

The Effect of using Chat GPT on Learning among Jordanian University Students

Nabil Salah Hemedan¹, Suhaila Mahmoud Banat², Wafaa Khaled ahmad Aldames³, Nusaiba Almousa⁴, Khaled Ahmad Albawareed³

¹Assistant Professor, Faculty of Educational and Psychological Sciences, Department of Special Education, Amman Arab University, Amman, Jordan

²Full Professor, Faculty of Educational and Psychological Sciences, Psychological Counseling Department, Amman Arab University, Amman, Jordan

³Researcher, Faculty of Educational and Psychological Sciences, Psychological Counseling Department, Amman Arab University, Amman, Jordan

⁴Associate Professor, Faculty of Educational and Psychological Sciences, Amman Arab University, Amman, Jordan
Email: nabil.h@aaau.edu.jo

Abstract

This study investigates the impact of ChatGPT on learning among Jordanian university students. It explores how the use of ChatGPT affects their educational experience, focusing on variables such as age, gender, and duration of usage. Data was collected from a sample of 300 students, revealing that ChatGPT positively influences learning by providing accessible and accurate information, aiding skill development, and improving understanding of academic concepts. The study results indicated that the impact of ChatGPT on learning was high. And it was differences in ChatGPT's impact based on gender and usage duration, with males and students using the tool for longer periods experiencing greater benefits. Age did not show significant differences. Despite its advantages, the study notes concerns about over-reliance on ChatGPT, which may impact critical thinking and independent learning. The study concludes that while ChatGPT offers valuable support in education, it is crucial to address its limitations and integrate it thoughtfully into learning processes. Recommendations include further research on its broader impacts, increasing awareness among educators about its potential drawbacks, and adapting evaluation methods to preserve academic integrity.

Keywords: ChatGPT, independent learning.

1. Introduction

1.1. Overview

Recent technological advancements have brought about significant changes in the field of education, rendering learning more flexible and readily accessible through online platforms. To this effect, e-learning has become the main option for many educational institutions, including

schools and universities, to provide students with a more interactive and effective learning experience. Alongside the advancements in technology globally, artificial intelligence (AI) is experiencing swift expansion. Artificial intelligence could be perceived as the emulation of human intelligence processes using machines, particularly computer systems. One aspect of AI that has caught the attention of educationists is chatbots, which have been used in various contexts to provide support and aid to users. In this regard, a chatbot is a computer program designed to conduct conversations with humans through chat applications, such as text messaging or instant messaging platforms. However, one increasingly common form of chatbot is ChatGPT, which is an artificial intelligence language model capable of understanding and processing human language very well. This model allows chatbots to interact with users naturally and provide relevant responses to the topic at hand (Hakiki, 2023).

Currently, artificial intelligence applications are being used in education to enhance administrative services, academic support, doing homework and complex problems, as well as addressing all questions and ideas. They also facilitate the work of teachers in teaching and learning. ChatGPT, for example, utilizes natural language processing to generate human-like responses. This application has caught global attention for its outstanding performance in producing well-organized, logical, and useful responses. ChatGPT was released on November 30, 2022, and it has become the fastest-growing application in user history, reaching 100 million active users in January 2023 (Lo, 2023).

1.2. ChatGPT

ChatGPT is an artificial intelligence-powered chatbot program released by OpenAI, which has garnered significant public interest since its launch in November 2022 among professionals, students, policymakers, and experts in higher education. ChatGPT utilizes artificial intelligence and natural language processing (NLP) to create answers resembling human responses. It has attracted international attention due to its effectiveness in generating convincing, organized, and useful answers (Gill, 2023). OpenAI was founded in 2015 by a team of technology innovators and received substantial funding from technology giants, such as Microsoft, Amazon, and Alphabet. The development of ChatGPT relies on significant advancements in neural linguistic programming (NLP). The GPT architecture has had numerous improvements to reach its current form, with each new release achieving superior language generation, accuracy, and performance. Chatbots have been praised as a breakthrough in NLP and have been utilized and benefited from in various contexts, including customer service, education, and healthcare (Dempere, 2023).

