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Research Paper

Exploring the Efficacy of ChatGPT in Enhancing Writing Skills among Iraqi Kurdish EFL Undergraduate Students

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Abstract
While the use of AI tools in education is increasing, limited research has examined their impact in non-Western EFL contexts, particularly within the Kurdish academic setting. The present study addresses this gap by investigating the effectiveness of ChatGPT in enhancing the academic writing skills of Iraqi Kurdish EFL undergraduate students. A mixed-methods design was employed with 46 participants, divided into a control group (n = 24) and an experimental group (n = 22), integrating both qualitative and quantitative approaches. Over 15 weeks, the experimental group integrated ChatGPT into their academic writing instruction, while the control group received traditional instruction. Writing performance was assessed through pre- and post-tests and analyzed in SPSS (27.0) using independent and paired samples t-tests, while qualitative interview data (n = 20) were examined

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through reflexive thematic analysis in NVivo (15.0). Results showed no significant difference between groups at pre-test ($t = –1.390$, $p = .178$), but the experimental group demonstrated significantly greater improvement at post-test ($t = –4.846$, $p = .001$). Thematic analysis of the interviews revealed three key themes: (1) Challenges—overreliance on ChatGPT and cognitive overload; (2) Interaction with feedback and learning tools—students preferred AI-generated feedback over traditional approaches; and (3) Perspectives and attitudes toward ChatGPT—concerns about ethics, academic integrity, and growing trust in AI tools. These results suggest that ChatGPT can be an effective aid for academic writing when used with appropriate pedagogical support. The study recommends that teachers, educators, and policymakers integrate AI literacy and AI-based tools into academic writing curricula across diverse educational contexts.

***Keywords**:* Academic writing, ChatGPT, Generative AI, Kurdish EFL students

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1. Introduction

Writing is an integral aspect of language learning and teaching, and its mastery becomes essential to the development of students' overall level of language proficiency, critical analytical ability, problem-solving, and linguistic competence to communicate (Deane et al., 2008). Writing well in a second/foreign language also promotes cognitive development: students learn to organize their ideas, to write with an argument, and to express complex ideas clearly. As stated by Hyland (2019), writing allows learners to interact with language in systematic ways and encourages them to use vocabulary and grammar correctly. In addition, writing also supports reflection as learners have opportunities to develop their proficiency in language over time (Brown, 2014). For educators, it is important to teach writing to provide students with effective tools of communication, as communication is

important for both academic success and the professional sphere (Nation, 2008).

The process genre approach is a pedagogical framework for teaching writing skills in language learning that provides a highly effective model incorporating advantages from both process-oriented and genre-based pedagogies. It highlights the writing process, which consists of prewriting, drafting, revising, and editing. It incorporates the knowledge of genre-based conventions and patterns, which are indispensable for creating coherent and context-based texts (Hyland, 2004). Through a focus on both process and genre, students are guided in producing texts suitable for specific communicative purposes, audiences and social contexts, and as a result, improve their versatility in writing (Badger & White, 2000). ChatGPT and other AI technologies have surfaced as powerful tools in the mission of providing immediate, tailored help to language learners. These tools can help students with brainstorming, vocabulary, and grammar, which will improve their overall writing. According to Xu et al. (2023), students can receive real-time feedback through AI-powered large language models (LLMs), enabling them to learn and refine their skills more effectively in an environment with limited consequences. AI tools provide better personalized learning experiences as students can identify weak areas and learn accordingly, with the capacity of tracking their progress over a period of time (Alharbi, 2023). ChatGPT serves as an innovative tool to complement traditional language instruction in classrooms, allowing learners to build learning experiences independently/online and collaboratively (Huang et al., 2023).

This study fills an important gap in the literature on the effect of AI tools, such as ChatGPT, on students' writing skills in Kurdish EFL undergraduates. While the positive influence of AI on language learners has been confirmed generally (Nazari et al., 2021; Rahman et al., 2022). There is an insufficient

number of studies surrounding Kurdish EFL learners, arising from different obstacles such as limited accessibility to direct engagement with English speakers and a lack of resources catering to their linguistic and cultural context. This study aims to answer these pressing questions by investigating how ChatGPT can help these students achieve academic writing proficiency—particularly in aspects such as grammar, coherence, and vocabulary use. This study further aims to provide context-appropriate insights and contribute to the design of more inclusive AI-assisted language learning (Al Mahmud, 2023).

The study takes a two-pronged approach to fill this gap. To start with, the targeted writing tasks were designed to imitate the academic writing needs of English Language Teaching majors. ChatGPT gives feedback every step of the way and focuses on key areas known to be problematic for Kurdish learners (e.g., grammar, coherence and lexical choice). This approach to feedback will support continuous skill building in response to targeted deficiencies faced by Kurdish EFL students. Additionally, the research features qualitative data on student perceptions and experiences of ChatGPT, gathering insights through interviews on the perceived appropriateness and accessibility of ChatGPT as a learning support. This will help to recognize the extent to which ChatGPT offers support to Kurdish EFL learners and determine the ways that AI tools may be additionally adapted for more culturally grounded assistance. Thus, concentrating on these two domains enables this study to not only explore the duality of ChatGPT as a language learning aid to Kurdish students but also to provide a holistic analysis that contributes to a better understanding of the role of AI in language education, particularly in traditional contexts.

This study aims to assess the effect of ChatGPT on the writing development of Kurdish EFL undergraduate English language teaching

students. The primary focus is to evaluate whether the guidance of an AI, in particular ChatGPT, can be a tool to effectively develop writing levels, structure, and coherence in academic writing. Due to the increasing significance of AI in education, this study aims to explore how ChatGPT-type tools may help language learners produce more advanced written language to help them reach higher levels of academic success (Xu et al., 2023). Drawing on the context of English Language Teaching, the findings of this research will provide some value in the discussion of AI-integrated small model language (SML) in higher education for language learning as well (Alharbi, 2023).

The following research questions are set to guide this study:

1.What is the impact of ChatGPT on undergraduate Iraqi Kurdish EFL students' writing skills?

2.What are the perceptions and attitudes of undergraduate Iraqi Kurdish EFL students towards the employment of ChatGPT in writing tasks?

