include Artificial Intelligence in Education, Employing Technological Innovations, Smartphones and Multimedia Applications in Education.

**Abdallah Salem Almahaireh** is an Associate Professor in psychological and Educational Counseling, School of Educational Sciences at The University of Jordan.