Some of the key advantages provided by ChatGPT include customer support around the clock, enhancing user experience, ensuring instant responses to inquiries, handling repetitive and multiple tasks without human intervention, such as answering questions and all recurring inquiries, reducing practical burdens, and minimizing human errors. ChatGPT can deal with numerous inquiries and tasks at the same time, making it ideal for companies dealing with fluctuating workloads and reducing the need to hire and train additional employees, leading to cost savings. Additionally, ChatGPT can communicate in multiple languages, expanding its usability to reach a global audience (Ngoma, 2023).

Despite its significant benefits, ChatGPT still faces some challenges. Users sometimes need to rephrase questions several times for ChatGPT to understand their intent. It also lacks logic in some answers, which may seem reasonable but hold no practical meaning or could be excessively lengthy. Furthermore, ChatGPT's data is limited until 2021, and chatbots have no information about events or news that occurred after 2021. Finally, ChatGPT does not provide sources for its answers (Ortiz, 2023).

1.3. Learning and ChatGPT

The impact of OpenAI's introduction of ChatGPT cannot be overstated. It is undeniable that this program has rapidly become a very useful tool applicable in numerous areas, ranging from sales and marketing to entertainment, education, blogging, and research. Dr. Steve Watson, a faculty member at Cambridge University's School of Education, believes that ChatGPT brings us new opportunities and more complexities. ChatGPT has surely played a role in education and will have a central role in the coming years (Digital learning institute, 2023).

The impact of ChatGPT on learning has been significant, enriching students' learning experiences by providing quick and personalized responses. This system has the capability to meet individual student needs, offer immediate feedback, and facilitate the understanding of complex concepts. This way, it has become a promising tool that enhances student engagement and cognitive progress by adapting to students' learning pace and providing necessary and continuous information in the knowledge acquisition process (Sanchez, 2023).

Furthermore, ChatGPT has proven to be an excellent tool for enhancing students' writing skills. Through interaction with the program, students can receive appropriate grammatical corrections, numerous suggestions to improve their writing process, and detailed feedback on their writing, thus offering them valuable chances to improve their written communication skills and attain higher effectiveness in expressing themselves in writing. Hence, this application is deemed a valuable asset for academic writing and research. Consequently, many studies have attempted to explore the potential impact of artificial intelligence on learning, demonstrating that this program, along with other AI additions, can significantly improve the learning process for students. This tool has positioned itself as a revolutionary technology in the field of education and has increasingly attracted attention for its impact on learning, student learning methods, and support in academic environments. Through this, educational institutions are re-establishing their role in improving the learning process considering this new development (Marta et al., 2023).

However, the introduction of ChatGPT represents a revolution in the field of education with both positive and negative implications. Some experts argue that frequent use of ChatGPT technology may lead to a reduction in students' critical thinking abilities and independent learning. Teachers also perceive that the ease of generating texts, essays, and research papers and obtaining answers easily greatly discourages students from developing their own ideas and conducting independent research, leading to a lack of creativity and innovation in their work. Moreover, heavy reliance on artificial intelligence language models may raise ethical concerns about academic integrity, increasing instances of plagiarism, and fostering laziness among students, thus disrupting the learning experience (Desk, 2023).

Korab (2023) views ChatGPT as a challenge for teachers and university professors because this program does not require human interaction. It may lead to misinformation and an increase in cases of cheating and identity deception, as students fulfill their learning needs through improper means. Meanwhile, Elenjichal (2023) believes that ChatGPT reduces social interaction because spending time solving problems and directing questions to a program will affect students' social interactions and may lead to the loss of essential social skills, such as teamwork, empathy, and communication, which are necessary for personal growth.

2. Study Problem

The study problem emerged as a relatively recent issue with the emergence and rapid spread of a program that was not expected to appear at such speed. It has become one of the most used programs by students due to its ease of use and its ability to provide information more accurately and in a manner closer to human interaction. This change, occurring within a period not exceeding two years, posed a dilemma for teachers who perceive that their position is beginning to shake. They now find themselves facing a new era that requires radical changes in teaching methods and a shift in the roles of teachers. This significant change has also reached the students, as they seek the easiest ways to acquire information. ChatGPT has presented them with golden opportunities. Statistics confirm the validity of what we feel. It is a problem that requires research.