2. Literature Review

2.1 Writing Skills and Language Learning and Teaching

Writing skills are a fundamental component of language learning and teaching, playing a crucial role in enabling learners to effectively express complex ideas, organize thoughts, and communicate in an organized manner. Writing requires a combination of grammatical accuracy, appropriate vocabulary, coherence, and cohesion, which are essential skills for learners aiming to achieve proficiency in a second/foreign language (Hyland, 2019). According to Brown (2014), writing is not merely a mechanical act but involves cognitive processing, such as planning, organizing, and revising. These cognitive processes are integral to language learning, as they

encourage deeper engagement with linguistic structures, aiding in the internalization of language rules and usage.

Educationally, writing is essential to effective academic and professional communication. Writing is one of the main modes of assessment in schools, while written communication is also a much sought-after skill in many professional contexts, where communication needs to be precise and unambiguous (Nation, 2008). In particular, academic writing necessitates a logical presentation of an argument and substantiation of ideas with evidence, which relies heavily on both critical and linguistic proficiency in the target language. According to Hyland (2019), effective writing instruction gives students the tools they need to produce clear, coherent, and persuasive texts that are necessary for achieving academic success.

In addition, writing skills work in harmony with other aspects of the language, including reading, listening, and speaking. Students who write regularly are more likely to have better comprehension skills when it comes to reading because they are more attentive to the structure of the text and vocabulary (Ahmed & Ariannejad, 2025; Liaw, 2007). Moreover, writing reinforces speaking skills, since exploring what words to use in a particular context, or how to structure a sentence, can be transferred across both modes of communication: the written and the spoken forms (Nuangchalerm et al., 2024; Wallace et al., 2004).

However, studies have proven that combining writing with language teaching may provide a holistic route to innate language learning. Research also underlines the correlation between writing practice and language skills, indicating that language learners who engage in writing practice show a better grasp of language forms and a broader vocabulary range (Xu et al., 2023). This shows that the incorporation of writing skills within language learning programs is important to contribute to well-rounded language

proficiency and equip learners with the ability to express themselves in different scenarios.

2.2 Effectiveness of AI in Improving Writing Skills

Recently, the implementation of AI tools such as ChatGPT has been highlighted as a possible helpful aid in language learning, especially in writing skill development. These AI-driven language models offer immediate feedback, including suggestions for grammatical, lexical, or cohesive instruments to correct or improve writing (Song & Song, 2023). Such tools foster a low-stakes environment in which learners practice their writing in a high-frequency way, without worrying about immediate consequences, making them ideal for self-directed learning.

Research studies have investigated the use of AI-based feedback in the language learning domain. According to Creely (2024), immediate or iterative (saving and recursive) feedback provided by ChatGPT helped learners to revisit and adjust their errors, mainly grammatical and structural errors in sentences. As students encountered errors in their writing and had to reconsider their use of verbal forms, this feedback loop stimulated deeper-level thinking in their writing, which eventually led to growth in accuracy and fluency, as the use of verbal forms became more automatic with time. The study also underscores ChatGPT's versatility in accommodating all kinds of writing assignments – from writing essays to creative writing – giving students a multi-purpose tool to respond to a wide range of writing tasks.

Crompton et al. (2024) further discussed the importance of AI-based technology to assist EFL students in their writing skills. In their study, they investigated the beneficial effects of employing AI tools in brainstorming, drafting, revising, and self-editing of students' writing. Their findings demonstrated the positive impact of AI-generated feedback and suggestions, which enhanced the academic level of students rather than those who were in

the control group (not using AI tools) in their writing tasks. They further showed a better version of writing sentences and paragraphs created by students while using AI-driven technologies through personalized learning.

Recent research highlights that ChatGPT can support not only surface-level writing accuracy but also higher-order thinking skills. A recent meta-analysis (Wang & Fan, 2025) shows that ChatGPT enhances learning performance, learning perceptions, and higher-order cognitive processes, particularly when used within structured pedagogical frameworks such as Bloom's taxonomy and over sustained periods. These findings align with studies showing that AI tools like ChatGPT foster student autonomy and self-directed learning by enabling learners to self-edit, refine ideas, and independently identify errors (Xu et al., 2023). Such autonomy is especially valuable for EFL students who may have limited access to immediate teacher feedback, as AI-supported self-assessment has been shown to strengthen writing development and metacognitive awareness (Creely, 2024). Together, this evidence underscores the potential of ChatGPT to support both the linguistic and cognitive demands of academic writing, including argumentation, organization, and critical reasoning.

On the other hand, using AI tools such as ChatGPT to acquire a language comes with some drawbacks and limitations. According to studies in language-related environments, non-human feedback provided by AI models may also sometimes be out of context: it is based on algorithms that cannot fully comprehend the use of language that is more culturally or context-dependent (Rusmiyanto et al., 2023). Moreover, while AI feedback is extremely beneficial for improving lower-order writing skills like grammar and vocabulary, AI assistance is less capable of aiding students in high-order argumentation or critical analysis, which requires more subject matter understanding (Chang et al., 2024). So, although AI as a writing tool is an

ideal source for scaffolding the writing process, it may be most beneficial when used in conjunction with traditional instruction.

In conclusion, existing literature indicates that ChatGPT and similar AI tools can provide significant advantages in enhancing the writing capabilities of language learners. These being accurate, coherent, and autonomous learning of a learner, via the use of these tools, we can have a great supplemental tool to academic teaching methods. But failure in contexts where higher contextual understanding is required, underscoring the necessity for an integration method that merges teachers' feedback with the AI assistance for the prime writing enhancement.

2.3 Scholarly Related Research

Although existing studies consistently show that AI tools such as ChatGPT can enhance various aspects of writing performance (Creely, 2024; Özçelik & Ekşi, 2024), most research has been conducted in broad or well-resourced EFL contexts. These findings cannot be assumed to generalize to Kurdish EFL learners, who face distinct challenges—including limited exposure to English-rich environments and reduced opportunities for academic writing practice—which shape how they interpret and benefit from AI-generated feedback (Crompton et al., 2024). Moreover, while AI tools have demonstrated effectiveness in improving surface-level writing features, far less attention has been given to their role in developing higher-order writing skills such as argumentation, synthesis, and academic tone (Chang et al., 2024), which are central to advanced academic literacy.

