

AI in Special Language Education: A Case Study of ChatGPT Utilization among Jordanian Students with ADHD

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Abstract

This study carried out a quantitative analysis to investigate the use of ChatGPT in teaching English vocabulary to students with ADHD in Jordan. The sample consisted of 100 students with ADHD from 40 schools. The data were collected using three instruments. A pre-test and post-test assessed students' vocabulary proficiency level over six months to evaluate students' vocabulary development. A questionnaire was constructed to evaluate students' attitudes toward using ChatGPT, while another questionnaire was administered to 20 English teachers from participating schools to measure the impact of ChatGPT and the challenges of integrating it into the educational environment. The assessment tests revealed an improvement in students' vocabulary performance. The students' questionnaire indicated that students with ADHD perceived ChatGPT as an effective tool for learning vocabulary, particularly due to the immediate feedback. The teachers' questionnaire revealed that teachers considered ChatGPT as a valuable instructional tool. Teachers highlighted the main barriers to its effective implementation, such as limited resources and insufficient teacher training. The study concluded that ChatGPT has substantial potential to enhance English vocabulary learning among students with ADHD, but adequate educational support and teacher training are required.

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Introduction

Recently, new opportunities for language education have been created by using various Artificial Intelligence (AI) tools (e.g., Bo et al., 2025; Özçelik, 2026; Su, 2026; Vafadar et al., 2025; Vogt, 2026). The upsurge in using these tools is that they offer personalized feedback and immediate answers. One prominent example is ChatGPT, a generative AI tool that has been effectively used to advance foreign language learning in multilingual and diverse cultural classrooms. This tool provides authentic grammar examples and vocabulary explanations in unlimited sentences (Athanassopoulos et al., 2023). Over time, these AI tools provide empirical evidence that the majority of students can improve their vocabulary. This enhancement is attributed to their personalized learning experiences that fulfill students' needs, which result in better class engagement and understanding (Kim et al., 2023). Additionally, their ability to simplify complex sentences and expand vocabulary demonstrates their value in language education (Feng et al., 2023). Therefore, this work focuses on AI tools, such as ChatGPT, as it is popular among Jordanian students.

According to the American Psychiatric Association (2013), Attention-Deficit/Hyperactivity Disorder (abbreviated as ADHD) is a neurodevelopmental condition; as the name suggests, individuals with ADHD suffer from behavioral problems, including attention, hyperactivity, and impulsive feelings. AI tools can provide personalized learning experiences for students with ADHD learning a second language, helping them focus and enhance their learning process (Parmar et al., 2026; Rapti, 2022; Wasserman & Bajaj, 2025). Research indicates that the educational requirements of students with ADHD are inadequately addressed, particularly in language learning and second-language and school contexts, limiting chances for effective academic support (Al Azzam et al., 2017). Early identification and appropriate intervention require greater awareness among parents, teachers, and policymakers. Previous research has also shown that ADHD is under-recognized across primary and secondary schools, creating challenges for students, teachers, and families. Jordanian school educators highlighted that inadequate recognition and learning support can hinder the effective inclusion of ADHD students (Abbasi et al., 2023; Lavidas, 2022). Moreover, ADHD affects a considerable proportion of the population in the Middle East and North Africa, highlighting the need for appropriate evidence-based learning approaches (Al-Wardat et al., 2024). These findings underscore the importance of increasing awareness and developing targeted educational interventions that are tailored to the needs of students with ADHD.

Rial (2024) reports that children with ADHD usually face learning difficulties (lacking the ability to concentrate and learn new information), including second language learning, due to impulsivity and inattention, thus reducing their academic performance. In addition, scholars indicate that using conventional teaching methods with ADHD students is inadequate to handle such problems (Al Ajalein, 2024). Accordingly, incorporating technology, especially AI tools, might provide the opportunity to overcome learning obstacles by presenting an adaptive and tailored learning environment. Such resources are capable of providing feedback and interactive materials designed to help ADHD students (Kohnke et al., 2023; Kim et al., 2023; Jin et al., 2023). Even though there is consensus on the acceptance of employing technology, especially AI tools, in language education, using them requires an accurate preparation process. Furthermore, cultural attitudes and resistance to changes in traditional teaching practices may present additional difficulties to their implementation (Cope & Kalantzis, 2009; Zhao et al., 2023).

Despite growing interest in the educational applications of artificial intelligence, empirical research examining the effectiveness of AI-assisted language learning for students with ADHD remains limited, and there is no study, to the best of our knowledge, investigating the use of ChatGPT in teaching students with ADHD in Jordanian schools. Previous studies primarily focused on the general advantages of using AI in teaching (Hong, 2023; Jurayev, 2023), with little attention given to supporting vocabulary acquisition among students with ADHD. Moreover, few studies have examined the perspectives of students as well as teachers regarding the use of ChatGPT in language teaching in Jordanian schools. To address these gaps, the present study examines the effectiveness of ChatGPT in enhancing English vocabulary learning among students with ADHD and investigates students' and teachers' perceptions of its role in the Jordanian educational setting. This population received very limited attention in AI-assisted language learning research. Thus, this study contributes to empirical evidence on language education and the pedagogical perspective of generative AI. Accordingly, the present analysis addresses the following research questions:

RQ1: How effective is ChatGPT in improving vocabulary learning for ADHD students in Jordan?

