

ARTICLE

The exploratory role of ChatGPT in enhancing the writing performance of architecture foundation students

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Abstract

The rapid development of generative artificial intelligence has transformed English language education by providing learners with immediate writing support and feedback. However, empirical evidence regarding its effectiveness in English as a foreign language (EFL) writing, particularly in under-researched contexts such as Iraq, remains limited. The study aims to investigate the effects of ChatGPT-supported writing instruction on students' writing performance and perceptions. A mixed-methods design was used in our study. Quantitative data were collected through pre- and post-tests, and qualitative data were collected through a 10-question Google Forms questionnaire to gather opinions from 25 architecture foundation students studying at an international private university in Iraq during the 2025–2026 academic year. Cronbach's alpha was used to assess the questionnaire's consistency. The findings showed that 70% of the students developed a positive attitude toward using ChatGPT. Significant improvements were observed in students' writing skills, particularly in the areas of idea generation, word choice, and grammatical accuracy. Another encouraging point was that more than 75% of the participating students experienced lower anxiety and increased self-confidence during writing activities. In conclusion, ChatGPT can be used as an effective support tool in English as a foreign language writing instruction. The only point to consider is that the pedagogical framework of this integration should be clearly defined and implemented under teacher guidance. This study is significant because it contributes to research on the effects of ChatGPT on writing in Iraq, given the limited number of studies already conducted.

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1. Introduction

Language teachers have begun using artificial intelligence (AI) tools in recent years out of curiosity. When it comes to AI tools, ChatGPT immediately comes to mind for almost everyone today.

In recent years, significant changes have occurred in the field of education. These changes have added a new dimension to education. One of the most influential factors

in the transformation of education is AI. One of the areas most frequently reshaped by AI is writing and assessment. When we examine the subject in greater depth, ChatGPT is the application that has had the greatest impact on writing skills (Naznin *et al.*, 2025). The integration of AI into language education has attracted the attention of many researchers (Alm & Watanabe, 2023; Ma *et al.*, 2024). The impact of this integration, particularly in writing courses within the English as a foreign language (EFL) field, has been a subject of much interest and research (Baskara, 2023; Harunasari, 2023).

ChatGPT offers numerous benefits for writing. This application has provided students with opportunities to correct grammatical errors and gain insights into EFL courses (Kucuk, 2024). The benefits offered by this application do not stop there; it also provides many alternative vocabulary options and offers opportunities for students struggling with sentence structure to improve paragraph composition (Han *et al.*, 2023). Mekheimer (2026) investigated the effects of ChatGPT on student motivation and found that this application both increased student motivation and was a positive factor in their success in writing courses. Today's students generally have a positive attitude toward ChatGPT. Teng (2024) examined EFL students' attitudes toward ChatGPT and found that their perceptions of previously used technological applications influenced their acceptance of ChatGPT. He also indicated that students who had previously experienced positive results with the integration of technological applications approached ChatGPT more favorably. He revealed that students' attitudes toward ChatGPT are closely linked to their writing courses.

Artificial intelligence, advancing at the same pace as technology, has impacted almost every segment of society. However, the integration of AI into education is a particularly welcome development for both educators and students. Students in today's digital age are exposed to technology and AI in every area of their lives (Wang & Fan, 2025). Students in the EFL field, in particular, use the AI application ChatGPT while learning languages. Looking deeper, they prefer to use it most in writing because they struggle with language skills in this area. This use occurs more often when learning a second language (Han *et al.*, 2023; Kucuk, 2023a).

Students with strong writing skills in EFL classes generally stand out and are able to effectively communicate their ideas to others (Kucuk, 2023b). Students who can express themselves well in this way also feel successful in the academic field. The biggest challenge students face in writing in EFL classes is limited vocabulary (Kara & Kucuk, 2023). Students with limited vocabulary cannot

progress beyond a certain level. Therefore, their writing remains poor and inadequate. Students who encounter such situations later face motivational problems and, as a result, their writing performance declines (Kucuk & Daskan, 2024). Students and teachers, who have been searching for a solution for a long time, have come to believe that ChatGPT can fill this gap (Kucuk *et al.*, 2025; Tarchi *et al.*, 2025).