Another gap concerns learners' subjective experiences with AI tools. Very few studies explore how students in underrepresented contexts, particularly Kurdish EFL learners, perceive AI assistance, manage challenges, or adapt AI feedback to their writing processes (Rusmiyanto et

al., 2023). Understanding these perspectives is essential because cultural and pedagogical factors influence how effectively AI tools support learning. Additionally, most existing studies examine short-term outcomes, leaving little evidence about whether improvements achieved through AI-supported writing are sustained over time.

To address these gaps, the present study investigates ChatGPT's impact on Kurdish EFL undergraduate students by examining its influence on both fundamental and higher-order writing skills, exploring students' experiences and perceptions of using AI tools, and evaluating whether writing gains persist over a semester-long intervention.

3. Methodology

3.1 Research Design

The present study follows a mixed-methods research design, combining quantitative and qualitative approaches to provide a comprehensive understanding of the impact of generative AI on academic writing skills (Ostlund et al., 2021). Because participants were placed into pre-existing class sections rather than randomly assigned, the quantitative component is more accurately described as a quasi-experimental design, in which intact groups served as the control and experimental conditions. Pre- and post-tests were used to measure changes in writing performance across these groups, while semi-structured interviews captured students' perceptions and experiences with ChatGPT. This design offered a robust framework for examining both the measurable outcomes and the subjective dimensions of AI-assisted writing development within an authentic classroom context.

3.2 Procedure

Experimental (quantitative) Phase

For the experimental—quantitative—phase, the participants were split into control and experimental groups. For the fall semester of 2024, all participants were enrolled in an academic writing English course (course code: ELT 247) for 15 weeks. This course is a three-credit unit, which is one of the primary courses for the second-year students at the Department of English Language Teaching. The purpose of the course was to improve the academic writing proficiency of the undergraduate students. The duration of the course was essential in assisting both in applying the intervention and collecting data over 15 weeks.

The participants from the experimental group, apart from academic writing materials, obtained targeted instruction regarding the incorporation of generative AI, ChatGPT. On the other hand, the control group participants received traditional methods of academic writing instruction. Furthermore, they were all guided to accomplish their tasks following the process genre approach proposed by Badger and White (2000). In this approach, the students integrate the elements of process, product, genre, and demonstrative writing styles. This approach focuses on producing efficient outcomes through planning, composing, editing, and revising writing steps (Bensen & Cavusoglu, 2017).

Furthermore, the participants from the experimental group were urged to complete tasks, for instance, different types of essays—by being actively involved with AI-based technologies during various stages of writing, comprising brainstorming, outlining, drafting, and receiving feedback. However, the initial drafts had to be written by the students themselves. They then used GPT-4o to obtain feedback, which they were expected to incorporate into their revisions per task on a weekly basis. Students were

taught how to brainstorm, organize their ideas, and write coherent drafts. Instruction also included the structural components of academic essays, such as hooks, connecting information, thesis statements, topic sentences, and supporting sentences for body paragraphs. Additionally, they were trained in peer-review techniques, including identifying grammatical errors, irrelevant content, and punctuation issues.

The control group followed the same curriculum and assignments but without the use of generative AI tools. They practiced essay writing using traditional methods, relying solely on their own writing skills. This group was also instructed to follow the stages of the process genre approach and received guidance on brainstorming, drafting, revising, and proofreading. However, they did not have access to ChatGPT or similar AI tools, intentionally excluding this form of technological assistance to measure its specific impact on writing outcomes.

Weekly Course Breakdown

Weeks 1–2: Introduction to academic essay writing. Students studied key components such as hooks, connecting information, and thesis statements. They practiced identifying various types of hooks and writing effective thesis statements.

Weeks 3–4: Introduction to the writing process. Students followed steps including topic selection, brainstorming, outlining, drafting, peer feedback, revision, and proofreading. Assignments were submitted following these stages.

Weeks 5–6: Focus on cause-and-effect essays. Students were assigned to write essays concentrating on either causes or effects, with topic choices provided by the instructor.

Weeks 7–8: Instruction on comparison essays. Two organizational methods were introduced—the point-by-point and block methods. Students practiced writing both types based on assigned topics.

Weeks 9–10: Focus on reflective essays. Students were taught how to structure reflection essays, including elements such as prompts, reactions, and reasons. They submitted essays following the provided guidelines.

Weeks 11–12: Instruction on argumentative essays. The structure was explained using the pros and cons format, and students completed assignments accordingly.

Some tasks were completed in pairs or groups, especially during peer-editing sessions or reflection activities, as guided by the coursebook. Feedback was provided weekly on submitted assignments, and students were expected to revise their work based on the comments received.

At the end of the course, all participants completed a post-test essay, designed to mirror the pre-test task. This allowed researchers to assess progress in writing skills over the semester. After the post-test, participants were interviewed as part of the qualitative phase of the study.

Interview (Qualitative) Phase

For the qualitative phase, semi-structured interviews were conducted with the participants at the end of the semester. The aim was to gain deeper insight into their experiences with generative AI in academic writing. The interviews were analyzed using reflexive thematic analysis, allowing the researchers to identify recurring themes and patterns in students' perceptions and experiences.

3.3 Participants

The participants of this study were second-year undergraduate students from the Department of English Language Teaching, Faculty of Education, at a private higher education institution in the Kurdistan Region of Iraq (KRI).

All students were enrolled in an academic writing course and were intentionally selected to ensure relevance to the study's focus on AI-supported academic writing development. A total of 46 students participated, consisting of 24 students in the control group and 22 in the experimental group. The participants were between 19 and 22 years old, and the sample included 18 male and 28 female students. Their baseline English proficiency level was pre-intermediate, as determined by the university's English placement exam administered upon admission. These demographic and proficiency details help situate the findings within the specific characteristics of the learner population under investigation.

Ethical Consideration

In adherence to ethical considerations, both oral and written consent were obtained from the students and the institution, all of whom confirmed their voluntary participation in the study. For the interview phase, only students from the experimental group were selected. Their responses were anonymized using coded identifiers to protect their identities.

3.4 Data Collection

A pre-test, a post-test, and interviews were employed as data collection instruments in this study.