RQ2: How do students with ADHD perceive the role of ChatGPT in the process of learning in Jordan?

RQ3: How do teachers perceive the integration of AI tools in the education process for students with ADHD in Jordan?

The Conceptual Framework

Dual Coding Theory

The Canadian psycholinguist Allan Paivio developed the Dual Coding Theory in 1967, which he later improved in 1986. His theory highlighted that individuals process and retain information through two interconnected cognitive systems: a verbal system for

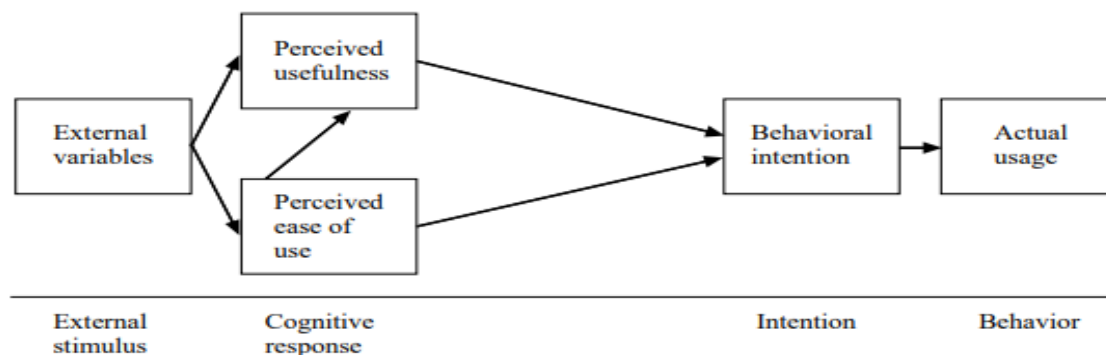
linguistic information and a non-verbal system for mental imagery. According to this theory, learning is enhanced when there is a connection between words and images, which results in deeper comprehension, stronger memory formation, and faster retrieval of vocabulary. The combination of both cognitive systems effectively enhances vocabulary acquisition and retention. Therefore, it has been widely applied in teaching.

Technology Acceptance Model

In this study, the researchers employ the Technology Acceptance Model (TAM) proposed by Fred Davis (1989) to evaluate the degree of acceptance of using the ChatGPT tool in the learning process of students in Jordan. Figure 1 illustrates the Technology Acceptance Model (TAM) (Davis, 1989), explaining how users develop behavioural intentions to adopt a technological system. Based on the model, an individual's behavioural intention to use a technology is typically determined by two factors: perceived usefulness and perceived ease of use (Ibrahim et al., 2025). Venkatesh and Davis (2000) subsequently extended the original model by incorporating other cognitive and social variables, such as subjective norms, to provide a comprehensive overview of technology acceptance. In the present study, TAM provides the theoretical framework for interpreting students' and teachers' perceptions of ChatGPT and examining factors that affect its acceptance as a tool for English vocabulary instruction among students with ADHD.

Figure 1

Technology Acceptance Model (TAM)



While Dual Coding Theory provides the theoretical basis for explaining improvement in English vocabulary learning, the Technology Acceptance Model explains teachers' and students' acceptance of ChatGPT through their perceptions of its usefulness and ease of use. Thus, the current research employed both models to gain a comprehensive understanding of the ChatGPT effectiveness for vocabulary acquisition. Moreover, investigating the users' attitudes towards its integration into second language teaching.

The Literature Review

In recent studies, researchers have examined the use of AI in education and its impact on students in general, and students with ADHD in particular. Previous studies have studied Artificial Intelligence from different aspects, such as language learning, educational

technology, and cognitive support, providing valuable insights into how AI can enhance learning in ADHD students. The following studies are presented chronologically to elucidate the development of research in this area.

Digital literacies and the integration of emerging technologies in education were surveyed by Cope and Kalantzis (2009). They explained how AI and other digital technologies could facilitate communication skills, personalized learning, and create educational opportunities beyond those offered by traditional classroom instruction. The study demonstrated the influence of AI tools in enhancing educational practices. Students can benefit from the personalized and adaptive learning experiences provided by AI tools.

Rapti (2022) investigated the learning process of students with ADHD after employing AI tools in teaching. The study results supported the development of the students' language, due to the adaptation of instructional content and working at a suitable pace with the students. These outcomes highlight the potential of AI tools to reduce the learning challenges commonly experienced by students with ADHD.

In diverse cultural learning environments where there are numerous languages, teaching a foreign language may be a challenging task for teachers. Athanassopoulos et al. (2023) described how ChatGPT can function as an effective educational resource. The reasons for students' development were effective engagement in class and personalized support depending on individual needs. In other words, the adaptive instruction provided by ChatGPT is successful.