According to Mahajan (2023), in September 2023 the number of subscribers to the application reached a billion, and the program receives one and a half billion monthly visitors. These figures are astonishing for an application created just a year ago. Experts and teachers in Jordan are concerned, as are experts worldwide, feeling that their position is threatened. Some think that the entire educational process is now threatened. Professors at Jordanian universities and teachers in Jordanian schools realize that we are now entering an era of changing the educational process. However, for us as Arabs, particularly in the Middle East, things are not that easy. The entry of ChatGPT into the student environment was easy but changing the education system and the roles of teachers, which must change now, is not easy in an environment characterized by economic scarcity and plagued by significant problems. In contrast to the Western countries known for their flexibility and readiness to embrace innovation, Arab countries, particularly in the Middle East, face challenges in reforming their education systems. Recognizing this disparity, the researchers have been motivated to explore this urgent subject matter.

3. Study Significance and Questions

3.1. Study Significance

To the best of the researchers' knowledge, this study is the first in Jordan to address the category of students in Jordanian universities and the impact of using ChatGPT on their learning. This category has not been studied with these variables before, and the study is also the first to consider this variable as new and ChatGPT as a chat program. In brief, the study significance lies in the following:

3.1.1. Theoretical Significance

- Acquiring data on the prevalence of ChatGPT usage among university students in Jordan is essential, as there have been no prior studies examining its extent among this demographic. This research could yield new insights previously absent in previous research.
- Acquiring insights into the influence of the ChatGPT program on the educational outcomes of Jordanian university students, potentially uncovering new findings absent in previous research.

3.1.2. Practical Significance

The findings of this study will lay the groundwork for future research endeavors and could inspire decision-makers to formulate preventive and remedial strategies to address this issue.

3.2. Study Questions

1. What is the impact of using ChatGPT on learning among Jordanian university students?
2. Are there statistically significant differences in the use of ChatGPT attributed to the variables of age, gender, and duration of ChatGPT use?

4. Method and Procedures

4.1. Study Population and Sample

The research covered all Jordanian universities, with a study population of 379,005 students as per Ministry of Higher Education statistics for the academic year 2022/2023. The sample was taken using the available sample method, which suits the purpose of the study. The available sample allows us to easily take the sample without complications, and our goal is to reach the largest possible number of students. Thus, we selected this type of sample. Full consent was obtained from each respondent to the questionnaire. After the study participants responded to the questionnaire, 30 incomplete questionnaires were excluded, and an additional 29 questionnaire papers were excluded due to patterned responses. Thus, the responses were limited to 300 questionnaires. Table (1) shows the distribution of study participants according to the variables.

Table 1: Frequencies and percentages by study variable

Variable	Category	Frequency	Percentage
Age	Less than 20 years	17	15.5
	More than 20 years	93	84.5
Gender	Female	157	51.8
	Male	153	48.2
Duration of ChatGPT Usage	One hour or less	81	73.6
	More than one hour	29	26.4
Total		310	100.0

4.2. Measures

ChatGPT Scale: The scale was designed to measure the impact of using the ChatGPT program on learning. The theoretical framework related to the topic was consulted, along with several previous studies that investigated the ChatGPT program. Information was also gathered from the views of interviewed students, and their input was utilized. The following studies were consulted

in designing the scale: Gill & Kaur (2023), Lo (2023), Adesholaa & Adepojuc (2023), Rahman & Watanobe (2023), Firaina & Sulisworo (2023), Al Ahmed & Sharo (2023), and Pradana et al. (2023). The initial form of the scale consists of 20 items. A Likert five-point scale was adopted to score the study's tools, assigning each item a score from one to five (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), corresponding numerically to (5, 4, 3, 2, 1), respectively. The following scale was adopted for the purpose of analyzing the results:

- From 1.00 to 2.33: Low
- From 2.34 to 3.67: Moderate
- From 3.68 to 5.00: High

The scale was calculated using the following equation: (Maximum scale value (5) - Minimum scale value (1)) / Number of required categories (3) = (5 - 1) / 3 = 1.33), and then adding the result (1.33) to the end of each category.