ChatGPT has made significant inroads into education worldwide and in Iraq, and is being used in almost every area of education. This widespread use has attracted the attention of researchers. Various studies have specifically examined the effects of ChatGPT on writing (Al-khresheh, 2024; Alm & Watanabe, 2023; Han *et al.*, 2023). Among these studies, Mahapatra's (2024) study stands out. It investigated the effect of ChatGPT on students' writing skills and described it as highly formative. In a recent study, Chaqmaqchee and Naithel (2025) investigated students' opinions regarding ChatGPT in Iraq and stated that this application generally improved students' performance in EFL classes.

Applications that work in coordination with AI are generally very useful for students, particularly for generating words, getting ideas for grammar topics, and getting quick answers. ElSayary (2024) examined teachers' perceptions of ChatGPT and found that most teachers stated that this application positively contributed to students' writing skills. Students particularly appreciate ChatGPT's quick feedback feature. Many students express themselves to some extent in the area of speaking a foreign language. When it comes to writing, however, it can be a nightmare for some students. Students who are extremely fluent in speaking can be below zero in writing (Yucedal *et al.*, 2022). While many studies, such as Mondal and Mondal (2024) and Alsaedi (2024), identified the advantages ChatGPT offers in writing, other studies, such as Guleria *et al.* (2023) and Lingard (2023), examined the concerns that may arise among students in the field of writing regarding this application. Among these concerns, they emphasized that it weakens students' autonomy and forces them into specific patterns. Kucuk (2024), in his study that collected and analyzed teachers' perceptions, found that ChatGPT could be a supportive tool in education but could never replace a teacher.

Just as there is black alongside white, and good alongside evil, as mentioned above, alongside the infinite advantages offered by ChatGPT, there are also some concerns. Perhaps the fear educators have most about their students is the weakening of their critical thinking skills (Farhi *et al.*, 2023). Today, many researchers and educators are concerned that students are integrating

prompts they receive from ChatGPT into their writing by directly copying and pasting them. Due to these concerns, ElSayary (2024) and Wang and Fan (2025) have stated that ChatGPT should be used under controlled conditions and with teacher guidance, especially in elementary, middle, and high schools, and even in universities.

2. Literature review

The integration of AI tools and ChatGPT into education, particularly EFL teaching, has become one of the most popular research topics in recent years, and countless studies have been conducted in this field (Harunasari, 2023; Jung *et al.*, 2026; Lo *et al.*, 2024). ChatGPT, one such AI application, provides students with the necessary assistance. This support is particularly prominent in EFL classes. One of the most important reasons for this is that writing is the area where students struggle the most when learning a second language. ChatGPT is a step ahead of other applications because it provides students with feedback at the right time and according to their needs (Kara & Kucuk, 2023).

This study was inspired by Vygotsky's (1987) work, which emphasizes the importance of social interaction in EFL learning. Vygotsky stated that the interaction between individuals and their environment plays an important role in the learning process. He stated that individuals' dynamic interaction with their surroundings, especially with peers who are more experienced than themselves, has a very positive effect on the learning process. It has been argued that all emerging developments initially begin with social interaction. In his work, Vygotsky proposed the concept of the zone of proximal development (ZPD), which states that students achieve a higher level of success when working with their peers than when working alone. When students are in collaborative environments and exchange knowledge with their peers, they effectively reach their ZPD, leading to more productive outcomes.

ChatGPT has attracted everyone's attention because it is present in every area of life. Kucuk (2024) stated that this rapid development stems from the ease of use of this application. Alongside these developments, ChatGPT has attracted the attention of many curious researchers in writing instruction. When examining these extensive studies, some scholars have focused on their benefits (Mondal & Mondal, 2023), some on the concerns they raise (Kalla & Smith, 2023), and some on both (Karthikeyan, 2023).

When examining recent studies, we see that people use ChatGPT in every area of life; some even use it to interpret their dreams. In a recent study, Munaye *et al.* (2025) presented a comprehensive review. In this study, they used

the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework and examined 40 separate studies. They noted that ChatGPT acts as an assistant, but that ethical values must be taken into account during implementation. In addition, it was added that it is too early to decide whether ChatGPT is an effective or harmful application. It was stated that patience is required to definitively discuss the benefits and harms of ChatGPT in various areas of life and within education, and that this will become clearer in the future. Similar to Munaye *et al.* (2025), Dos (2025) systematically reviewed 20 studies conducted over the last 5 years. These studies generally examined both students' attitudes and their experiences with this application. These studies were generally compiled from journals based on Web of Science and Scopus. The results of these studies emphasized that ChatGPT increases learning effectiveness, but that necessary training must be received before integrating this application.