In the same vein, Feng et al. (2023) studied the impact of AI tools in supporting language learning, particularly writing. The results confirmed that AI can simplify sentence complexity for students. Furthermore, the outcomes suggested that students having difficulties in achieving a proficiency level, such as those with ADHD, can benefit from these tools.

A study conducted in Jordan by Zhao et al. (2023) explored the use of AI tools for students with disabilities at the high school level. The study results showed that students have a positive attitude towards the implementation of AI-assisted tools in schools. Accordingly, students perceive technology as a special education tool to support diverse educational needs in Jordan. Although this study focused on students with disabilities excluding ADHD, the outcomes provide a beneficial basis for using AI-assisted learning applications among students with ADHD.

Regarding teaching vocabulary, Qudah et al. (2025) investigated English teachers' acceptance of using AI across 100 public schools in Amman. The researchers used a mixed-methods design. The study projected important results. Teachers have a positive attitude towards AI tools, particularly concerning their ability to increase learner

engagement and autonomy. Nevertheless, the participants identified several barriers that may hinder AI implementation. Some of these obstacles include ethical concerns, limited literacy in using AI tools, insufficient teacher training, as well as limitations of resources and time. The study concluded that it is essential for students to integrate AI into the curriculum and to offer targeted professional development.

In a substantial study, Liu et al. (2025) compared two teaching methods for writing to examine vocabulary development. The first approach was the use of traditional writing instruction, and the second was using ChatGPT while explaining the lesson. The results of the study underscored that students face various challenges in writing. For example, students found it difficult to select suitable vocabulary, and teachers could not provide enough aid to all the students. However, at the end of the study, students were able to choose words correctly, maintain coherent sentence structure, and increase their autonomy in learning after using ChatGPT. Similarly, Abril et al. (2025) investigated the use of ChatGPT as a learning instrument for enhancing English vocabulary among 60 high school students. The sample was divided into two groups. The first group was taught traditionally, while the second was taught using GPT during laboratory sessions. Students were assessed continuously over one month. The findings showed that students in the ChatGPT group achieved significantly higher vocabulary scores than in traditional lessons. Warriar (2025) carried out an exhaustive qualitative review of ADHD school students to examine the various factors that impede the learning process, such as attention span, disorganization, and cognitive impairment. In addition, the study detected the impact of AI-based educational systems on students with ADHD. The results highlighted the significance of using AI tools. Students showed some improvement due to the tailored lessons provided by AI tools. Furthermore, they looked more confident because the teaching environment was free of any judgment, which in turn enhanced their concentration and emotional reinforcement. The findings also suggested that teachers are responsible for implementing AI to create a more inclusive learning environment for students with ADHD.

Anuja and Nagasundaram (2025) confirmed that an AI-driven adaptive learning prototype was very beneficial. The teaching approach was adapted to suit ADHD students. Their lessons were short, involved micro-assessments, and personalized task pacing. The findings showed AI-driven approaches improve students' engagement and attention levels by increasing students' focus span, reducing their cognitive load and stress, and providing immediate feedback. Qiu et al. (2026) developed an AI-powered vest that monitors children's classroom behavior. This vest helped students check their hyperactive behavior in class through vibration. The sample of the study consisted of 40 children aged 7 to 12 years. The findings revealed that the system achieved an accuracy of 0.84, suggesting that the vest could be an effective real-time behavioural support. The vest vibration not only helped the students concentrate but also helped teachers to evaluate them accurately.

A narrative literature review conducted by Deep et al. (2026) examined the extent to which artificial intelligence (AI) can support college students with Attention-Deficit/Hyperactivity Disorder (ADHD) from cognitive, emotional, and ethical perspectives. The review analysed various major academic databases, such as PubMed, ERIC, SpringerLink, ScienceDirect, PsycINFO, and IEEE Xplore. The findings indicate that AI technologies, such as ChatGPT, mobile applications, and explainable AI systems, can improve decision-making, self-regulation, writing organization, and personalized learning to support students with ADHD. Moreover, the results highlighted the importance of complementing the teaching process with AI tools instead of replacing educators and healthcare professionals. The study also emphasised a number of challenges, particularly ethical concerns, including data privacy, digital literacy, algorithmic bias, and students' willingness to disclose their ADHD status. The study concluded that when establishing appropriate ethical and institutional safeguards, AI tools may contribute to the academic success of students with ADHD.

Polakova and Ivenz's (2026) study aimed at examining the effectiveness of ChatGPT in teaching vocabulary. The study used a mixed-methods approach. The sample included 31 students who completed pre-tests, post-tests, and questionnaires to detect changes in vocabulary proficiency following the use of ChatGPT. The outcomes displayed significant progress in vocabulary learning due to personalized learning. The study results supported AI tools' involvement in addressing students' learning needs.

