

PAPER

The Use of ChatGPT as a Learning Tool Among Jordanian Students in Technical Universities: Attitudes and Perceptions

Sahar Altikriti¹(✉),
Ziad Nemrawi²

¹An Independant Researcher,
Amman, Jordan

²Al-Zaytoonah University
of Jordan, Amman, Jordan

smallcrystals@yahoo.com

ABSTRACT

The rapid advancement of technology, particularly with the emergence of artificial intelligence (AI) language models such as Chat Generative Pre-Trained Transformer (ChatGPT), has significantly transformed various domains, especially in education. While ChatGPT has revolutionized complex task performance by enabling personalized learning and automated assessments, its application raises significant concerns about academic integrity. This study investigates the attitudes and perspectives of undergraduate students at Al Hussein Technical University (HTU) toward using ChatGPT in educational settings and the challenges they encounter. Data were collected through a questionnaire administered to 110 undergraduate students, comprising 15 items rated on a three-point Likert scale. The study's findings indicate that 66% of students are aware of the use of ChatGPT, with 56% expressing comfort in its use, indicating a substantial integration of this technology within educational settings. However, concerns about its reliability persist, with only 43% affirming its accuracy and 26% expressing disagreement. Nonetheless, 67.5% recognize its efficiency, time-saving benefits, and potential to enhance learning. While ChatGPT is useful for brainstorming and idea generation, 79% of students reported hesitation to use it for at-home assessments, indicating persistent apprehensions related to academic integrity. The findings suggest that integrating ChatGPT in educational settings requires addressing reliability and ethical issues through targeted training and clear guidelines. This study advocates incorporating ChatGPT into the HTU curriculum as a complementary resource, balanced with human intellectual engagement, to optimize academic performance and student learning.

KEYWORDS

artificial intelligence (AI), Chat Generative Pre-Trained Transformer (ChatGPT), educational tools, attitudes, higher education, technical universities

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1 INTRODUCTION

Artificial intelligence (AI) has evolved significantly since its mid-20th-century inception. Alan Turing laid early theoretical foundations with his work on computation and the Turing Test, which influenced the formal establishment of AI at the 1956 Dartmouth Conference. After an initial surge in progress, AI research faced a decline during the 'AI Winter' because of the limited practical success. The 1980s saw the rise of expert systems and neural networks, which set the stage for machine learning advancements in the 1990s.

In the 21st century, breakthroughs in deep learning facilitated substantial progress in language models. While AI language models offer considerable advantages in data analysis and decision-making [3], [4], [5], their integration into society presents challenges, including misuse risks and unintended social impacts [6]. Among these technologies, Chat Generative Pre-Trained Transformer (ChatGPT) stands out for its profound societal influence, rapidly outpacing other AI innovations in adoption and significance [7], [8]. As natural language processing (NLP)-based systems, such chatbots can generate human-like text, engage in complex dialogues, and have quickly become valuable tools in education, offering personalized tutoring, instant feedback, and improved access to information [1], [2], [48]. Given the rapid expansion of ChatGPT and similar tools, this study examines their role in transforming educational practices, particularly in higher education, where their potential to enhance learning contrasts with concerns about dependency and ethical risks. Policymakers, researchers, and educators must critically evaluate these tools to ensure they contribute positively to education [52].

2 LITERATURE REVIEW

2.1 ChatGPT

ChatGPT represents a groundbreaking advancement in digital technology. Developed by OpenAI and released on November 30, 2022, ChatGPT builds on the success of earlier models to introduce advanced natural language capabilities, revolutionizing how humans interact with machines. Unlike unimodal AI chatbots, ChatGPT is multimodal, enabling natural communication by responding to user queries instantly and generating advanced text [9], [10], [11], [12]. Its NLP capabilities, augmented by reinforcement learning with human feedback, utilize deep learning methodologies, particularly the Transformer architecture [13], [14].

ChatGPT has several free and paid versions, each customized for specific platforms or service providers with varying features and capabilities [15], [16], [17]. These versions support diverse applications, including customer support, content creation, virtual assistance, education, translation, etc. The initial version, GPT-1, was released in 2018 and built a transformer-based architecture for unsupervised learning. Building on this foundation, GPT-2 improved text generation, translation, and summarization capabilities. Then, GPT-3 extended these skills with a more comprehensive model built for challenging assignments such as answering questions and writing creatively. Finally, GPT-4 has expanded the potential of AI-driven language models by greatly enhancing accuracy, context handling, and multi-modal inputs.