Various methods have been employed in the studies presented. Specific researchers have conducted valuable studies to investigate the effects of ChatGPT on writing skills. In one of these studies, Wang and Fan (2025) investigated the effects of ChatGPT on students' learning performance and learning perceptions. They examined 51 studies conducted between 2022 and 2025. After analyzing the results of this comprehensive research using the SPSS scale, the findings revealed that ChatGPT positively contributes to both students' learning performance and learning networks. They stated that ChatGPT should be integrated into every part of education, especially in EFL courses, and that this integration would act as a tutor, leading to more efficient results. Finally, they added that students' learning times will vary from student to student and from environment to environment. Another study that supports and sheds light on our work was presented by Khampusaen (2024), who investigated the effects of ChatGPT on the argumentative essay writing of 30 third-year EFL university students. In their study, which lasted 16 weeks, they collected and analyzed the effects of AI on writing, including whether there was any improvement in students' writing and perceptions. Using the Artificial Intelligence Assessment Scale (AIAS) framework, students' essays were analyzed individually. It was observed that ChatGPT significantly improved students' writing skills, and many students who initially had negative perceptions changed their perceptions to positive ones by the end of the study.

In a recent study, Jung *et al.* (2026) investigated EFL students' experiences with ChatGPT in Korea. In this mixed-methods study involving 13 EFL students, the researchers analyzed both the students' argumentative essays and their

perceptions. The study revealed interestingly contradictory results. Specifically, the feedback students received across different versions of ChatGPT was highly inconsistent. Some students did not achieve the desired results due to both cultural differences and varying levels of English proficiency. Even worse, some students showed a lack of self-confidence. Toward the end of the study, it was emphasized that while using ChatGPT is important, it should be integrated into EFL courses and education in a balanced way. While Jung *et al.* investigated challenges, Lee *et al.* (2025) presented a more comprehensive study examining the effects of AI in education. In general, their studies emphasized that integrating AI tools such as ChatGPT into education is necessary, but that a clearly defined pedagogical framework is essential for this integration. In their studies, they particularly emphasized that student-teacher relationships increase learning motivation, and therefore, the integration of AI must be guided and controlled by teachers.

In recent years, numerous studies have investigated the impact of ChatGPT on writing skills in EFL courses. Many scholars have experimentally supported these studies and the role of ChatGPT (Kucuk, 2023a; Teng, 2024; Wang & Fan, 2025). These studies have generally demonstrated through experiments that ChatGPT positively contributes to students' writing skills. Similarly, Egera *et al.* (2025) conducted a 14-day study in the Philippines to investigate the effects of ChatGPT on students, showing a noticeable improvement in their writing skills. Specifically, the content of the students' topics was enriched, and the improvement was particularly evident in grammar. Similarly, Teng and Huang (2025) conducted an experimental study with 169 EFL students in China preparing to become teachers. After the students were divided into control and experimental groups, they took mandatory writing lessons. While the control group received feedback from their teachers, the experimental group received feedback from ChatGPT. As a result, there was a significant increase in affective and behavioral engagement among the students in the experimental group. Both studies have shown, through experiments, that ChatGPT improves students' writing skills, even in short-term studies.

Numerous studies investigated students' perceptions and attitudes. In the United Arab Emirates, ElSayary (2024) collected and examined teachers' opinions and perceptions to investigate the role of ChatGPT in education. Forty teachers from private schools in Abu Dhabi participated in the study. The results indicated that teachers primarily used ChatGPT in lesson planning, learning, and teaching. However, the most common complaint among teachers was the questionable accuracy of the information obtained

from the application and the lack of human input in its content generation. Furthermore, Hamid *et al.* (2023) collected and analyzed students' opinions about ChatGPT and AI in their study, revealing that students reported experiencing less stress when writing in EFL classes using ChatGPT. A majority of students also stated that their self-confidence increased. While these are generally the positive aspects of ChatGPT, some studies have also raised concerns. It has been argued that long-term use can lead to a significant decline in students' problem-solving and critical thinking skills (Teng, 2024).