An investigation into the effectiveness of ChatGPT-assisted vocabulary practice among English as a Medium of Instruction (EMI) university students was performed by Abdullajon (2026). The study was implemented over 4 weeks to compare new and traditional vocabulary learning strategies. The 60 students underwent several pre- and post-vocabulary tests to assess lexical acquisition. In addition, students who used ChatGPT showed great improvement in vocabulary proficiency. Thus, the results provided evidence for the effectiveness of AI-assisted instruction. Likewise, Yu (2026) explored the impact of AI-driven vocabulary learning strategies on EFL learners in China. A controlled mixed-methods design was used. The sample included 383 students. The students performed several pretests, posttests, delayed posttests, and semi-structured interviews. The findings indicated that AI-powered instruction yielded the highest scores of vocabulary acquisition and retention compared to traditional teaching methods. As for the interview, personalized feedback, adaptive learning, and rich contextual experiences were all factors that improved students' vocabulary. Conversely, the respondents indicated that students identified challenges related to cognitive overload and cultural bias, even if AI tools may be implemented in vocabulary teaching in the future.

The reviewed research displayed the significant plausibility of using AI tools for improving vocabulary acquisition, writing performance, and personalized instruction. However, there are several gaps that needs to be addressed. Despite the growing body of

research on artificial intelligence in education, there is still limited literature addressing the use of ChatGPT in teaching English vocabulary to students with ADHD, particularly within the Jordanian educational context. The majority of research conducted in Jordan concentrated on the general advantages of AI in learning or its implementation in a broad educational context, with little attention given to learners with special educational needs. Moreover, there is a paucity of studies that have examined both students' and teachers' perspectives on integrating ChatGPT into English language instruction. Thus, these gaps provide the rationale for the present study.

Drawbacks of Using ChatGPT

Despite the massive educational benefits, few previous studies have identified some drawbacks related to the use of ChatGPT in teaching and learning. Zhai (2022) found that students were concerned about becoming overly dependent on ChatGPT, which may reduce their creative thinking and increase the risk of plagiarism in their written assignments. In addition, Bekdaş (2025) reported that ChatGPT may generate repetitive or overly general responses. Moreover, the ChatGPT prompt answers were not always accurate, which might mislead students. The study also showed that excessive reliance on ChatGPT may reduce students' dependence on traditional learning resources such as textbooks. Karimova's (2024) study also highlighted several issues associated with ChatGPT. The findings indicated that increased reliance on ChatGPT may weaken students' creativity and critical thinking skills. In addition, students expressed ethical concerns about submitting assignments generated with ChatGPT without fully understanding the content.

The objectives of this study are to bridge these gaps by investigating the effectiveness of ChatGPT in teaching English vocabulary to ADHD students in Jordan. It mainly explores how teachers and students perceive the integration of ChatGPT into English language teaching in the Jordanian educational context. As the study adopts a quantitative approach that combines vocabulary assessment, a students' questionnaire, as well as a teachers' questionnaire, it provides empirical evidence on both learning outcomes and technological acceptance. The findings are expected to contribute to the growing body of literature on AI and education, where very few studies have explored how AI can support students with ADHD, a population that remains underrepresented in previous research.

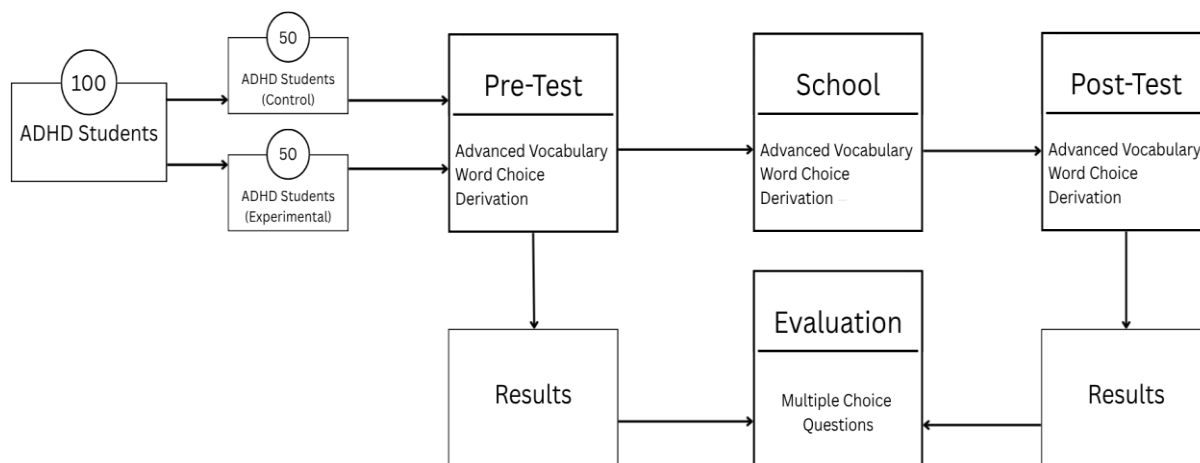
Methodology

Research Design

The study was conducted during the 2024 -2025 academic year at 40 private schools in Amman. The participating schools and teachers were selected because they used ChatGPT as a supplementary tool in English lessons. The study employed a quantitative approach to obtain comprehensive data from multiple sources. Accordingly, the data were obtained in three phases. First, students' vocabulary proficiency levels were assessed through pre- and post- tests involving a control group and an experimental

group. The study explored the impact of ChatGPT on enhancing vocabulary learning, particularly students' ability to improve word choice, derivation, and advanced vocabulary, as shown in Figure 2. Second, a questionnaire was administered to students, and third, a different questionnaire was administered to English teachers.