3.4.1 Pre-test and Post-test

A pre-test was administered to determine the academic writing level of the participants before the start of the course. A post-test was conducted immediately after the intervention to evaluate improvements in the participants' writing skills. During the instructional period, students were required to write essays employing the process genre approach on specific topics suggested by the lecturers. The writing tasks included various essay

types such as descriptive, exploratory, cause-and-effect, and reflective essays, with students given the option to choose their topics. For each task, students were provided with a writing assessment rubric to evaluate their work based on grammar mechanics, verb tenses, organization, coherence, cohesion, and content. The rubric was developed by National Geographic Learning (Folse & Pugh, 2020) and was used throughout the semester. Both the pre-test and post-test were adapted from the course materials and were face-validated as appropriate tools for assessing academic writing proficiency in this context.

3.4.2 Scoring Procedures and Inter-Rater Reliability

All essays were scored by two independent academic writing instructors. Before scoring, raters participated in a calibration and training session to ensure uniform interpretation of rubric criteria. Essays were scored blindly, with no identifiers for group or test type.

Inter-rater reliability was examined using Cohen's kappa, which indicated almost perfect agreement ($\kappa = 0.82$). The final score for each essay was calculated as the average of the two independent instructor scores. This procedure ensured that the final score reflected a consensus between the two expert evaluations.

3.4.3 Interview

Semi-structured interviews were used to collect the undergraduate students' perceptions regarding the impact of generative AI, specifically ChatGPT, on academic writing. The participants were asked a series of open-ended questions designed to elicit detailed reflections aligned with the study's objectives. Sample questions included: "What were your first impressions of using ChatGPT to assist with academic writing tasks?", "How did you use the feedback from ChatGPT to revise your essays?", and "Do you feel that

using ChatGPT improves your academic writing skills? If yes, in what areas?" These questions aimed to explore students' cognitive, affective, and strategic engagement with AI-supported writing. The interviews were recorded using a smartphone voice recorder application, and the sessions lasted a total of seven hours. The full list of interview questions is provided in Appendix A.

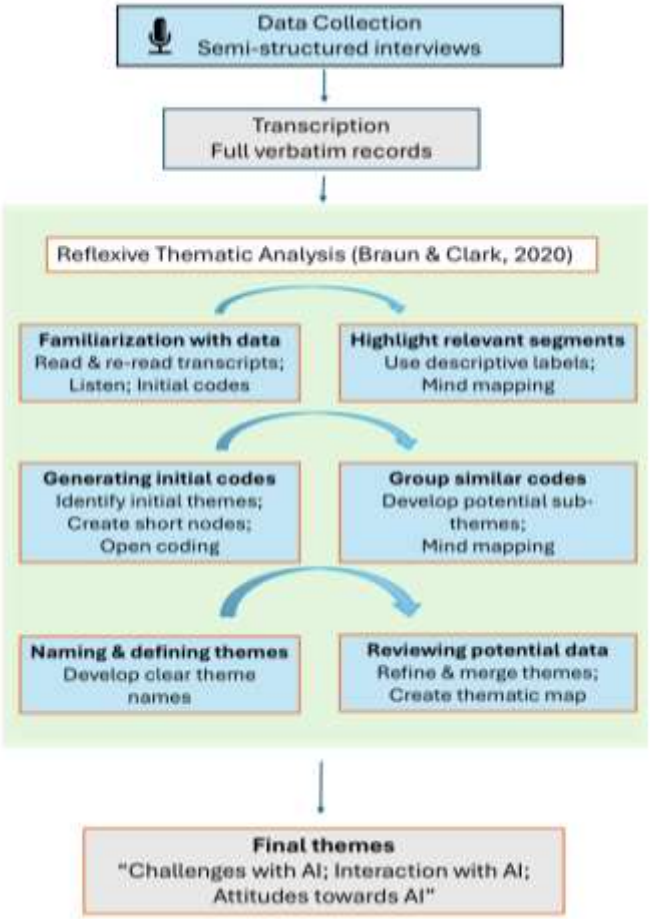

Figure 1:

Sample Codes, Subthemes, and Themes from Reflexive Thematic Analysis

Figure 1 presents representative codes, subthemes, and final themes derived through reflexive thematic analysis, along with short excerpts illustrating how student responses informed the analytic process. Including these examples increases the transparency and credibility of the qualitative findings and shows the progression from raw data to thematic interpretation.

Table 1.

Sample Codes, Subthemes, Themes, and Illustrative Excerpts from the Interviews

Theme	Subtheme	Code	Excerpt
Challenges with AI	Overreliance	"Depending too much on AI"	"Sometimes I relied on ChatGPT too much and felt confused."
Interaction with AI	Feedback & Revision	"Using AI to rephrase"	"ChatGPT helped me rewrite unclear sentences."
Attitudes toward AI	Trust & Ethics	"Worried about plagiarism"	"It helps, but I am scared of becoming dependent."

Table 1 provides examples of how interview data were coded and organized into subthemes and overarching themes. The excerpts illustrate how students described their challenges, interactions, and attitudes toward AI, demonstrating the analytic process used to develop meaningful themes from participants' experiences.

3.5 Data Analysis

After data collection, normality tests confirmed that the dataset met the assumptions for parametric analysis. All quantitative analyses were conducted using SPSS (Version 27.0). To evaluate the effectiveness of ChatGPT in improving academic writing skills, a paired samples t-test was performed to compare pre-test and post-test scores within each group. This

assessed whether students' writing performance changed significantly after the intervention. An independent samples t-test was then used to compare post-test scores between the control and experimental groups to determine whether the ChatGPT-supported instruction produced significantly different outcomes compared to traditional instruction. For the qualitative component, NVivo (Version 15.0) was used to manage, code, and analyze the interview transcripts. Reflexive thematic analysis supported the identification of patterns and themes across students' experiences with ChatGPT.

Table 2.

Descriptive Statistics of Score Distribution across the Two Groups

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Pre-test	0.103	46	.200*	.972	46	.320
Post-test	0.094	46	.200*	.974	46	.401

Table 2 presents the results of the normality tests for the pre-test and post-test variables. The Kolmogorov-Smirnov and Shapiro-Wilk tests were employed to determine whether the data followed a normal distribution. According to standard interpretation, if the significance value (p-value) is greater than .05, the data can be considered normally distributed. Based on the results shown in the table, the Kolmogorov-Smirnov test returned to a significant value of .200, which is greater than .05, indicating that the data were normally distributed.