Despite its growing popularity, with over 100 million active users, ChatGPT has raised concerns regarding privacy, data security, and potential negative effects on

teaching and learning [18], [19]. These challenges underscore the importance of carefully evaluating the use of ChatGPT and similar AI language models, particularly in educational contexts, to ensure that they enhance learning without compromising privacy or fostering undue dependency.

2.2 ChatGPT in higher education

The use of ChatGPT in academia has led to a significant debate. Some educators perceive it as a transformative asset for learning and research, while others express apprehensions about risks such as over-dependence and academic dishonesty. This debate highlights the challenges of integrating ChatGPT into education, as its capabilities prompt concerns about how it may affect traditional teaching methods, student learning, and problem-solving skills [14], [20], [21], [22], [23].

Despite its limitations, ChatGPT is widely used in higher education to generate and evaluate content. It serves as both a standalone learning tool and an integral component of educational systems, offering benefits such as personalized tutoring, instant feedback, and enhanced creativity [26], [51], [53]. These capabilities enable educators to develop engaging content, automate administrative tasks, and facilitate language translation, thereby improving efficiency and saving time [24], [25]. However, concerns persist regarding its reliability, potential misuse, and its possible impact on students' critical thinking skills. Ethical issues such as data privacy, academic dishonesty, and over-reliance on ChatGPT require careful consideration and proactive measures [49], [50]. Addressing these challenges is essential to fully realizing ChatGPT's potential in education.

Considering these factors, it is important to recognize that ChatGPT represents a recent development in education, resulting in a relatively limited body of research exploring its applications and impacts across various higher education sectors. A thorough critical analysis of these studies offers valuable insights into the benefits and challenges of ChatGPT and its effective integration into educational practices. Below is a synthesis of the key findings from this body of research.

1. **Application and impact**—The integration of ChatGPT in education addresses diverse needs, ranging from health to language acquisition. However, there are concerns that excessive reliance on such technology may weaken critical thinking skills. Studies [27], [28], [29], [30], [31] have highlighted both the benefits and drawbacks of using ChatGPT in educational settings. While it enhances personalized learning and engagement, it can also reduce critical thinking if overused.
2. **Teaching and learning processes**—Studies [32], [22], [33], [34], [35], [38], [39] highlight the potential of ChatGPT to enhance learning through real-time feedback while raising critical concerns about the accuracy and reliability of the information it generates. These studies focus on factors influencing students' intentions to use ChatGPT in academics, stressing its benefits in personalized learning and engagement but cautioning against risks such as over-reliance and ethical concerns. Thus, it is essential to balance the benefits of ChatGPT with the need to uphold critical thinking skills.
3. **Research and professional activities**—Recent studies [40], [22], [41], [42], [43], [44] highlight ChatGPT's significant role in academia, emphasizing the need to uphold ethical standards and ensure the accuracy of AI-generated content. The findings underscore that for effective integration into educational settings, it is

essential to balance the benefits of ChatGPT with the risks of misinformation and AI dependency, thereby safeguarding academic integrity and maintaining the quality of scholarly work.

Building on previous global studies, this study aims to examine the dynamics and perceptions of ChatGPT within the context of Jordanian higher education. While the body of literature on this subject in Jordan is limited, several significant studies [36], [37], [45], [46], [47] have investigated related themes. These include the attitudes of healthcare students toward AI and machine learning, the adoption of ChatGPT within the technology acceptance model (TAM) framework, and students' perspectives on leveraging ChatGPT as a pedagogical tool at the University of Jordan. This study addresses the existing research gap by conducting the first comprehensive analysis of ChatGPT's role as an educational tool for science students at Al Hussein Technical University (HTU), focusing on its applications and implications in technical disciplines.

3 METHOD

3.1 Research design

This study employed a quantitative methodology with a descriptive design to examine undergraduate students' attitudes toward using ChatGPT as a learning tool at HTU. This method is suitable for exploring patterns, attitudes, and challenges associated with emerging technologies in defined academic settings [54], [55]. Utilizing this approach, the study effectively examined variables within a defined population and gathered quantifiable data to provide insights into students' perspectives on ChatGPT in education.

3.2 Participants

The study comprised 110 undergraduate students from HTU in Jordan, selected through random sampling to ensure representation across academic disciplines and levels. This choice reflects the university's diverse student body, which includes programs in social and basic sciences, engineering technology, and informatics, providing a comprehensive perspective on ChatGPT's role in education.