4.3. Scale Validity

The scale was prepared to be suitable for the Jordanian environment. Validity indicators for the scale were obtained using two methods: content validity and construct validity.

4.3.1. Content Validity

The initial tool was presented to 10 of our colleagues in Jordanian universities (Clinical Psychology Department and Psychological Counseling Department) to assess the suitability of the items for measurement and to ensure their appropriateness for the study community in the Jordanian environment. Language formulation appropriateness was also evaluated. Adjustments and additions were made accordingly. Approval from at least 7 reviewers was obtained to keep an item. Based on the reviewers' feedback, 10 items were removed from the scale, resulting in a scale composed of 10 items after removing the 10 items.

4.3.2. Construct Validity

To extract indicators of construct validity for the scale, the correlations of the items with the total score of the scale were calculated in a sample outside the study sample, consisting of 30 students. The correlations of the items with the total score ranged from 0.53 to 0.85, as shown in the following table.

Table 2: Correlation coefficients between the item and the total score of the scale

Item Number	Correlation Coefficient	Item Number	Correlation Coefficient
1	**0.73	6	**0.53
2	**0.74	7	**0.78
3	**0.82	8	**0.74
4	**0.85	9	**0.74
5	**0.65	10	**0.74

* Statistically significant at the (0.05) level.

** Statistically significant at the (0.01) level.

It is worth noting that all correlation coefficients were acceptable and statistically significant. Therefore, none of these items were deleted.

4.4. Study Tool Reliability

To ensure the reliability of the study tool, a test-retest method was employed by reapplying the scale after two weeks to a group of 30 students outside the study sample. The Pearson correlation coefficient between their estimates on both occasions was calculated to be 0.88. Additionally, the stability coefficient was computed using the internal consistency method according to the Cronbach's alpha equation, resulting in 0.83. These values were considered suitable for the purposes of this study.

5. Study Results and Discussion

The aim of this study was to investigate the impact of using ChatGPT on learning among Jordanian university students. The following discussion presents the results.

Question 1: What is the effect of using ChatGPT on learning among Jordanian university students?

To answer this question, the arithmetic means and standard deviations for the effect of using ChatGPT on learning among Jordanian university students were calculated. Table (3) below illustrates this.

Table 3: Arithmetic means and standard deviations for the effect of using ChatGPT on learning among Jordanian university students, ranked in descending order according to the arithmetic means.

Rank	Number	Item	Mean	Standard Deviation	Level
1	6	ChatGPT provides information easily, quickly, and with high accuracy.	4.08	0.910	High
2	1	ChatGPT helps me learn new skills.	3.88	0.974	High
3	3	Using ChatGPT has contributed to improving my understanding of academic concepts.	3.86	1.018	High
4	2	When I use ChatGPT, I feel that I can learn my lessons better.	3.79	1.032	High
5	9	ChatGPT provides me with the latest and most up-to-date information.	3.75	1.006	High
6	4	I believe that using ChatGPT has increased my effectiveness in participating in class discussions.	3.70	1.000	High
7	10	I feel confident in the information provided by ChatGPT.	3.66	0.998	Average
8	7	I feel that ChatGPT has improved the interaction and communication between me and my professors at university.	3.62	1.058	Average
9	8	ChatGPT answers all the complex questions and problems I face during my studies.	3.62	1.075	Average
10	5	My academic achievement has generally increased since I started using ChatGPT.	3.53	1.098	Average
		Total Score	3.75	0.805	High