For the qualitative component, the interview data were transcribed and analyzed using reflexive thematic analysis in NVivo 15.0, a widely used tool for qualitative data analysis. Themes were systematically defined, labeled, and organized within the software for all 20 participants. According to Braun

and Clarke (2020), reflexive thematic analysis is both accessible and theoretically flexible, making it well-suited for qualitative research. The analysis followed the six key phases of reflexive thematic analysis: Familiarization with the data, Generating initial codes, Identifying initial themes, Reviewing potential themes, Naming and defining themes, and Producing the report.

The researchers began by transcribing and thoroughly reading the interview transcripts to familiarize themselves with the data. Initial codes were generated and are shown in Table 2. These codes were then reviewed to identify emerging patterns and relationships. Similar codes were grouped together to form initial themes, which were subsequently refined to align with the study's objectives. The final themes were directly mapped to each of the research questions.

Table 3.

The Generated Primary and Secondary Themes of the Interview

Name	References
Barriers and Limitations	30
Challenges with AI tools	30
Interaction with Feedback and Learning Tools	154
Feedback and Writing Support	58
Learning and Improvement	48
Traditional vs AI Feedback	48
Perceptions and Attitudes Toward AI in Academic Writing	96
Attitude Toward AI Tools	43
Confidence and Independence	24
Future Use and Recommendations	29

4. Findings and Discussion

This section presents the primary findings of the study, addressing each research question in detail. The findings determine the current level of the participants before integrating AI-driven tools such as ChatGPT into academic writing instruction for experimental group students.

4.1 Pre-test Writing Score

This section displays the results of the pre-test using independent samples t-tests for both control and experimental groups.

Table 3.
Independent Samples t-test for Pre-test Scores

Group Statistics

Group	N	Mean	SD	t-value	p-value	Cohen's d
Control	24	68.04	11.08	-1.39	.178	.45
Experimental	22	72.55	8.00			

Table 3 presents the results of pre-tests conducted for both control and experimental groups. These tests were conducted to assess the academic writing proficiency of Kurdish EFL undergraduate students at the beginning of the course and to determine whether both groups started at a similar level.

An independent samples t-test was performed to compare the pre-test scores of the control group (N = 24, M = 68.04, SD = 11.08) and the experimental group (N = 22, M = 72.55, SD = 8.00). The results showed no statistically significant difference between the two groups' mean scores (t = -1.390, p = .178 > .05), indicating comparable levels of academic writing skills at the outset.

To better understand the magnitude of the pre-test difference, Cohen's d was calculated and resulted in a small effect size (d = .45). This indicates

that, although the experimental group's mean score was slightly higher, the difference was both statistically non-significant and educationally small, confirming that the two groups began the study with comparable levels of academic writing proficiency. This finding is consistent with Creely (2024), who noted that initial proficiency differences between experimental and control groups are common when students are randomly assigned. The slight variation observed could be attributed to individual factors such as previous exposure to AI tools, motivation, or self-directed writing practices, which are often seen in initial assessments (Fathi & Rahimi, 2024). Therefore, this pre-test comparison supports the internal validity of the study, indicating that both groups were similarly positioned at the beginning of the intervention.

4.2 Post-Test Writing Scores

This section presents the findings of the post-test writing scores, analyzed using an independent samples t-test, to identify any significant similarities or differences in academic writing performance between the control and experimental groups. The control group did not receive any intervention involving the integration of ChatGPT for improving writing skills.

Table 4.

Independent Samples t-test for Post-test Scores

Group	N	Mean	SD	t-value	p-value	Cohen's d
Control	24	72.08	14.20	-4.846	.001	.88
Experimental	22	82.82	10.25			

Table 4 presents the post-test writing scores of both the control and experimental groups, analysed using an independent samples t-test. While both groups participated in the regular academic writing course for over 15 weeks, only the experimental group received targeted instruction incorporating AI-based tools, specifically ChatGPT. The post-test aimed to

determine whether the integration of ChatGPT led to measurable improvements in the academic writing skills of the experimental group compared to the control group, which followed a traditional teaching approach without AI assistance.

The post-test results revealed a statistically significant difference between the two groups: the control group (N = 24, M = 72.08, SD = 14.20) and the experimental group (N = 22, M = 82.82, SD = 10.25), with a t-value of -4.846 and a p-value of .001 ($p < .005$). The higher mean score in the experimental group suggests that students who received AI-supported instruction demonstrated significantly greater development in academic writing skills than those who received only traditional instruction. To assess the magnitude of this difference, Cohen's d was calculated and indicated a large effect size ($d = 0.88$), demonstrating that the improvement in the experimental group was not only statistically significant but also substantively meaningful. This large effect shows that ChatGPT had a strong positive impact on students' academic writing development.

Additionally, a notable increase in mean scores from pre-test to post-test further supports the effectiveness of ChatGPT. The large t-value and highly significant p-value indicate that the observed improvement is statistically significant and unlikely to be due to chance. These findings provide strong evidence for the positive impact of ChatGPT on students' academic writing development.

Moreover, the data indicate that ChatGPT offered personalized assistance in key areas such as vocabulary, grammar, and sentence structure—domains where traditional feedback is often limited. This AI-driven scaffolding helped students produce higher-quality written work and contributed to their overall academic progress. These results align with previous studies. For instance, Alkamel and Alwagieh (2024) found that ChatGPT significantly enhanced

the writing performance of EFL undergraduate students in Yemeni universities. Similarly, ElSayary (2024) reported that generative AI tools positively influenced students' metacognitive skills. In the present study, students in the experimental group appeared to develop greater metacognitive awareness, demonstrated through their ability to identify common errors, paraphrase complex ideas, organize their writing, and revise based on feedback. Although such cognitive developments are challenging to quantify directly, they are reflected in the substantial improvement in post-test outcomes. Finally, the implementation of a blended learning model likely contributed to these results. ChatGPT supported various stages of the writing process—including brainstorming, drafting, revising, and editing—which appears to have played a critical role in enhancing students' academic writing proficiency.

4.3 Comparing Groups

This section presents the results of the paired sample test for comparing the gain scores of both groups: control and experimental. It aims to identify the level of improvement in the academic writing performance (if any) within the groups.