3.3 Data collection tool

Data were collected online using a Google Forms questionnaire comprising 15 items to assess students' perceptions, usage patterns, and challenges in using ChatGPT for educational purposes. This method enables researchers to gain insights into respondents' knowledge, opinions, attitudes, beliefs, and behavior [56].

The questionnaire employed a 3-point Likert scale (agree, neutral, disagree), selected for its simplicity and ease of interpretation. This scale enables structured data collection and maintains clarity for participants. Its design effectively captures varying degrees of agreement or disagreement, clearly understanding students' attitudes toward ChatGPT integration in education while ensuring reliable and straightforward analysis.

3.4 Data analysis

The collected data were analyzed using descriptive statistics, with response distributions calculated as percentages to illustrate trends in attitudes and usage patterns. Statistical tools, including SPSS, were employed to ensure accuracy and reliability. Ethical considerations, such as anonymizing responses and securing participant data, were prioritized throughout the research process to maintain the integrity and confidentiality of the study. Then, the results were interpreted to assess correlations between attitudes, patterns of use, and challenges, with particular attention to reliability and ethical considerations of ChatGPT integration within educational contexts.

3.5 Ethical considerations

This methodology was structured to uphold reliability, validity, and ethical integrity throughout the research process. Ethical approval was obtained in advance, and participants provided informed consent, ensuring their rights to privacy and confidentiality were protected at all stages of the study.

Data privacy and confidentiality were strictly maintained by anonymizing the data to protect participants' identities.

4 RESULTS AND DISCUSSION

Based on the data analysis, the first finding indicates that most students were fully aware of ChatGPT and its purpose. A significant number of students, representing 66%, acknowledged their familiarity with ChatGPT, while 20% were neutral, and 14% were unfamiliar with the tool. This indicates the effective adoption of ChatGPT tools in educational settings. These high levels of awareness provide a strong foundation for further integrating ChatGPT into academic curricula and activities. Furthermore, 56% of students reported feeling comfortable using ChatGPT, while 28% were neutral, and 16% were uncomfortable.

These findings highlight the need for targeted interventions, such as training programs and clear communication about ChatGPT's capabilities and limitations, to address uncertainty and discomfort. Thus, most students found ChatGPT engaging and easy to use, as illustrated in Figure 1.

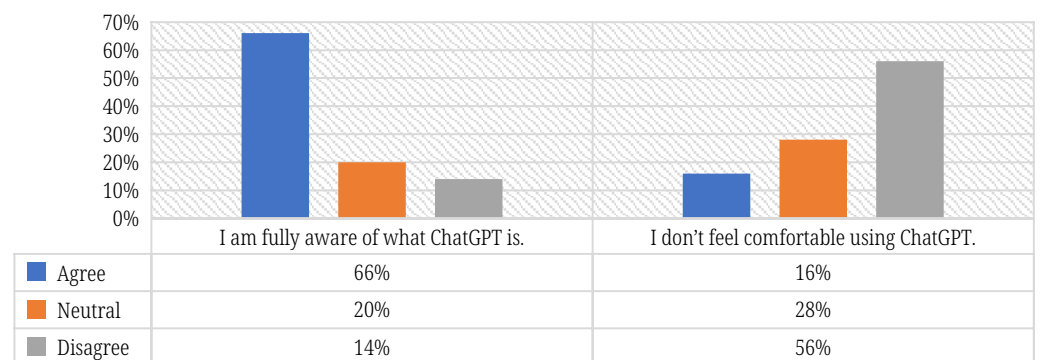


Fig. 1. Students' awareness and comfort levels

When surveyed about ChatGPT’s accuracy, 43% of students found it reliable, 31% were undecided, and 26% disagreed. These mixed attitudes highlight concerns about the reliability of its data, emphasizing the importance of building trust and ensuring continuous improvement. Uncertainty or skepticism among users can impact their learning experience and reduce the perceived value of integrating ChatGPT into education. Addressing these concerns will require improvements in algorithms, regular updates, and robust validation processes to enhance ChatGPT’s credibility and reliability (see Figure 2).