Figure 2
Research Design



Sample

A purposive sampling technique was carried out. The participants consisted of 100 male and female students diagnosed with ADHD, aged between 14 and 16, from 40 private schools in Amman. In addition, the sample included 20 English teachers aged between 26 and 56 years. The participating schools have specialized programs for students with ADHD and other special educational needs. The inclusion criteria for students were based on a confirmed diagnosis of ADHD and current enrolment in one of the participating schools. The participating teachers had prior experience using AI tools in their English language teaching practices. To address the second and third research questions, students completed a questionnaire to investigate their perceptions of ChatGPT, while teachers underwent another questionnaire to examine their experiences and perceptions of using ChatGPT in teaching English vocabulary to ADHD students.

Data Collection and Analysis

The required data were obtained in three ways. Regarding the first research question, there were a pre-test and a post-test designed to measure the students' level of vocabulary proficiency. Both tests were developed with reference to the Cambridge English vocabulary specifications for the A2-B1 proficiency levels. To ensure the validity of the tests, they were reviewed by three experts in English language teaching before being administered. To ensure Ethical compliance, the participating schools informed parents about the purpose of the study and assured them that all the collected data would remain confidential. Then, written parental consent was obtained before data collection. Following parental consent, all 100 students undertook the 10-item pre-test, which

assessed vocabulary meaning, word choice in context, and word derivations. The sample was then divided into two groups. The first group was the experimental group (50 males and females) that received vocabulary instruction supported by ChatGPT. All structured and interactive activities were performed under the supervision of their English teachers in the school computer laboratory. Dual Coding Theory was integrated into teaching vocabulary classes. Teachers combined verbal explanations with visual representations and interactive ChatGPT activities to strengthen vocabulary retention. Moreover, students were encouraged to associate new vocabulary with visual materials and their use in the given context. The immediate feedback provided by ChatGPT was intended to increase students' engagement, attention, and vocabulary retention. On the other hand, the control group (50 males and females) received conventional classroom vocabulary instruction without using ChatGPT. All classroom activities and any vocabulary assignments were completed during regular English lessons. After six months, all the students in the sample took a post-test (10 items), which contained different items than the pre-test.

Students' Questionnaire

A five-point Likert scale (Never, Sometimes, Often, Usually, and Always) questionnaire was used to collect the data for the second question. The questionnaire was designed to measure the students' attitudes toward learning English vocabulary, interacting in class, and their perception of how using ChatGPT supported their language learning. A pilot study was conducted to ensure the questionnaire's validity. Three specialised English language teachers in curriculum design reviewed the questionnaire items. As reflected in their feedback, a few items were modified. The questionnaire consisted of seven items in the last stage. A pilot study was conducted on 20 students who were not included in the main study. Cronbach's Alpha was used to assess the internal consistency of the final questionnaire, which yielded a coefficient of (0.86), indicating good internal reliability. Table 1 lists the items included in the students' questionnaire.

Table 1

Students' Questionnaire Questions

Number	Question
Q1.	When using ChatGPT for learning, I feel very engaged.
Q2.	ChatGPT makes lessons more enjoyable.
Q3.	ChatGPT helps me focus on using new vocabulary.
Q4.	ChatGPT helps me understand complex phenomena more easily.
Q5.	Clear mistake explanations and feedback on my vocabulary choice.
Q6.	I feel more confident using the learned concepts after practicing with ChatGPT.
Q7.	I prefer learning with ChatGPT compared to traditional methods.

Descriptive statistics were used to analyse the questionnaire data, including means and standard deviations, to investigate students' perceptions of ChatGPT.

Teachers Questionnaire

For the third research question, a different questionnaire was presented to the twenty English teachers from the participating schools. The selected schools mainly adopted an inclusive educational approach. Regular classroom teaching was used for both students with and without ADHD. The teachers' questionnaire aimed to explore their experiences integrating ChatGPT into vocabulary instruction, its apparent benefits, ways of implementing, faced challenges, and recommended insights to be performed in the future. The questionnaire questions are shown in Table 2. The questionnaire data were analysed thematically to uncover recurring themes across participants' responses.

Table 2

Teachers' Questionnaire Questions

Question No.	Question
TQ1	ChatGPT is easy to integrate into teaching vocabulary.
TQ2	Confidence in using ChatGPT in teaching.
TQ3	Using ChatGPT improves student engagement.
TQ4	Utilizing ChatGPT helps ADHD students stay focused.
TQ5	ChatGPT leads to better student understanding of concepts.
TQ6	ChatGPT provides fast and useful feedback on vocabulary choice.
TQ7	Employing ChatGPT resulted in observed improvement in ADHD students.
TQ8	Limited resources or training for using ChatGPT are a barrier to the utilization process.
TQ9	There is cultural or parental resistance to using ChatGPT in the classroom.
TQ10	I recommend wider adoption of ChatGPT in English teaching as a supplementary tool.