Table 5.
Paired Sample Test-Within-Group Comparison

Group Statistics						
Group	Test Type	Mean	SD	t-value	p-value	Sig.
Control	Pre-test	68.04	11.08	-1.390	.178	>.005
	Post-test	72.08	14.20			
Experimental	Pre-test	72.55	8.00	-4.846	.001	<.005
	Post-test	82.82	10.25			

Table 5 presents a within-group comparison of the pre-test and post-test writing scores for both the control and experimental groups. There is a slight improvement in the scores in the control group (M = 68.04, SD = 11.08) compared to the post-test (M = 72.08, SD = 14.20). Therefore, the paired samples t-test presented that the development in the score is not significant t(-1.390, p = 178 > .005. On the other hand, the scores of the experimental group showed a significant increase in the mean score in the pre-test (M = 72.55, SD = 8.00) and (M = 82.82, SD = 10.25) in the post-test indicate statistical improvements. These findings showed that the improvement is significant t(-4.846, p = .001 < .005).

These results indicate that while both groups showed some improvement in their academic writing skills, the progress was significantly more pronounced in the experimental group. This suggests that the integration of ChatGPT effectively supported students in enhancing their academic writing performance. As such, the findings reinforce the potential of AI-driven technology as a valuable tool in EFL writing classroom environments. The notable improvement observed in the experimental group aligns with the findings of Song and Song (2023), who reported that incorporating AI tools into writing instruction not only improved students' academic writing skills but also increased their motivation compared to traditional classroom settings.

4.4 Undergraduate students' Perceptions towards AI employment in Academic writing

Following the integration of ChatGPT into the writing classes of the experimental group, follow-up interviews were conducted. This section presents the findings from semi-structured interviews with 20 Kurdish EFL undergraduate students. Their experiences and perspectives were analyzed

using reflexive thematic analysis in NVivo 15.0. Three main themes, along with several subthemes, emerged from the data, reflecting the students' challenges, interactions, and attitudes toward the use of generative AI technology—particularly ChatGPT—and its influence on the development of their academic writing skills.

4.4.1 Challenges

While students acknowledged the significant positive impact of AI on their academic performance, they also highlighted some drawbacks of AI technology on their educational experiences.

One of the recurrent topics mentioned by the students was the overreliance of undergraduate students on ChatGPT in preparing their tasks:

> *"In my opinion, it has more bad effects than the good ones, I agree that it helps us so much for improving our skills, but also it made us to be lazy and ask ChatGPT for our even easiest tasks, so I think we focus on it more than necessary."* (Student 5)

> *"In my opinion no it has more bad effects than good, I agree that it helps us so much for improving our skills but also it made us to be lazy."* (Student 6)

From this perspective, it can be inferred that a great deal of dependency among the students can be achieved by utilising ChatGPT during the academic writing course. Furthermore, some students further showed discomfort in their judgements regarding using ChatGPT since it makes difficulties for their decisions:

> *"Sometimes ChatGPT provided many ideas that overwhelmed me and could not decide which one was better to include in my essay." (Student 8)*

> *"I had faced this feeling, so I had to prioritize and choose which idea and suggestions were better for my requirements."* (*Student* 8)
>
> *"One of them was difficulty in choosing which of the suggestions was the best for me since some did not suit the writer's notes"* (*Student* 13)
>
> *I faced some challenges while using Chat GPT especially in understanding some of the advanced feedback it provided. It required a bit of extra effort to fully grasp and implement all the suggestions.* (*Student* 15)

These challenges seemed to have shaped a precautionary approach among the undergraduate students, who realized the imperative to double-check the content generated by AI, causing more time consuming verifying the material than saving time.

> *"When I started writing, I thought ChatGPT will make everything simple; however, I have to double-check everything."* (*Student* 10).

4.4.2 Interaction with Feedback and Learning Tools

The emerging theme of *Interaction with Feedback and Learning Tools* was the most frequently referenced among participants. A large number of students discussed how they engaged with AI tools throughout the writing process. Their responses clustered around three main subthemes: feedback and writing support, learning and improvement, and traditional versus AI feedback.

Many students described how ChatGPT assisted with surface-level editing, such as correcting grammar, vocabulary, and sentence structure. Several participants also reflected on how the tool contributed to their learning and improvement in writing. In addition, a comparable number of students compared the feedback received from AI with that provided by their instructors, offering insights into the perceived strengths and limitations of each approach.

> *"Yes, ChatGPT did help me to write a better essay by helping me use better vocabulary and help with brainstorming ideas." (Student 2)*
>
> *"ChatGPT improved my writing in areas such as coherence and sentence structure." (Student 3)*
>
> *"I agree that using ChatGPT helped my academic writing skills. It helped me to pay more attention to such things as repeating, and as for structuring arguments, it was also beneficial in the case of forming vocabularies." (Student 13)*

On the contrary, some students had counterarguments showing that ChatGPT did not have a positive impact on writing development.

> *"ChatGPT did not significantly change how I approached writing essays. I used it to gather ideas but avoided relying on it for detailed guidance or corrections." (Student 1)*
>
> *"As I said before, we focused on completing assignments rather than improving our English in general. If we had more time, we could learn more from it."* (*Student* 7)

As far as learning and improvement are concerned, students find ChatGPT to be an initial AI tool for writing enhancements.

> *"I think ChatGPT improved my skill in correcting my grammar mistakes." (Student 4)*

Regarding the third sub-theme, *Traditional versus AI Feedback*, students' responses highlighted distinct perceptions about incorporating ChatGPT to support their academic writing skills throughout the semester. According to the interviews, students noted that AI feedback is faster, while human feedback tends to be more personalized and thoughtful.

> *"I think feedback from ChatGPT was more useful because I could fix my mistakes before handing in any work."* (*Student* 2)
>
> *"I think the feedback provided by AI tools are more helpful, you can take your time and ask about every single detail, and it can help you in any way you want."* (*Student* 3)

Apart from the students' positive attitudes, some of them had completely counterarguments regarding the comparison between AI feedback and traditional feedback provided by the lecturers.