As in other countries, some researchers in Iraq have investigated the role of ChatGPT in education. Although studies in Iraq are fewer than in other countries, some good research has been produced. Almustaafa (2025), in a study with 60 students in the English department at Baghdad University, investigated the effects of AI applications on students' writing skills. It was observed that AI tools made a visible contribution to students' academic writing skills, grammar, and, especially, word choice. In addition, Almustaafa observed that students also had increased time management and motivation. On the other hand, Almustaafa observed excessive dependence on AI applications among students, which was found to affect their self-confidence. Therefore, it was emphasized that while these applications can support education, their integration should be careful and balanced. A similar study by Jassim (2025) at Misan University found that one of the most challenging aspects for EFL students is academic writing. In her study with 20 second-year EFL students, she examined the opinions of both students and teachers. Jassim, who supported his study with pre- and post-tests, stated that, based on data collected from students and teachers, ChatGPT could be a supportive material for EFL students in Iraq. He also emphasized the need to take precautions before integrating ChatGPT into EFL courses.

Despite the growing number of studies investigating the role of ChatGPT in EFL writing, there is still a lack of research on specific regional contexts, such as Iraq. Moreover, while many studies emphasize general improvements in writing performance, fewer studies examine both performance outcomes and student perceptions simultaneously within a structured instructional framework. Therefore, this study aims to fill this gap by providing empirical evidence from an underrepresented context.

2.1. Theoretical framework

The theoretical basis of this study rests on the perspectives of generative AI-supported learning and human-AI collaboration. As everyone has witnessed, the integration of ChatGPT into education has revealed the need to reshoot

a film that was already in progress. Many educational institutions have felt the need to restructure their learning processes in response to the emergence of ChatGPT (Zhai, 2023).

Additionally, this study is based on the perspective of human–AI collaboration. As Dwivedi *et al.* (2024) argued, AI is not intended to replace or eliminate humans, but rather to enhance human performance through augmented intelligence. In this context, students are primarily in control during the writing phase, while ChatGPT plays a strategically supportive role. Ultimately, the impact and benefits of ChatGPT depend on how correctly students use the application.

2.2. Research questions

The research questions of this study were:

- (i) Does ChatGPT integration significantly improve students' writing performance?
- (ii) What changes are observed in writing performance (grammar, vocabulary, coherence, task achievement)?
- (iii) What are students' perceptions of ChatGPT usage?

3. Methodology

3.1. Research design

In this study, we used a mixed-methods research project to analyze students' opinions about ChatGPT and to investigate how this application benefits their writing skills. As Taherdoost (2022) states, using a mixed-method approach allows for a deeper understanding by examining both student opinions and test results. For this reason, both quantitative and qualitative data were collected and analyzed.

This study followed an explanatory sequential design. First, we collected quantitative data through pre- and post-tests. This allowed us to assess whether there was any change in students' initial and final writing skills due to the use of ChatGPT. Data were evaluated with the same rubric for both the pre-test and post-test results, using SPSS-29 (IBM, United States of America).

In the second part of our study, qualitative data were collected to examine students' perceptions regarding the use of ChatGPT in their writing activities. Immediately after the post-test, the final quantitative data collection for our study, a 10-question questionnaire was administered to students via Google Forms to gather their opinions about ChatGPT. Our goal at this stage was to examine whether the answers given by the students supported the collected quantitative data.

Although the study did not include a control group, this

design was intentionally selected due to practical classroom constraints. All students were enrolled in the same course and received the same instructional framework. Therefore, it was not feasible to separate students into different instructional conditions. However, the use of pre- and post-tests provided a reliable means of measuring changes in writing performance over time.

3.2. Participants

Twenty-five first-year foundation English students from the Architecture Department of a private international university in Iraq participated in this study. The study was conducted during the 2025-2026 academic year. The students were selected using convenience sampling. All participating students were very active in class and willingly agreed to participate in the study.

The students' age range was 18–21. In terms of gender, there were 13 female students and 12 male students. Of these students, 22 were Kurdish, 2 were Arab, and 1 was Turkmen. The students took foundation classes from 8:15 a.m. to 9:50 a.m. and attended department classes after 10 a.m. Based on the results of the placement test conducted at the beginning of the academic year, the students' English levels ranged from A2 to B1 levels according to the Common European Framework of Reference for Languages (CEFR), and they were able to express themselves freely and comfortably.

Before the study began, all students were informed about it, and they were enthusiastic about the study, which involved using ChatGPT in their writing activities. Ethical considerations were carefully addressed in this study. Before data collection, students were informed about the purpose of the research and how their data would be used. Written informed consent was obtained from all participants. Participation was voluntary, and students were assured that their personal information would remain confidential and anonymous throughout the study.