Results

The findings were derived from the analysis of the pre-test and post-test vocabulary assessments, the students' and the teachers' questionnaires. The following sections present the quantitative results obtained from the vocabulary assessments and questionnaire, followed by the themes that emerged from the teachers' questionnaire.

How effective is ChatGPT in improving vocabulary learning for ADHD students in Jordan?

The students demonstrated an improvement in their vocabulary performance. The data from the pre-test and post-test were analyzed to compare the performance of the control group and the experimental group, as shown in Tables 3 and 4.

Table 3

Students' Pretest Results

Groups	Mean Score	Standard Deviation	Min & Max Scores
Control	2.48	1.249326349	1-4
Experimental	2.5	1.147312743	1-4

Table 4*Students' Pretest Results*

Groups	Mean Score	Standard Deviation	Min & Max Scores
Control	2.54	1.164263803	1-4
Experimental	2.8	1.049781318	1-4

The pre-test was conducted at the beginning of the study, and the post-test was done after six months. Hence, the results presented in Tables 3 and 4 indicate that both groups showed improvement in the students' vocabulary level over time. Nevertheless, the experimental group achieved a higher mean score than the control group. Accordingly, these findings suggest that using ChatGPT with ADHD students can improve their lexical retention and word choice.

These findings are consistent with Dual Coding Theory, which proposes that combining verbal and visual information facilitates vocabulary learning and retention. The post-test results showed that students had better word choice and greater accuracy in identifying the correct derivational forms of the words. In general, ADHD students suffer from difficulties in focusing or maintaining attention for a long time; however, the interactive AI-supported activities may have contributed to facilitating vocabulary learning due to increased engagement. Overall, the results assured that ChatGPT can contribute significantly to improving English vocabulary learning among students with ADHD.

How do students with ADHD perceive the role of ChatGPT in the process of learning in Jordan?

To obtain the second research question data, the students were given instructions on how to respond to the questionnaire items. The questionnaire items measured students' engagement, motivation, and vocabulary learning experiences. Distinctive patterns in students' perceptions of using ChatGPT for learning were revealed from the data. The 100 students' responses were coded and analysed quantitatively. Table 5 displays the questionnaire results and the mean scores for each item. The data provided a general impression of students' perceptions of ChatGPT.

Table 5*Students' Questionnaire Results and the Mean Scores*

Question No.	Question Focus	Mean	Rank
Q1	When using ChatGPT for learning, I feel very engaged	4.07	1
Q7	ChatGPT's preference over traditional methods	3.98	2
Q5	Clear explanation and feedback on my vocabulary choice mistakes.	3.92	3
Q2	Enjoyment of using the tool for learning	3.92	3
Q6	ChatGPT helps me focus on using new vocabulary.	3.83	4
Q4	Understanding complex structure	3.77	5
Q3	Increased confidence in using specific concepts	3.75	6

Regarding engagement and motivation, Table 5 revealed that students have positive attitudes towards ChatGPT. Students believed that ChatGPT was highly engaging during English vocabulary lessons, as confirmed by Q1 (When using ChatGPT for learning, I feel very engaged), recording the highest mean $M=4.07$). The second place was for Q7 (preference for ChatGPT over traditional teaching methods, $M=3.98$), emphasizing the importance of ChatGPT for students' learning process. Followed by Q5 (clear explanation and feedback from ChatGPT, $M=3.92$), and Q2 (enjoyment of using the AI tool, $M=3.92$), where students found it more interesting than traditional teaching methods. The results revealed that students value the engagement and immediate feedback when using ChatGPT. However, Q3 (increased confidence in using new vocabulary, $M=3.75$) received the lowest mean score. In fact, it reflects a positive attitude. This suggests that even though ChatGPT may improve students' vocabulary learning, class engagement, and develop students' confidence, in some cases, when introduced to new words, students still need some practice and support.

How do teachers perceive the integration of AI tools in the education process for students with ADHD in Jordan?

As for the third research question, another questionnaire was administered to 20 English teachers from the participating schools. The findings of this questionnaire showed strong support for the functional benefits of ChatGPT, as illustrated in Table 6.

Table 6
Teachers Responses Mean

Question No.	Question Focus	Mean Score	Rank
TQ6	Provides fast and useful feedback on vocabulary choice.	4.05	1
TQ10	I recommend wider adoption of ChatGPT in English teaching as a supplementary tool.	3.70	2
TQ5	Better student understanding of grammar/vocabulary	3.25	3
TQ3	Improves student engagement	3.15	4
TQ7	Observed improvement in ADHD students	3.10	5
TQ2	Confidence in using ChatGPT in teaching	2.95	6
TQ4	Helps ADHD students stay focused	2.90	7
TQ1	ChatGPT is easy to integrate into teaching vocabulary.	2.65	8
TQ9	Cultural or parental resistance	2.40	9
TQ8	Limited resources or training for using ChatGPT are a barrier to the utilization process.	1.95	10