Table (3) shows that the arithmetic means ranged between (3.53 - 4.08), where item number (6), which states "ChatGPT provides information easily, quickly, and accurately," ranked first with an arithmetic mean of (4.08), while item number (5), stating "My academic achievement has generally increased since using ChatGPT," ranked last with an arithmetic mean of (3.53). The arithmetic mean for the effect of using ChatGPT on learning among Jordanian university students

as a whole was (3.75). From the previous table, it is evident that the item "ChatGPT provides information easily, quickly, and accurately" is perceived by Jordanian university students as highly effective in learning. The ease of accessing information provided by ChatGPT has rapidly increased its spread and usage among students. The program quickly presents information upon typing a question or topic, delivering it in a manner close to human interaction, thus making it the most widely used program among students. The value of easy access to information and its impact on learning cannot be denied. Difficulty in accessing information may affect students' learning, especially because this generation of students is accustomed to a fast-paced lifestyle and has adapted to ease of information access since early years of schooling. Currently, the education system has changed, and the method of accessing information has evolved. ChatGPT provides the desired information in the easiest way possible. However, the item "My academic achievement has generally increased since using ChatGPT" obtained the lowest arithmetic mean. Despite the ease of accessing information, as reported by students, ChatGPT did not contribute to improving their academic performance. This is expected because while ChatGPT focuses on providing immediate information, a significant part of academic achievement depends on exams, making it difficult to use ChatGPT during exam hours. Moreover, exams rely on specific material that may not be available on ChatGPT. In the end, ChatGPT is a program, and there is a significant portion of assessment that relies on students' possessing critical thinking skills, the ability to speak, and express themselves, which ChatGPT does not provide. It reduces critical thinking among students. Hence, it is natural for students to report that ChatGPT did not contribute to their academic improvement.

The present study's results align with Sanchez (2023), who emphasizes the importance of ChatGPT in learning by providing quick and personalized responses, meeting individual student needs, and providing immediate feedback. They also align with Marta et al. (2023), demonstrating that this program can greatly enhance student learning. Additionally, the results align with Desk (2023), who highlights that ChatGPT leads to a reduction in students' critical thinking abilities and independent learning, as well as with teachers' perceptions that the ease of creating texts and written expressive research and obtaining answers easily greatly discourages students' determination to develop their own ideas, thus not aiding in improving academic performance as reported by students.

Question 2: Are there statistically significant differences ($\alpha = 0.05$) in the use of ChatGPT on learning among Jordanian university students attributed to age, gender, and duration of using ChatGPT?

To answer this question, arithmetic means and standard deviations for the use of ChatGPT on learning among Jordanian university students were extracted according to age, gender, and duration of using ChatGPT. Table (4) below illustrates this.

Table 4: Arithmetic means and standard deviations for the use of ChatGPT on learning among Jordanian university students according to age, gender, and duration of using ChatGPT.

Variable	Category	Mean	Standard Deviation	Frequency
Age	Less than twenty	3.75	0.785	17
	Twenty or more	3.75	0.812	93
Gender	Female	3.56	0.821	57
	Male	3.95	0.743	53

Duration of ChatGPT Usage	One hour or less	3.63	0.832	81
	More than one hour	4.08	0.624	29

Table (4) demonstrates apparent variations in the means and standard deviations of ChatGPT usage on learning among Jordanian university students due to differences in the categories of age, gender, and duration of ChatGPT usage. To determine the statistical significance of the differences between the means, a three-way analysis of variance was conducted, as shown in Table (5).

Table 5: Three-way analysis of variance for the effect of age, gender, and duration of ChatGPT usage on ChatGPT usage in learning among Jordanian university students

Source of Variation	Sum of Squares	Degrees of Freedom	Mean of Squares	F Value	Statistical Significance
Age	0.024	1	0.024	0.042	0.839
Gender	4.420	1	4.420	7.573	0.007
Duration of ChatGPT Usage	4.599	1	4.599	7.881	0.006
Error	61.859	106	0.584		
Total	70.555	109			

Table (5) illustrates the following:

- There are no statistically significant differences ($\alpha = 0.05$) attributed to the effect of age, as the F value was 0.042 with a statistical significance of 0.839.
- There are statistically significant differences ($\alpha = 0.05$) attributed to the effect of gender, with an F value of 7.573 and a statistical significance of 0.007. The differences favored males.
- There are statistically significant differences ($\alpha = 0.05$) attributed to the effect of the duration of ChatGPT usage, with an F value of 7.881 and a statistical significance of 0.006. The differences favored usage of more than one hour.