> *"Of course, the feedback from my teacher is more helpful because he/she can see your mistakes more clearly and know how to give feedback better. For me feedback from my teacher is more effective because I will take it more seriously and try to fix it."* (*Student* 14)
>
> *"It is true that the feedback from Chat-GPT has been useful, but of course the teacher focuses more on your writing and sees more mistakes It is better and more effective for improving writing."* (*Student* 18)
>
> *"ChatGPT's feedback was helpful for quick fixes, but my teacher's feedback was more detailed and focused on deeper skills."* (*Student* 19)

4.4.3 Perceptions and Attitudes toward ChatGPT

This section summarizes students' ethical, future-oriented, and emotional perspectives on incorporating AI into academic life. A considerable number of participants shared views that were grouped into three subthemes: *Attitudes toward AI tools*, *Confidence and Independence*, and *Future use and Recommendations*. Many students expressed positive or cautious attitudes

toward using AI tools. Some reflected on how these tools affected their confidence and writing independence, while others discussed whether they would continue using AI and recommend it to peers in the future.

The first sub-theme explores undergraduate students' attitudes toward AI tools. Overall, the students expressed positive views of ChatGPT, recognizing its value in improving their academic writing when used responsibly and thoughtfully.

> *"Chat-GPT has improved my academic writing skills in several areas. It has helped me with grammar, vocabulary, and organization. When I didn't know how to organize an essay or correct my grammar, Chat-GPT helped me make improvements. It also helped me find better synonyms and improved my writing style."* (*Student* 18)

In contrast, other students expressed concerns about ethical issues and questions of authorship.

> *"Yes, I did. Sometimes it gives you so many answer that make you confuse and don't know which one is the best one to choose to add for your writing."* (*Student* 17)

With respect to confidence and independence, this subtheme captured the undergraduate students' reflections on their experiences using ChatGPT. Many students reported that their confidence in academic writing improved significantly with the support of ChatGPT.

> *"With the help of ChatGPT my confidence has increased a lot when I want to write about something, but I don't have an interesting it is going to give me, and it gives me an idea it always makes it easier for me."* (*Student* 10)
>
> *"It makes me more confident with various ideas and thoughts. We can get benefit from it."* (*Student* 11)

> *"The only thing that makes me confident while using ChatGPT is that I'm asking for suggestions, opinions, or telling me if I did something wrong and it guides me to correct it after correcting it and seeing there's now wrong, I feel confident that my essay doesn't have any problems."* (*Student* 12)

Conversely, some other students have more uncertainty in their writing after relying on AI tools.

> *"Before I became familiar with ChatGPT I had the confidence to do all of my things alone without it so it doesn't give me any confidence."* (*Student* 4)
>
> *"In my opinion no it has more bad effects than good, I agree that it helps us so much for improving our skills but also it made us to be lazy and ask ChatGPT for our even easiest tasks, so I think we fox on it more than necessary."* /sic/ (*Student* 5)
>
> *"In my opinion no it has more bad effects than good, I agree that it helps us so much for improving our skills but also it made us to be lazy."* (*Student* 6)

When students were asked to share their perspectives on the future use of ChatGPT and their recommendations for its role in academic writing, they emphasized the importance of AI tools in enhancing academic writing skills. At the same time, they acknowledged ethical concerns surrounding the use of ChatGPT and its potential implications for academic integrity and practices.

> *"I would recommend it to students who have had any problems in academic writing that's student use ChatGPT for resolve their issue also will be more skill."* (*Student* 10)
>
> *"I'm going to use ChatGPT for my assistance to give me ideas explain what I don't get and show me if I do something wrong related to grammar."* (*Student* 12)

> *"I suppose I will stay with ChatGPT for academic writing because it minimizes time and boosts the chance of improving several drafts."* (*Student* 13)
>
> *"I use ChatGPT not just for academic or writing process, I sometimes get advice from it, or ask for movie recommendations in my holidays, and other different criteria."* (*Student* 14)
>
> *"Chat GPT can be a real lifesaver for students who need help with academic writing."* (*Student* 15)
>
> *"I would recommend ChatGPT to other students. It helps with grammar, gives quick feedback, and makes writing easier. It's a good tool for improving writing skills."* (*Student* 19)

On the other hand, several students expressed concerns about using ChatGPT to improve their writing skills, suggesting that AI-driven tools should be used with limitations—particularly in contexts that require critical thinking and assessment.

> *"ChatGPT is good for academic writing but make students laze and don't learn more about their subjects if everything ready for you don't try to learn more sometimes." /sic/* (*Student* 9)

The study showed diverse understanding among Kurdish EFL undergraduate students regarding the ChatGPT incorporation into academic writing classes. Three major themes: challenges, interaction with AI feedback, and attitudes and perspectives have been determined through qualitative analysis using the interviews.

The participants brought up the primary issue regarding the employment of ChatGPT, which is the risk of overreliance, considered a drawback in their academic autonomy. Therefore, the great advantage of this AI-based technology, such as support in brainstorming and generating ideas, has been

acknowledged by the participants; some of the students raised their concern that the extreme dependency on AI could result in loss of motivation, fostering laziness, and a negative effect of academic performance. In this regard, AI-powered content might diminish the students' soft skills—critical thinking and problem solving—which are necessary for academic life.

Moreover, a group of participants highlighted the risk of cognitive overload while dealing with various types of AI technologies for writing and paraphrasing texts, which results in difficulty in decision-making processes and in adapting to their academic careers. These results emphasize the importance of receiving planned training sessions to enhance their understandings regarding ethical matters and maintain balance with the use of AI-tools—promoting students to perceive it as an inspirational source for writing rather than a replacement for independence in writing. This concern aligns with Al-Sofi (2024), who observed the overdependency of students on ChatGPT for writing assignments in their classes.

It is worth noting that another prominent issue related to AI-based tools is time management. Therefore, some students mentioned the positive sides of ChatGPT in writing and its benefits as a time-saving tool; other students stated that it takes time to verify the AI-generated material, and this is counted as a drawback for academic practice. Participants raised issues regarding ethical issues and frequent inaccuracies in the AI-generated content, in which they sometimes need to double-check the information or rewrite the tasks completely. Regardless of the drawbacks, several students focused on the benefits of employing AI tools for feedback and assessment of their writing assignments, especially in the fields of grammar checking, restructuring sentences, verifying pronunciation, revising content, and proofreading options. These results corroborate the findings of a great deal of

the previous work conducted by Elmadi (2023) that ChatGPT is used as a supplementary tool for obtaining feedback.