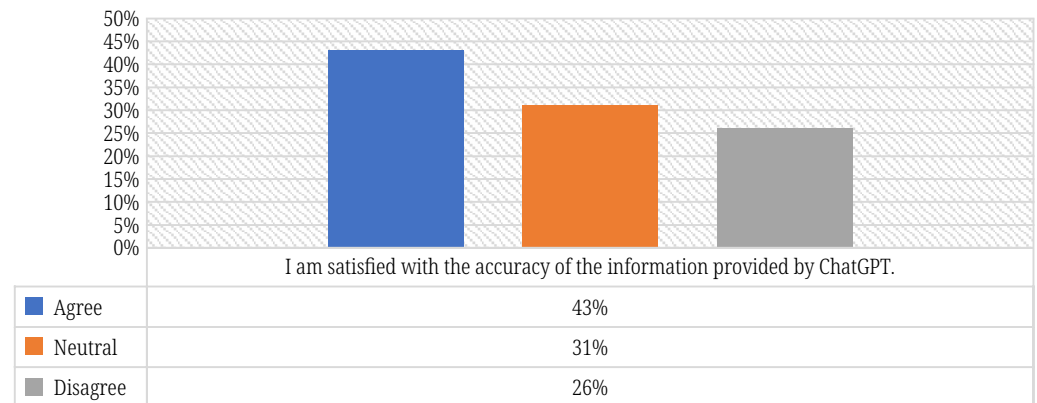


Fig. 2. Students’ views on ChatGPT’s effectiveness and precision

Furthermore, the findings demonstrate ChatGPT’s significant role in enhancing students’ time management and learning efficiency. With 66% of students praising its speed in answering queries, ChatGPT is highly valued for providing quick and accessible information, especially in academic settings where students juggle multiple tasks and deadlines. The efficiency provided by ChatGPT enables students to concentrate on critical thinking and engage in deeper learning, rather than spending excessive time searching for answers. 67.5% of students reported that ChatGPT saves time and effort during complex tasks, and 75% affirmed its utility is not wasted time. To address the concerns of the 18% of neutral respondents and the 16% who disagreed, specific interventions—such as tailored training programs to improve user familiarity and awareness campaigns to highlight the benefits—could be implemented to strengthen the effective integration of ChatGPT into educational practices (see Figure 3).

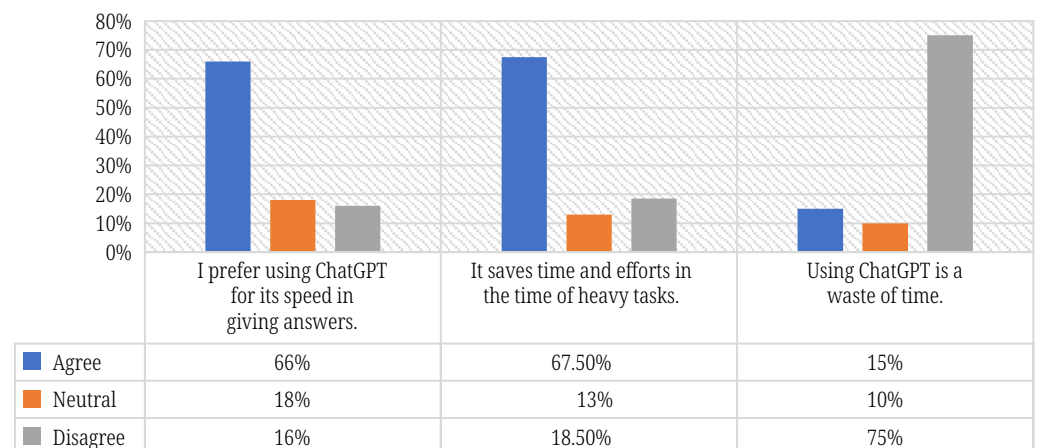


Fig. 3. Students’ attitudes toward the efficiency of ChatGPT in saving time

Students expressed positive views regarding ChatGPT’s accuracy in responding to general questions but were uncertain about its reliability for completing assignments. As shown in Figure 4, most students recognized ChatGPT’s benefits, with 65.4% and 70% highlighting its usefulness, particularly in brainstorming, idea generation, summarizing, and providing responses for assignments. These results highlight ChatGPT’s potential to foster creativity and assist in the initial phases of academic tasks. However, opinions were divided on using ChatGPT for homework assignments, with 39% agreeing, 25% neutral, and 36% disagreeing. This distribution emphasizes the need for enhanced guidance on utilizing ChatGPT effectively for academic purposes. In contrast, 79% of students firmly opposed using ChatGPT to complete at-home tests or quizzes. This demonstrates a high level of integrity and a desire to avoid accusations of plagiarism. Additionally, 44% of students believed that ChatGPT does not provide accurate results for their assignments, while 20% agreed that it does, and 36% remained neutral. This lack of confidence in ChatGPT’s accuracy may discourage students from using it for academic purposes. These findings underscore the need for ongoing improvements in the accuracy and reliability of ChatGPT’s responses and efforts to build trust among users.