Since the study was conducted within a single class, no special control group was formed. All students received instruction from their teachers in the same manner and used ChatGPT in the same way.

3.3. Research instruments

In this study, two main instruments were used. First, written tests were administered, including pre- and post-tests. Second, a 10-question Likert-scale questionnaire was prepared using Google Forms to gather information on students' perceptions of their writing activities.

Pre-tests and post-tests were administered to measure changes in students' writing skills. At the beginning of the

study, students were asked to write an argumentative essay on the topic “Describe your dream house” to assess their initial writing skills. At the end of the seven-week study, students were given a post-test on the topic “Money cannot buy happiness” in the same way. Both the pre-test and post-test were conducted in the classroom.

The same rubric was used to evaluate both pre-test and post-test results, ensuring consistency in assessment between the two tests. This allowed for an equal comparison of essays written using ChatGPT and those written without it. The rubric used in this study was adapted from commonly used EFL writing assessment criteria and was reviewed by subject experts to ensure its validity and applicability. The rubric considered four criteria: grammar, vocabulary use, organization, and task achievement. Students were awarded 5 points for each criterion, for a maximum total of 20 points. To ensure scoring reliability, two experienced writing instructors independently evaluated all essays using the same rubric. The inter-rater reliability was calculated using Pearson correlation and yielded a high level of agreement ($r = 0.89$), indicating strong consistency between the raters.

The study lasted seven weeks from start to finish. During this period, students were given controlled access to ChatGPT. They generally used ChatGPT to get ideas, create templates, and sometimes for grammar and sentence correction. At other times, they received help from ChatGPT regarding which words best suited their argumentative essays. The prompts students gave to ChatGPT were limited. No student was allowed to give prompts such as “write this essay for me.” Students who did so were warned that their essays would not be evaluated. The reason for this limited use was that students used ChatGPT as a supporting tool. Otherwise, our work would be meaningless, and the students would lose the opportunity to write argumentative essays. This planned approach, using ChatGPT-supported essay writing, aimed to build students’ self-confidence and develop a sense of ownership.

As the final research instrument, a 10-item Likert-scale questionnaire was administered via Google Forms. Students responded on a five-point scale ranging from strongly disagree to strongly agree. This aimed to gather different perceptions of ChatGPT among students. Based on the questions, the study attempted to examine the effects of ChatGPT on vocabulary development, grammar, self-confidence, and stress reduction from students’ perspectives. The goals were to assess the benefits of ChatGPT and to collect and analyze the concerns perceived by the students. To ensure the validity of the questionnaire, the items were developed based on previous

studies in the field of EFL writing and AI-supported learning (Teng, 2024; Wang & Fan, 2025). In addition, the questionnaire was reviewed by two experts in the field of English language teaching to ensure content validity. Based on their feedback, minor revisions were made to improve clarity and relevance before administering the questionnaire.

All quantitative data were analyzed using SPSS 29. This allowed for the accurate calculation of the means and standard deviations from the pre-test and post-test results. After these calculations, the pre-test and post-test results were compared using a paired-samples *t*-test, and the differences were examined. The 10-item Likert-scale questionnaire administered to students after the post-test was evaluated using Cronbach’s alpha, and its consistency was assessed. A two-sided *p*-value of <0.05 was considered statistically significant.

4. Results

4.1. Pre- and post-test analysis

Table 1 details the scores from the 25 participating students on the argumentative essay titled “Describe your dream house.” The students’ initial writing skills were at a moderate-to-low level. The total score range was 7–13. In particular, the organization and vocabulary usage scores were low. In terms of content creation, a fluctuating pattern emerged: some students performed well, while others scored low. This difference is also evident in grammar. These pre-test results demonstrate that students are in serious need of support.

Table 2 reflects the post-test results from the participating students who completed ChatGPT-supported writing lessons for seven weeks. In the post-test, students were given the topic “Money cannot buy happiness” and asked to write an argumentative essay of 150–200 words. Post-test results were evaluated using the same rubric used in the pre-test. A significant improvement in students’ writing skills was observed. Students scored between 13 and 19 points. More encouragingly, many students scored above 15 points. Specifically, students achieved high scores in organization and grammar, in contrast to the pre-test results. Overall, post-test results indicate that students performed more consistently. These results demonstrate that the method used significantly contributes to students’ writing skills.