Students presented various perspectives when comparing traditional feedback provided by lecturers to AI-feedback which was generated by ChatGPT. Several students appreciated the instant and coherence of AI-feedback, whereas other students showed their preference for feedback by the lecturers due to being more individualized, contextual, and emotionally subtle. These findings are in line with the study that stresses the constraints of AI-generated feedback regarding the contextual understanding of the students (Chauncey & McKenna, 2023). For this reason, ChatGPT should be considered as a supplementary device within a blended learning context, not a replacement for human feedback.

Regarding the third theme, positive attitudes toward the use of AI, several students reported more independence in writing when integrating ChatGPT into their writing assignments. Improvements in brainstorming and outlining have been observed by some students due to the incorporation of ChatGPT. On the other hand, some students brought up their concerns regarding the overreliance and ethical matters of ChatGPT in terms of academic integrity and authorship. Students will not be the original owners of these texts generated by AI-technology tools. For this reason, these issues contemplate broader discussions for educational institutions to set guidelines and protocols for using ChatGPT to maintain academic integrity and promote the inventive thinking of users. Several students showed their willingness to employ ChatGPT for personal and academic practices.

Overall, the students' perceptions presented the revolutionary possibilities and complicated drawbacks of employing AI-based technology, such as ChatGPT, for academic writing practices. In line with these findings, teachers

and educators should introduce these tools to ensure students implement them in classroom environments and are well-prepared to include AI technologies responsibly and ethically in their academic journey.

5. Conclusion

In conclusion, this study sought to establish to what extent the Kurdish EFL undergraduate students responded to academic writing sessions integrated with AI-driven technology—ChatGPT. The findings from the quantitative data provide powerful evidence that the employment of ChatGPT can significantly enhance the students' academic writing skills such as brainstorming, drafting, proofreading, coherence, and cohesiveness. The participants from the control group, on the other hand, showed less development after receiving a traditional teaching method, without AI assistance.

Qualitative data offered a deeper understanding of students' perceptions regarding ChatGPT's role in academic writing. Many students reported improvements in grammatical accuracy, increased confidence, and enhanced brainstorming skills. However, some expressed concerns about overdependency on AI tools, which could lead to cognitive overload, decision-making difficulties, and ethical issues related to using ChatGPT for academic tasks.

These varied perspectives underscore that ChatGPT is more than just a technological aid; its impact also depends on how students are guided to integrate AI tools responsibly into their writing process. Most students agreed that ChatGPT is particularly helpful for brainstorming, drafting, and making

surface-level revisions, but they valued human feedback more when it came to critical thinking and deeper rhetorical skills.

Ultimately, this study concludes that ChatGPT is a powerful AI technology with the potential to benefit educational institutions, provided its integration is carefully scaffolded within academic practices and aligned with ethical guidelines. To ensure the effective and responsible use of AI tools, educators and institutions should offer training sessions that encourage ethical use and promote a balanced approach to incorporating ChatGPT, rather than relying on it exclusively.

A key limitation of the study is its relatively small sample size (N = 46), which restricts the generalizability of the results. Although the findings offer meaningful insights into the use of ChatGPT in Kurdish EFL academic writing classes, the outcomes may not be fully representative of the wider Kurdish EFL learner population or transferable to different institutional or cultural contexts. Future studies involving larger and more diverse samples would help strengthen external validity and confirm the robustness of these findings. Future research should build on these findings by conducting longitudinal studies and higher sampling sizes across various disciplines to explore the long-term effects of AI tools on academic writing.

These findings suggest several practical implications for teachers and policymakers seeking to integrate AI tools into academic writing classes responsibly. Teachers should incorporate AI literacy instruction into the curriculum, helping students understand when and how to use tools like ChatGPT, as well as their limitations. Explicit guidelines on ethical use, such as avoiding overreliance, verifying AI-generated content, and maintaining academic integrity, should be taught alongside writing skills. Policymakers

can support this process by providing training programs and professional development that equip instructors with the pedagogical and technical knowledge needed to use AI effectively. Institutions should also consider implementing clear policies that outline permissible AI usage, ensuring consistency across courses. Additionally, incorporating AI tools as supplementary aids—for brainstorming, organizing ideas, and revising drafts—rather than as replacements for critical thinking can help students develop balanced writing habits. Finally, integrating structured monitoring mechanisms, such as reflective logs or AI-use checklists, can help educators track how students interact with AI and encourage more mindful engagement.

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Appendix A:

Questioned used in the interview with the participants:

1.How familiar were you with using AI tools like ChatGPT before this study?

2.What were your first impressions of using ChatGPT to assist with academic writing tasks? Did it feel helpful, confusing, or something else?

3.What specific types of feedback did you receive from ChatGPT? (e.g., grammar, vocabulary, sentence structure, or clarity)

4.How did you use this feedback to revise your essays?

5.Did ChatGPT change how you approached writing essays? For example, did it help you organize ideas, improve grammar, or focus more on certain sections of the essay?

6.What challenges, if any, did you face while using ChatGPT?

7.Did you ever feel overwhelmed by the suggestions? If yes, how did you deal with it?

8.Do you feel that using ChatGPT improves your academic writing skills? If yes, in what areas (e.g., grammar, coherence, vocabulary)?

9.Can you give an example of a specific essay where you noticed an improvement?

7.Did using ChatGPT make you more confident in your writing skills? Why or why not?

8.Did you learn anything new about writing or grammar while using ChatGPT? For instance, did it make you aware of errors you didn't notice before?

10.How would you compare using ChatGPT to traditional writing instruction (without AI)? Which method felt more effective or engaging for you?

11.Do you think ChatGPT's feedback was more helpful or less helpful than feedback provided by your teacher? Why?

12.What was the most helpful part of using ChatGPT in your writing process?

13.What would you change or improve about the experience of using ChatGPT?

14.Do you think you will continue using ChatGPT for your academic writing in the future? Why or why not?

15.Would you recommend ChatGPT to other students who struggle with academic writing?

14.Is there anything else you'd like to share about your experience with ChatGPT that we haven't discussed?