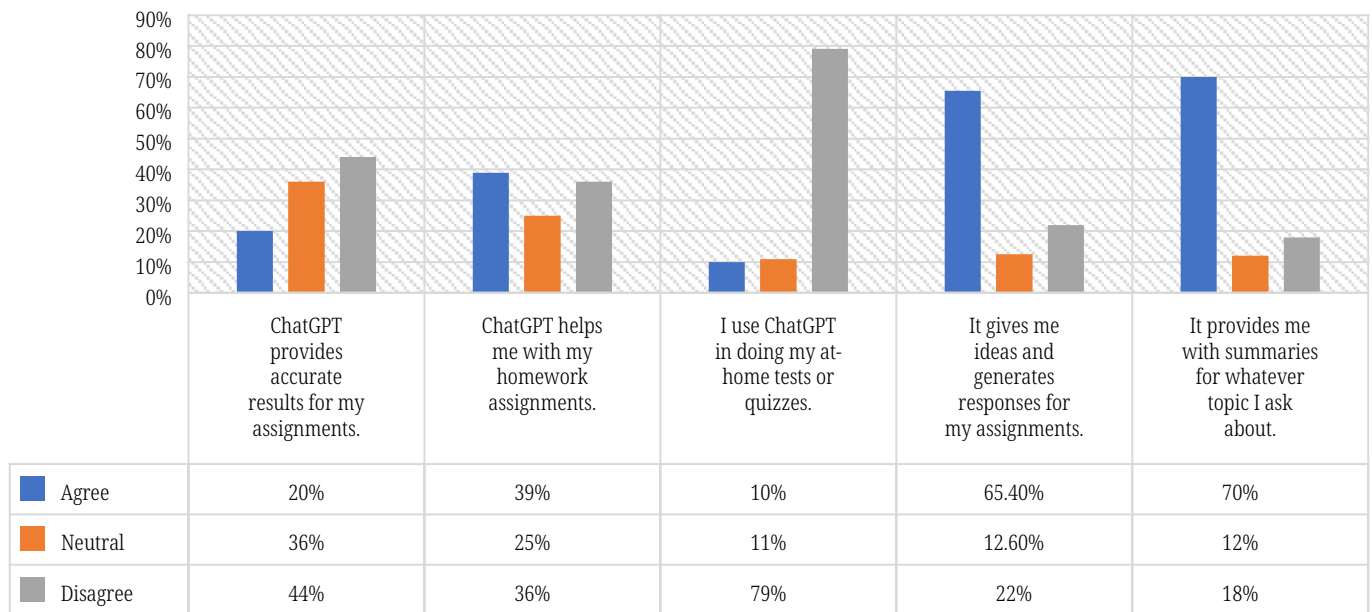


Fig. 4. Students’ perceptions of using ChatGPT for academic assignments

However, the positive feedback from 55% of students regarding ChatGPT’s role in enhancing problem-solving abilities highlights its potential as a valuable educational tool. This is particularly relevant in technical and scientific disciplines where critical thinking and problem-solving skills are essential. Another key finding of this study is the benefit of using ChatGPT to improve the quality of students’ learning. This was evident because 65% of students believed ChatGPT helped enhance their learning skills, 20% disagreed, and 15% remained neutral. These findings suggest that ChatGPT can effectively assist students in understanding complex concepts, providing a more interactive and engaging learning experience. Despite these advantages, 45% of students preferred using authentic resources for gathering data instead of relying solely on ChatGPT. This reveals a nuanced perspective among students: while they acknowledge ChatGPT’s effectiveness in

understanding and processing information, they also emphasize the importance of traditional resources for obtaining credible and detailed knowledge. Such a preference reflects a critical perspective on the limitations of AI, underscoring the importance of traditional methods and resources that provide depth, credibility, and comprehensive exploration of topics. These findings highlight ChatGPT’s role as a complementary tool rather than replacing conventional learning methods (see Figure 5).