Additionally, the study results indicate no statistically significant differences attributed to the effect of age. It was not evident through the students' responses that there were age-related differences. This could be attributed to the fact that the age group sampled mainly consisted of students, resulting in relatively similar ages. Furthermore, the ease of use of ChatGPT makes it accessible to individuals of all ages. We also focused on university students in our variables, so the age differences might not be significant. Moreover, the results indicated statistically significant differences attributed to the effect of gender, favoring males. The results indicated that males perceived a greater impact of the ChatGPT program compared to females. This could be due to males preferring easier access to information compared to females. The nature of females tends towards learning and having more patience in learning compared to males. Hence, males tend to search for easier ways to obtain information, unlike females. Also, a significant portion of our study's sample included computer science college students, where the male ratio is higher compared to females. Male students often use the ChatGPT program to obtain ready-made codes. This can be attributed to the fact that males are usually more obsessed with technology than females, which increases the likelihood of their faster adoption of ChatGPT compared to females, who typically focus on matters a little further from technology.

Furthermore, the results showed statistically significant differences attributed to the effect of the duration of ChatGPT usage, favoring usage of more than one hour. Using ChatGPT for less than an hour and for simple purposes would not significantly affect learning in terms of information acquisition or academic outcomes. Therefore, for the program to have an impact on learning, students should use it for periods exceeding an hour. The extent of extended hours directly affects the learning outcome. This observation can be viewed in both a positive and a negative light. Positively, using ChatGPT for extended periods could enrich a student's knowledge, enhance their understanding of the material, and provide information not covered by teachers. It could also contribute to enriching their general knowledge. Negatively, excessive use of ChatGPT may impede the learning process and undermine critical thinking skills in students. These findings are consistent with Elenjichal (2023), who suggests that prolonged use of ChatGPT reduces social interaction, as spending time solving problems and directing questions to the program can affect students' social interactions. This might result in a decline in fundamental social skills like collaboration, compassion, and effective communication, all crucial for individual development and consequently impacting the learning process.

The current study aimed to explore the impact of using ChatGPT on learning among university students in Jordan, where the sample included all government and private Jordanian universities. The study results indicated that the speed, ease, and accuracy provided by ChatGPT affect learning among Jordanian university students. Also, the study found that ChatGPT helps in learning new skills and complex concepts with a high level of statistical significance, implying that ChatGPT has a positive impact on learning. Some students we interacted with orally mentioned that its presence has become necessary. Some students also mentioned that they feel embarrassed to ask their professors about certain meanings or to explain complex problems, and ChatGPT makes this easier for them as it explains in a detailed, comprehensible, and human-like manner.

Furthermore, the study indicated that age did not show a statistically significant effect, while gender and the number of hours spent online showed statistically significant differences. The study was conducted on a sample of 300 male and female students using ChatGPT. The researchers ensured to obtain consent before applying the scale to the sample, and they utilized the verbal responses of some students. However, it is evident that ChatGPT reduces critical thinking among students and provides ready-made answers, disrupting the learning and understanding process, especially for students of information management, as ChatGPT simplifies a lengthy process of generating ChatGPT codes. In fact, the program has both positives and negatives like all technological programs. Nevertheless, it has undeniably transformed the landscape of education. Assessing its full impact will become increasingly precise over time. As researchers, it is incumbent upon us to embrace these significant technological advancements while also developing solutions to maintain the integrity of the learning process.

6. Recommendations

The researchers recommend conducting further research to explore the impact of ChatGPT on broader and more comprehensive samples using different variables. They also recommend

raising awareness among university professors about the negative impact of ChatGPT, and using methods that ensure students benefit from the learning process away from easy and ready-made answers. Additionally, the researchers recommend using new evaluation methods that ensure fairness, objectivity, and avoid ChatGPT's impact on the evaluation process. Furthermore, the researchers recommend reorganizing and restructuring the learning process considering the immense technological advancements that will inevitably affect the learning process, ensuring that we accommodate this evolution while maintaining the learning process.

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