Table 3 presents a descriptive analysis of the pre-test and post-test scores using SPSS 29. A significant increase in the students’ writing skills was observed. The pre-test mean score was 8.84 ($SD = 1.65$), increasing to 16.08 ($SD = 1.66$) in the post-test. The difference between the two

Table 1. Pre-test argumentative essay scores

Student	Content (5)	Organization (5)	Vocabulary (5)	Grammar (5)	Total
Student 1	3	2	3	2	10
Student 2	2	3	3	2	10
Student 3	3	2	1	2	8
Student 4	1	2	3	2	8
Student 5	1	1	3	3	8
Student 6	3	4	3	3	13
Student 7	1	1	3	3	8
Student 8	1	3	1	3	8
Student 9	3	3	1	1	8
Student 10	1	3	2	1	7
Student 11	3	1	1	3	8
Student 12	2	3	2	5	12
Student 13	3	3	2	3	11
Student 14	3	2	3	2	10
Student 15	2	1	2	2	7
Student 16	3	2	3	1	9
Student 17	2	3	1	4	10
Student 18	1	2	1	3	7
Student 19	2	2	2	1	7
Student 20	2	3	3	3	11
Student 21	2	3	2	2	9
Student 22	2	2	2	2	8
Student 23	3	1	3	2	9
Student 24	2	2	1	2	7
Student 25	3	1	1	3	8

tests demonstrates that the applied method contributed substantially to students' writing skills. The similarity of the standard deviations in both exam results indicates that the students' scores showed a similar distribution. The seven-point difference between the two tests suggests that ChatGPT-supported writing training has significantly benefited students' writing skills.

Table 4 presents the paired-samples *t*-test results from SPSS 29. A significant increase in students' writing skills was observed following the ChatGPT-supported writing process. The mean difference was 7.24 (SD = 2.28). This difference, considering the maximum score was 20, is significant, and the small SD indicates that the variability

of the difference scores was moderate. The *t* was 15.88, *df* was 24, and *p* was <0.001. In addition to statistical significance, an effect size (Cohen's *d*) was calculated to determine the magnitude of the difference. The effect size was very large (*d* = 3.1), indicating a substantial impact of the intervention on students' writing performance.

4.2. Likert-scale questionnaire analysis

Table 5 presents the numerical distribution of students' responses, providing a clearer representation of the data compared to graphical visualization. In Statement 1, 85% of the students gave positive responses, 7% negative responses, and 8% neutral responses, suggesting that ChatGPT greatly facilitates their idea generation.

Table 2. Post-test argumentative essay scores

Student	Content (5)	Organization (5)	Vocabulary (5)	Grammar (5)	Total
Student 1	5	3	5	4	17
Student 2	4	3	5	4	16
Student 3	4	4	5	3	16
Student 4	3	5	3	5	16
Student 5	3	3	3	4	13
Student 6	3	3	5	5	16
Student 7	3	4	3	4	14
Student 8	3	3	5	3	14
Student 9	5	3	5	4	17
Student 10	5	5	5	4	19
Student 11	4	3	4	4	15
Student 12	3	5	5	4	17
Student 13	3	3	4	5	15
Student 14	5	5	3	5	18
Student 15	4	3	4	4	15
Student 16	3	5	3	4	15
Student 17	4	4	3	3	14
Student 18	4	3	4	5	16
Student 19	3	5	3	3	14
Student 20	4	4	4	4	16
Student 21	4	4	4	5	17
Student 22	4	5	4	4	17
Student 23	5	5	5	4	19
Student 24	4	3	5	5	17
Student 25	5	5	5	4	19

Table 3. Descriptive statistics for pre-test and post-test scores

Test	<i>n</i>	Mean	SD
Pre-test	25	8.84	1.65
Post-test	25	16.08	1.66

Table 4. Paired-samples *t*-test results

Comparison	Mean difference	SD	<i>t</i>	df	<i>p</i>
Post- & Pre-tests	7.24	2.28	15.88	24	<0.001

Statement 2 analyzed how ChatGPT affected students' vocabulary learning. The results showed that 75% gave positive responses, 10% negative responses, and 15% neutral responses, indicating that ChatGPT improves students' vocabulary. It should not be overlooked that 15% of students expressed neutral views and 10% expressed negative views, indicating that students held differing opinions.