Table 6 results demonstrate a positive attitude towards implementing ChatGPT in teaching, as designated to the highest mean scores in TQ6, $M=4.05$, and TQ10, $M=3.70$. On the other hand, the data identified key obstacles with TQ8, recording the strongest negative response ($M=1.95$). For teachers, one of the vital themes was their acknowledgement of potential advancement versus systematic hurdles. In general, teachers agreed on ChatGPT implementation in teaching. The outcomes underscored the students' optimized performance (TQ7), valued students' autonomous interaction in class (TQ3 and TQ5). However, teachers demonstrated their annoyance due to the lack of

advanced resources and adequate training, which impedes the teaching process (TQ8), while concerns and anxieties over cultural or parental resistance (TQ9) appraised external social pressure. Interestingly, a notable disagreement emerged from the teachers' responses to (TQ4), where they suggested that AI tools could be highly inconsistent because students depend on them in their teaching, believing they cannot learn without them. Therefore, the students' learning profiles may vary. Regarding the outcomes of the students' and teachers' questionnaires, they disclosed a positive attitude towards AI being implemented in education and indicated the substantial challenges, particularly for students with ADHD. It could be noticed that the TAM model was reflected in the attitude results: the younger (students) accepted the adaptation to technology integration much faster and more easily than the adults (teachers).

Discussion

The assessment of students' vocabulary was conducted in the first six months of school. Although the testing period was short, the results of the students with ADHD were promising; they showed improvement in word choice and derivation. As the English teachers adapted the lessons and assignments to the Dual Coding Theory, several students demonstrated substantial progress in memorization and derivation of vocabulary effortlessly. Moreover, these results were compatible with those of Liu et al. (2025), Abril et al.(2025), Rapti (2022), and Kohnke et al. (2023) studies which underscored that employing ChatGPT as a supporting tool in education is necessary and substantial. Additionally, Abdullajon's (2026), Polakova and Ivenz's (2026), and Deep et al.'s (2026) results of the studies reflect how AI tools helped both students with ADHD and those without in strengthening their vocabulary learning.

Several reasons encourage students to use ChatGPT; students, as teenagers, find it interesting to use computers as if they play games. As a result, their concentration time has increased; eventually, their ability to retain vocabulary improved. In addition, students tend to use mobile phones daily, whether they are their parents' or their own. Thus, students can have extra practice due to the ease of accessibility to ChatGPT at any time to learn during the class or after school. Another reason, students enjoy the immediate feedback when asking for explanations.

The second question data demonstrated underlying themes and contradictions in the participant experience. The results of the second question agreed with Rapti (2022), Praveena and Mahalakashmi (2022), Liu et al. (2025), and Polakova and Ivenz's (2026) results, in that students have a positive attitude towards using AI tools. These outcomes could be attributed to the advanced technology that Jordan has developed in the last few decades. Thus, the Ministry of Education has implemented computer science in the school curriculum at all levels. Consequently, students have a positive attitude towards studying and using technology. As a result, students believe that using advanced technology such as ChatGPT keeps them motivated to learn and complete their assignments. This means

that ChatGPT succeeded in helping students with ADHD stay engaged in the learning process. Not only that, but the second-highest ranking question, with a mean of 3.898, is the seventh question, stressing their preference to learn the language using ChatGPT over learning it traditionally, supporting the main premise of Davis's (1989) TAM, which includes acceptance and usefulness, among school students.

The most prominent students' quantitative responses develop a systematic account of pragmatics rather than a passionate relationship with AI tools that high scores on skill-based outcomes suggest that students derive a sense of instrumental confidence. They believe the tool is effective for achieving learning goals. Nonetheless, the low score of enjoyment and preference for traditional methods indicate that this confidence does not translate into intrinsic motivation or engagement. The AI tool is perceived as a useful tutor, but not as an engaging learning partner. Hence, this separation should be taken seriously, especially for ADHD students who often struggle with constant attention. These results are consistent with Kim et al. (2023) and Athanassopoulos et al. (2023) studies suggested that AI tools are capable to act as a tutor to help learners increase their focus and attention span.

The findings of the third question were similar to those of Cope and Kalantzis's (2009) study, which emphasised the benefits of AI tools in providing tailored learning to enhance education. They proposed that ADHD students learn best when the school materials were adapted and personalized according to their own pace and needs. Another advantage of using AI tools in teaching was the opportunities for these students to blend with their classmates naturally without being left alone. Additionally, the outcomes align with Abril et al.'s (2025) study, which emphasised positive students' engagement with ChatGPT in learning English vocabulary.

A deeper analysis of the third question delivered profound insights into teachers' perspectives. Teachers believe that ChatGPT provides a perfect tool for practice. Through constant drilling and repetition of the lesson, students can achieve confidence and autonomy in language use. Thus, some teachers were aware of the positive feedback of individualized learning strategies. On the other hand, a minority of teachers showed some scepticism concerning the impact on ADHD students, where the use of AI tools is not universal. The teachers' data revealed several insightful themes. The first theme was the students' degree of enjoyment and engagement during the lesson. Although the data suggested that students prefer traditional methods, the enjoyment scored a little lower. While ADHD students believe that they have the urge to learn, in fact, they cannot render it into strong motivation or engagement. The reason behind this is that ADHD students require more time and attention due to their short attention span. On the other hand, there was a clear belief in the pedagogical value of AI, evidenced by strong agreement with its feedback capabilities and its perceived positive impact on understanding.