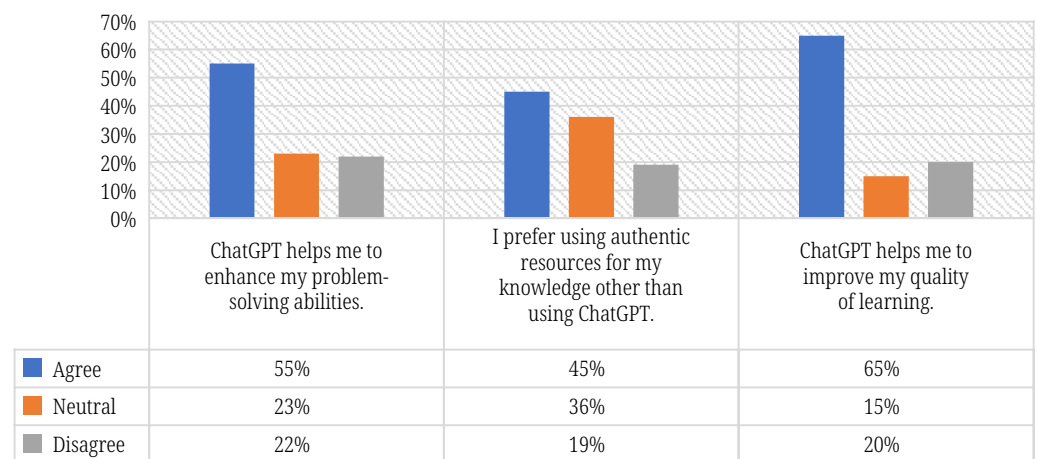


Fig. 5. Students’ pros and cons of utilizing ChatGPT as an educational tool

Interestingly, as shown in Figure 6, while ChatGPT is designed to generate human-like text [17], the findings revealed diverse student attitudes toward this concept. Specifically, 46% of students disagreed with considering ChatGPT a human-like tool, 30% agreed, and 24% remained neutral. These findings indicate that although ChatGPT can support learning, it cannot fully replicate humans’ unique cognitive and interactive abilities. This perspective underscores the enduring importance of intellectual engagement in tandem with technological advancements, emphasizing the complementary roles of human cognition and machine innovation.

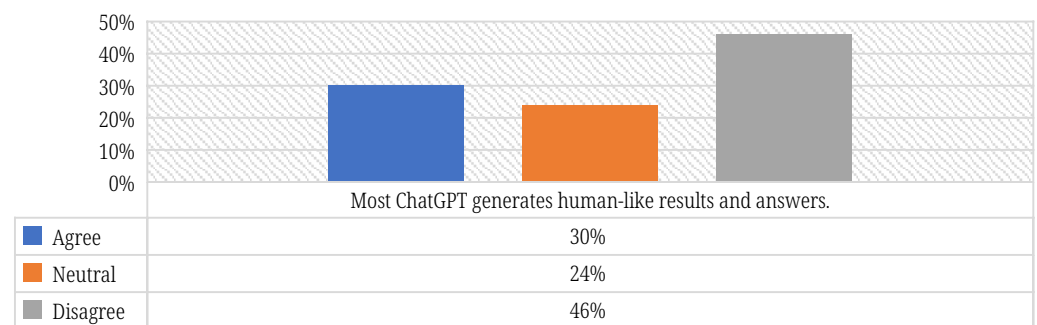


Fig. 6. Students’ perceptions of ChatGPT’s ability to generate human-like texts

Based on the data analysis in this study, students’ attitudes reflected a combination of acceptance and skepticism, highlighting the need to integrate ChatGPT with traditional educational methods to achieve a balanced approach. The overall responses from the participants to the questionnaire are summarized in Figure 7.

