ISSN 1799-2591 (print); ISSN 2053-0692 (online)
Theory and Practice in Language Studies, Vol. 16, No. 2, pp. 670-679, February 2026
DOI: https://doi.org/10.17507/tpls.1602.32

Measuring the Impact of ChatGPT Feedback on Saudi Undergraduate EFL Learners' Writing Skills

Faris Allehyani
Department of Languages and Translation, University College of Umluj, University of Tabuk, Saudi Arabia

Nasser Alqahtani
Applied College, Shaqra University, Shaqra, Saudi Arabia

Mohammad Jamshed*
English Department, College of Science & Humanities, Prince Sattam Bin Abdulaziz University, Saudi Arabia

Wahaj Unnisa Warda
English Department, College of Science & Humanities, Prince Sattam Bin Abdulaziz University, Saudi Arabia

***Abstract*—As the conventional methods of instruction no longer seem to effectively conform to the taste of today's tech-savvy young generation, AI-powered tools are increasingly being incorporated in ESL/EFL classrooms for their efficiency, precise correction, and specific feedback. Despite multiple studies, the empowering role of ChatGPT in enhancing English writing skills, particularly in Saudi Arabia, remains largely unexplored. Therefore, this study employed a quasi-experimental design to compare and contrast the efficacy of ChatGPT with that of conventional feedback. While the students in the experimental group received feedback on their writing errors from ChatGPT for seven weeks, students in the control group received feedback from their teachers. To collect data, pre-and post-tests were carried out, which required respondents to draft tales based on pictures. It was revealed that the experimental group, which used an intervention, demonstrated fewer errors for all inflected morphemes than the control group, which used conventional instruction. These findings suggest that the use of AI tools like ChatGPT for language education courses serves as an effective supplement to traditional instructional methods, providing immediate feedback and personalized corrections that enhance instructional effectiveness.**

***Index Terms*—ChatGPT feedback, effective supplement, instructional effectiveness, precise correction, tech-savvy young generation**

I. Introduction

Language teaching and instructional practices in EFL classrooms are becoming increasingly reliant on feedback, as it helps language learners improve their writing skills (Steiss et al., 2024; Teng, 2024). However, offering different levels of learners valuable and meaningful customized feedback can be challenging, leading to a significant workload for EFL instructors (McMartin-Miller, 2014; Graham, 2019). Constructive feedback directs students toward constructive change or enhancement of specific writing skills by explicitly conveying the characteristics of quality performance and the means to achieve them. EFL learners' self-efficacy beliefs influence how they offer and receive writing feedback, and teachers often become exhausted by the laborious task of revising student documents (Panadero et al., 2023; Teng & Teng, 2024). The potential of machine-generated feedback in writing, therefore, is being studied by researchers with increasing frequency. As conventional methods of instruction no longer align with the modern tastes of the Z generation, technology, particularly AI-powered tools for language instruction, has been increasingly incorporated by educational institutions over the last few years.

Technology-based instruments have become essential for language learners, with various AI-powered tools correlating with specific instructional methods to enhance learning and teaching. Similar to other AI chatbots, ChatGPT is increasingly being used for generating ideas and facilitating the brainstorming process. ChatGPT utilizes conversational AI to offer written feedback, promoting constructive learning and personalized data engagement (Almashy et al., 2024; Jamshed et al., 2024). Nowadays, ChatGPT is being utilized, making writing easier and more effective for EFL/ESL learners (Lingard, 2023; Stokel-Walker, 2022). ChatGPT can offer numerous advantages in this realm, including assistance with language, translation, revision, and proofreading. For instance, ChatGPT can assist language learners and instructors in enhancing their writing skills and linguistic competency by providing them with

* Corresponding Author.

immediate feedback on multiple aspects of Grammar, syntax, and vocabulary. Wang and Guo (2023) described ChatGPT as an important tool that can be utilized to assist language learners in learning Grammar and vocabulary. As the larger section of Saudi Arabia comprises tech-savvy youths who respond actively to technology-powered learning and instruction, Saudi Arabian universities are equipped with state-of-the-art digital infrastructure.

A. Research Problem Statement

Saudi undergraduate English learners face challenges in Grammar, vocabulary, structure, and consistency in writing. Traditional instruction limitations hinder personalized support. Although AI technologies like ChatGPT provide instant feedback, there is insufficient evidence of their effectiveness in improving writing skills, prompting inquiry into their potential role in enhancing conventional teaching methods in academic writing.

B. Research Purpose Statement

This study investigates the impact of ChatGPT feedback on the writing skills of Saudi EFL students, addressing the gap in research regarding the efficacy of AI-powered tools in EFL classrooms.