Statement 3 analyzed students' perceptions of their confidence when using ChatGPT. The responses from students showed that 70% were positive, 15% negative, and 15% neutral. Overall, the majority of students gained self-

Table 5. Students' responses to the questionnaire

No.	Statements	Strongly disagree	Disagree	Neutral	Agreee	Strongly agree
1	ChatGPT helped me generate ideas more easily.	2	5	8	55	30
2	ChatGPT improved my vocabulary use.	3	7	15	50	25
3	I felt myself more confident while writing with ChatGPT.	5	10	15	45	25
4	I became dependent on ChatGPT while writing.	15	25	20	25	15
5	ChatGPT improved my grammar accuracy.	3	7	15	50	25
6	Using ChatGPT made writing tasks less stressful.	5	10	10	50	25
7	I think ChatGPT should be integrated into writing classes.	5	10	15	45	25
8	I critically evaluated ChatGPT suggestions before using them.	10	20	25	30	15
9	ChatGPT helped me organize my ideas better.	3	7	15	50	25
10	I worry about the ethical use of ChatGPT in writing	10	20	25	30	15

confidence.

Statement 4 analyzed whether students became dependent on ChatGPT. The results showed that 40% were positive, 40% were negative, and 20% were neutral, resulting in a balanced graph. While some students expressed a feeling of independence, an equal percentage said the opposite. This balanced result shows that while some students found ChatGPT beneficial, others considered it risky.

Statement 5 investigated whether ChatGPT was beneficial to students in grammar. The results showed that 75% of students were positive, 10% negative, and 15% neutral, indicating that ChatGPT significantly improves language accuracy and is a supportive factor in grammar in the writing field.

Statement 6 analyzed students' perceptions of reduced stress while writing with ChatGPT support. The results showed that 75% of students agreed, 15% disagreed, and 10% remained neutral, demonstrating that students' stress levels decreased during the writing process due to the use of ChatGPT.

In Statement 7, students were asked about the idea of integrating ChatGPT into writing lessons. The results showed that 70% of students agreed, 15% disagreed, and 15% remained neutral. While a large majority of students (70%) supported integration into education, 30% expressed reservations.

In Statement 8, students were asked whether they critically evaluated the information obtained from

ChatGPT before using it in their writing tasks. The results showed that 45% of the students responded positively, 30% negatively, and 25% neutrally, suggesting that a considerable number of students tend to reflect on ChatGPT-generated content; however, not all students consistently engage in critical evaluation. This indicates that further guidance may be needed to help students develop stronger critical thinking skills when using AI-supported tools in writing.

Statement 9 investigated whether ChatGPT helps students organize their ideas when creating paragraphs in writing lessons. The results showed that 75% of the students responded positively, 10% negatively, and 15% neutrally, suggesting that ChatGPT plays an important role in idea organization.

Statement 10 investigated whether students have ethical concerns regarding the use of ChatGPT. The results showed that 45% of the students responded positively, 30% negatively, and 25% neutrally. The balanced responses from the students indicate that they have different views on ethics. Looking at the statistics, almost half of the students are anxious, but one-third are not. As a result, this statement presents a controversial ratio.

5. Discussion

This study, conducted in Iraq during the 2025–2026 academic year with 25 architecture foundation students, aimed to examine the effects of ChatGPT-supported writing courses on students' writing performance and perceptions. Based on quantitative and qualitative data from pre- and post-tests, as well as a 10-item Likert-

scale questionnaire, we observed that approximately 70% of our students had a positive attitude toward ChatGPT. More specifically, our data confirmed that ChatGPT plays a more supportive role in areas such as idea generation, word selection and creation, and grammar. These results align with previous studies.

Specifically, most participants stated that ChatGPT helps in generating ideas for argumentative writing and facilitates the process. This is consistent with the findings of Wang and Fan (2025) and Khampusaen (2024), who emphasized the role of ChatGPT as a mentor for both teachers and students. Fan's (2025) study, in particular, addressed two aspects of ChatGPT: first, it improves students' writing performance; and second, it helps them develop content. Similarly, Teng and Huang (2025) and Triantafyllou (2024) reported that ChatGPT and AI provided greater improvements in students' linguistic performance compared to other applications. These improvements in linguistic performance perfectly match the results of our study.