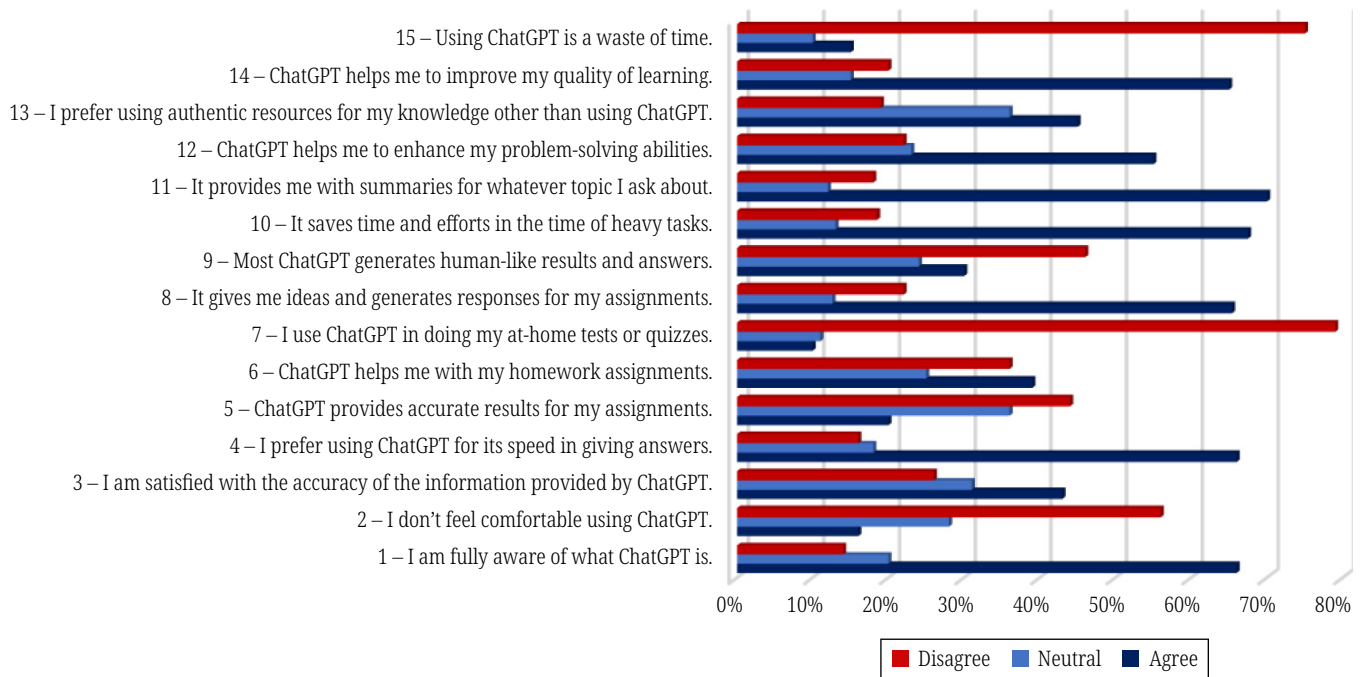


Fig. 7. Total distribution of students' answers to the study questionnaire

4.1 Comparison with previous studies

The findings of this study align with existing literature on ChatGPT's applications and challenges in higher education, emphasizing its dual role as both a facilitator of learning and a subject of critical evaluation. Previous research has highlighted ChatGPT's potential to enhance personalized learning, engagement, and efficiency in areas such as language acquisition and time management, as well as its benefits in brainstorming, idea generation, and problem-solving. However, consistent with earlier studies, this study identified concerns regarding the tool's accuracy, overreliance, and ethical implications. The results underscore the importance of integrating ChatGPT with traditional educational resources to preserve critical thinking and academic integrity. In line with studies exploring students' attitudes, the current findings from Jordan demonstrate high awareness and comfort levels with ChatGPT's use while also revealing varying degrees of trust in its accuracy and reliability. Addressing these concerns through targeted interventions, including user training and ongoing improvements to ChatGPT's algorithms and data validation, is essential to optimize its role in education.

A key distinction of this study lies in its focus on science students at HTU, providing insights into their unique attitudes and ethical considerations. While global studies have highlighted similar trends in awareness and readiness to use AI language models, this study offers a distinct perspective from the Jordanian context. In conclusion, this study aligns with previous research on ChatGPT's potential and challenges while offering valuable insights into region-specific attitudes, ethical concerns, and application preferences.

5 LIMITATIONS

Although the findings of this study provide valuable insights, several limitations must be acknowledged. The research was conducted with a relatively small sample of

110 students from a single private technical university in Amman, Jordan (HTU), which may not reflect the broader population. Future research should include larger and more diverse samples and employ mixed-method approaches to more effectively capture the complexity of attitudes and behaviors related to using ChatGPT in science classes.

Educators and policymakers should focus on improving ChatGPT's accuracy and reliability, providing targeted training and support for its effective use, and promoting critical thinking and ethical awareness among students. Additionally, future studies should examine the long-term impact of ChatGPT on learning outcomes, its effectiveness in collaborative learning, its role in supporting students with special needs, its cost-effectiveness, and its impact on mental health and well-being. These efforts will ensure a balanced, ethical, and effective integration of ChatGPT into education.

6 CONCLUSION

This pioneering study explored the attitudes of Jordanian university students in science disciplines at a technical university, focusing on their use of ChatGPT as part of the learning process. The findings revealed that students commonly relied on ChatGPT as a readily accessible resource for addressing academic inquiries. This aligns with previous research on adopting ChatGPT in educational settings, consistently highlighting its ease of access and immediate availability as key factors in its popularity among students. Notably, students appreciated ChatGPT's efficiency in delivering material across various topics, reinforcing existing literature on the benefits of ChatGPT-based education tools.