Two major factors that impact the teachers' dilemma: First, teachers feel inexperienced and untrained, which prevents them from fully leveraging the technology. The lack of infrastructural support, as captured by, leaves teachers demanding a profound solution. Second, external pressure in some areas in Jordan has a great influence, such as culture and parental resistance, which adds a significant social impediment in some situations. Teachers are in a quandary because they recognize that ChatGPT is a powerful educational tool, yet they cannot fully adopt it in teaching. The majority of Jordanian public and some private schools have no suitable modern computers. Thus, this step is currently difficult to achieve.

Teachers' attitude results were similar to those of Zhao et al. (2023) and Qudah et al. (2025), who supported the idea that technology acceptance depends on parents' and teachers' attitudes. Likewise, Yu's (2026) investigation assured that teachers have a positive attitude towards implementing AI tools in teaching. The study promotes moral principles and values to be taken into consideration in the teaching process.

A different theme proposed by the teachers was their foremost concern about whether AI tools actually have benefits for students with ADHD. Although the questionnaire concentrated on this notion, the opinions are not unified. There was no consensus among the teachers regarding the extent to which AI tools can assist students in increasing their focus, and many students did not report fewer distractions. This demonstrates that schools, teachers, and educators are still not aware of how to make the most of AI tools' advantages, such as personalized pacing that could benefit ADHD learners. To effectively manage attention and hyperactivity challenges, teachers ought to use ChatGPT to make teaching more fun, such as game-like activities and interactive exercises for engaging these students. Alternatively, some of these results oppose Deep et al. (2026) review. While some studies support the use of AI, others refute that it can foster genuine engagement. Students with ADHD may increase their confidence and comprehension, but not their enthusiasm all the time. The results were similar to Zhai's (2022) and Karimova's (2024) studies, where students may rely heavily on these tools, reducing their creativity skills and interaction with others.

Another point to consider was the academic potential at the Jordanian schools. The results of the teachers' questionnaire highlighted the factors impeding the appropriate learning system. They proposed that the shortage of resources, lack of training, and support of culture should interact together to achieve the required educational level. It can be concluded that the success of ChatGPT implementation is not merely a question of technological capability but one of holistic execution, including teachers, schools, institutions, and pedagogical factors. Therefore, the results of the second and third questions verify that TAM is very applicable in current situations. The majority of students had greater acceptance than teachers for using technology in the learning and teaching process over the last few decades. Last but not least, ChatGPT can simplify

information and aid students in understanding various comprehension tasks, assisting vocabulary learning in an effortless manner, which reduces the cognitive load. ADHD learners maintain attention through such tools. When mental effort is reduced, students are more likely to perceive AI tools as useful and easy to use, increasing acceptance and continued use.

Conclusion

Using ChatGPT is one of the prominent AI tools that is deeply rooted in education. The research aimed to investigate the vocabulary improvement among ADHD students after employing ChatGPT in teaching English. To obtain a comprehensive understanding, a pre-test and post-test were performed to assess students' vocabulary proficiency level, a questionnaire was given to students, and a different questionnaire was completed by English teachers at different schools to measure their perspectives on using such a tool. Based on the findings, educators are optimizing the use of AI tools, such as ChatGPT, for learning, particularly for students with ADHD. Integrate ChatGPT as a component within a blended learning model, using it for specific drills and feedback while reserving teacher-led sessions for collaborative and vocabulary- building activities that are based on the AI-generated foundation. In addition, teachers are encouraged to implement gamification, interactive storytelling, and other interactive exercises to enhance students' learning engagement. As has been demonstrated, if ChatGPT is used for its designated purpose, then it is a viable tool for ADHD students' vocabulary improvement.

Based on the findings of this study, the study suggested a number of recommendations. Curriculum developers should provide vital teaching strategies for blending ChatGPT in language instruction. Furthermore, the government and schools should provide technological infrastructure and give teachers sufficient training courses to integrate AI tools in vocabulary teaching for students with ADHD. Finally, future studies are invited to examine the influence of AI tools with different samples and educational goals to gain a wider perspective on AI-assisted language learning and teaching.

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Grammarly was used for language editing and clarity improvement. The authors reviewed and take full responsibility for the content.

Ethics Declarations

World Medical Association (WMA) Declaration of Helsinki–Ethical Principles for Medical Research Involving Human Participants

The study was carried out in accordance with ethical principles. Permission was obtained from the school administration, and participants' confidentiality was ensured. Moreover, informed consent was obtained from all participating students and teachers before collecting the data.

Competing Interests

There are no competing interests.

Data Availability

The data are not publicly available because they contain confidential participant information. Access to the data is restricted to comply with the ethical conditions under which the study was approved.

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