Hamid *et al.* (2023) reported that ChatGPT significantly reduced student stress and boosted their self-confidence. This finding is similar to our findings. Kara and Kucuk (2023) reported that ChatGPT provided very important pedagogical support in writing lessons. Similarly, this is consistent with our results. The situations in both studies are almost perfectly in line with Vygotsky's (1987) sociocultural theory, and especially the concept of ZPD. A common conclusion is that ChatGPT should be considered not as a tool to replace humans, but rather as an auxiliary tool to support students' learning.

Our findings differ from some studies and yield different results. Almustafta (2025) emphasized that excessive dependence and decreased self-confidence would occur in students who used ChatGPT for a long time. Such a result did not emerge in our study. The presence of excessive dependence among some students and its absence among others is consistent with Jung *et al.* (2026), suggesting that ChatGPT needs to be integrated into writing courses in a balanced way.

Most academic studies on ChatGPT, from its inception to the present, have raised ethical concerns (Alm and Watanabe, 2023; Baskara, 2023; Kucuk, 2024). In this study, the students' neutrality regarding ethical concerns and critical thinking statements in the questionnaire confirms the cautious approach to ChatGPT expressed in the studies by Dos (2025) and Munaye *et al.* (2025). A common conclusion from the studies presented is that ChatGPT provides significant pedagogical assistance in both life and education, but the ethical concerns it raises are also important and should not be ignored. The questionnaire

results showed that while a certain percentage of the students participating in the study were aware of ethical issues, they were in serious need of ethical guidance.

Despite the valuable contributions of this study, several limitations should be acknowledged. First, the study was conducted with a relatively small sample size ($N=25$), which may limit the generalizability of the findings. In addition, the sample was limited to one group of students from a single institution, which may affect the external validity of the findings. Second, the absence of a control group makes it difficult to attribute the improvement solely to ChatGPT integration. Third, the duration of the study was limited to seven weeks, which may not fully reflect long-term effects. Finally, the study relied on self-reported data for student perceptions, which may be subject to bias. Future studies should consider larger samples, longer intervention periods, and experimental designs with control groups.

Overall, the results of both the literature and our current study are consistent. ChatGPT appears to provide significant support to students in their writing processes, particularly in idea generation, linguistic accuracy, and motivation. However, students must adhere to ethical guidelines and maintain their critical thinking skills when using ChatGPT. This will be achieved with a proper pedagogical framework and supported guidance. In summary, the integration of ChatGPT into EFL writing courses should be carried out in a balanced manner under teacher guidance.

6. Conclusion

This study examined the impact of ChatGPT-supported writing instruction on Iraqi EFL architecture foundation students during the 2025–2026 academic year. The results showed that ChatGPT integration had a generally positive effect on students' writing performance and perceptions. Improvements were particularly observed in idea generation, vocabulary use, and grammatical accuracy. In addition, a majority of students expressed positive attitudes toward using ChatGPT in writing classes.

The findings suggest that ChatGPT can function as an effective supportive tool in EFL writing contexts when used appropriately. Rather than replacing the teacher, ChatGPT appears to act as a scaffold that assists students during challenging stages of the writing process. In line with the theoretical framework of human–AI collaboration, the results indicate that learning outcomes are strengthened when AI is used as an auxiliary resource under teacher guidance.

However, the study also highlights the importance of balanced and structured integration. Although students

generally reported positive perceptions, ethical awareness and responsible use remain essential considerations. Without proper pedagogical regulation, there is a potential risk of overreliance or reduced critical engagement. Therefore, institutions and instructors should provide clear guidelines and training before implementing AI-supported writing instruction.

In conclusion, ChatGPT holds significant potential to enhance EFL writing performance in higher education contexts such as Iraq. Nevertheless, its effectiveness depends largely on how it is integrated into the curriculum. Future research may explore long-term effects, different proficiency levels, and comparative instructional models to better understand the sustainable role of AI in language education.

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Conflict of interest

The authors declare no conflict of interest.

Author contributions

The authors contributed solely to the article.

Ethics approval and consent to participate

Ethical approval was obtained from Scientific Committee approval no. 5. Before the study began, all participants were informed about the purpose and procedures of the research. Written informed consent was obtained from all participants prior to their participation, and participation was entirely voluntary.

Consent for publication

Written informed consent was obtained from all participants for the use and publication of their anonymized research data. No identifiable personal data or images are presented in this study.

Availability of data

Not applicable.

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