However, the study also identified several limitations hindering the effective use of ChatGPT. Students reported obstacles in obtaining accurate results for specific issues or accessing analytical data relevant to their disciplines. This finding aligns with concerns raised by experts about ChatGPT, who caution that tools such as ChatGPT, while powerful, are fallible and may struggle with complex, domain-specific queries. Furthermore, students indicated that ChatGPT's lack of transparency regarding the sources and references of its information posed an additional challenge. These concerns echo critiques of ChatGPT-generated content that emphasize the need for transparency in the sources of information provided by ChatGPT tools.

Interestingly, this study revealed that students' perceptions and attitudes towards ChatGPT varied by field of study, particularly within science disciplines. This aligns with studies indicating that students in technical fields may engage with AI language models differently than their peers in other disciplines, due to variations in academic rigor and research methodologies. For instance, science students often depend on accurate, data-driven information, which may heighten their awareness of ChatGPT's limitations in providing precise or contextually relevant responses.

While ChatGPT has been positively received as a tool for addressing technical and academic inquiries, the study highlights the importance of fostering critical thinking among students. ChatGPT should be viewed as an assistive tool rather than a replacement for human judgment and analysis. Such an approach prevents over-reliance on ChatGPT and promotes a more informed and discerning attitude towards technology in learning. Despite its considerable benefits, ChatGPT presents ethical challenges, particularly regarding plagiarism and cheating, which demand thorough consideration. Academic institutions must develop and implement clear guidelines to address these challenges and ensure the responsible application of this technology.

In conclusion, understanding ChatGPT's benefits and limitations is essential for its effective use in education. By raising awareness of these aspects, educational

institutions can better support students using ChatGPT as a complementary tool alongside traditional learning method. Addressing its limitations while leveraging its benefits can enhance teaching and learning outcomes, promoting responsible and effective use. The study highlights that while ChatGPT faces implementation challenges, it has significant potential to improve learning outcomes. Future research and policy development should focus on integrating AI language models into pedagogy through evidence-based frameworks prioritizing transparency, accuracy, and ethical use.

7 RECOMMENDATIONS

Based on the findings of this study, several strategic measures are recommended for educators and policymakers to optimize the integration of ChatGPT in educational settings. While ChatGPT holds significant potential for enhancing teaching and learning, its successful integration requires addressing challenges such as improving accuracy, promoting ethical usage, and fostering critical thinking. To ensure that both students and educators completely benefit from this tool, the following recommendations are proposed:

1. Improve accuracy and reliability—Invest in ongoing research and development to enhance ChatGPT's accuracy and reliability, ensuring it can meet the specific needs of diverse academic disciplines.
2. Provide targeted training—Develop comprehensive training programs to equip students and educators with the skills needed to effectively use ChatGPT and understand its functionalities.
3. Foster a balanced approach—Promote the integration of AI language models with traditional learning methods to encourage critical thinking and uphold academic integrity.
4. Establish ethical guidelines—Create and enforce ethical standards to address concerns such as plagiarism and misuse of ChatGPT in assessments.
5. Implement feedback mechanisms: Establish feedback systems to gather insights from students and educators, enabling continuous improvements in ChatGPT's integration.
6. Enhance communication and transparency—Educate users about ChatGPT's capabilities, limitations, and potential biases to set realistic expectations and build trust.

By implementing these recommendations, educators and policymakers can ensure that ChatGPT is integrated effectively into educational practices, fostering a dynamic, ethical, and thoughtful learning environment.

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9 AUTHORS

Dr. Sahar Altikriti is an Assistant Professor of Linguistics and an Independent Researcher. She received her PhD in Linguistics from the University of Baghdad, Iraq in 2006. Her research interests include Linguistics, Text Analysis, Pragmatics, and ESP. She has over 27 years of teaching experience at different universities in Iraq and Jordan. Dr. Altikriti has published papers in international journals indexed in Clarivate and Scopus (E-mail: smallcrystals@yahoo.com; ORCID: <https://orcid.org/0000-0002-5743-0162>).

Dr. Ziad Nemrawi is a Professor of Math Education in the Department of Educational Sciences at Al-Zaytoonah University of Jordan in Amman, Jordan. His research interests revolve around instruction and curriculum, specifically social constructivism and multiple-intelligence theory (ORCID: <http://www.orcid.org/0009-0005-3363-5066>).