II. Literature Review

A. Theoretical Framework

ChatGPT's corrective feedback framework incorporates multiple sociocultural learning and interactionist approaches. ChatGPT integrates these concepts while offering immediate, context-sensitive, and customized feedback to enhance knowledge. Vygotsky's (1978) sociocultural theory of learning, developed in the early 20th century, emphasizes social interactions, cultural tools, and the sociocultural framework. As this paradigm emphasizes collaborative learning over individualism, ChatGPT mediates this learning process by offering enabled feedback to help users develop within their ZPD. Similarly, interactionist approaches, such as Krashen's (1985) input hypothesis and Long's (1980) interaction hypothesis, emphasize that learning is dynamic and interactive, involving meaning negotiation, feedback, and active engagement. They integrate well with contemporary instructional technologies, such as ChatGPT, which simulates meaningful interactions and provides targeted feedback to enhance learning. A practical assessment of current and future performance levels could enhance language learners' writing skills. Therefore, learner-appropriate material or treatment tools are utilized. Mediating tools assist and impact tasks, including thought regulation, in line with sociocultural theory (Storch, 2018). Digital text correction feedback enhances cognitive processes and writing skills.

B. Automated Feedback in Foreign Language Learning

Escalante et al. (2023) examined how AI-powered tools could be utilised to support students' writing skills. The research used two longitudinal studies (study 1 and study 2). The first six-week repeated measurements quasi-experimental research assessed ChatGPT (GPT-4) in a human tutor's writing feedback for 48 university ENL learners. 43 ENLs received ChatGPT and tutor feedback in Study 2. While Study 1 revealed no group differences in learning, Study 2 revealed a near-even divide between AI-generated and human-generated feedback, with advantages for both. The study suggests that AI-generated feedback can be used to assess ENL essays without affecting learning outcomes. Fleckenstein et al. (2023) conducted a meta-analysis of AWE feedback tools on students' writing skills.

Twenty research articles ($k = 84$; $N = 2,828$) met inclusion requirements after evaluating 4,462 papers. A moderator analysis examined the learner, the intervention, and the effects of the results. In a three-level model with random effects, it was found that automated feedback had a medium impact ($g = 0.55$) on the writing skills of students. The study implies that instructors and administrators could utilize AWE to develop students' writing skills. It suggests more study to establish the best application of automated feedback in diverse educational settings and groups. Bodaubekov et al. (2025) compared instructor and Write & Improve feedback on the writing skills of senior undergraduates in a two-foreign language program at a Kazakhstani private university. Four teachers delivered eight classes, comprising one control and one experimental group, in the quasi-experimental design. Over five weeks, pre-and post-tests examined task accomplishment, consistency and cohesiveness, vocabulary proficiency, grammatical accuracy, and cumulative scoring. Descriptive statistics, Mann-Whitney U tests, and MANCOVA were utilized for pre- and post-test comparisons. It was found that Write & Improve feedback was just as effective as conventional instructor feedback on several aspects of writing tests, both when used separately and in collaboration with other forms of feedback. It suggests that educational institutions could enhance writing skills by integrating conventional methods of instruction with technologically driven feedback systems, such as Write & Improve.

Taskıran and Goksel (2022) investigated whether automated and instructor feedback impact academic writing and EFL performance in an open and online educational context. This quasi-experimental quantitative investigation revealed considerable differences between the diagnostic exam and accomplishment tests. It was also found that receiving regular input from teachers enhanced academic writing results more than using automated feedback tools. Chan et al. (2024) investigated the impact of large language model (LLM) feedback on the essay writing skills, revision emotions, and essay revisions of Hong Kong university students. The study utilized a randomized controlled trial to compare the performance and interactions of 918 Hong Kong university language students who received generated feedback (GPT-3.5-turbo LLM) and those who did not. It was revealed that essay quality improved when AI-generated

feedback was used in revision, with qualitative comments from students suggesting that AI feedback increased engagement, motivation, and mixed emotions throughout the revision process. Further studies could explore the impact of AI personalization on emotional states. Ozfidan et al. (2024) examined the perspectives of Saudi EFL undergraduate learners on the use of artificial intelligence in academic writing. The study examined 189 English-proficient freshman academic writers. ChatGPT, Grammarly, and Google Translate are famous among students. A descriptive analysis revealed that students thought AI improved conceptualization, planning, Grammar, spelling, and time savings. It was found that academic writing with AI needed training and clear standards. Participants thought that AI-enhanced writing accuracy and creativity were beneficial, but improper utilization worried them. The study suggests that AI technology can benefit students when used effectively to address their needs.

C. ChatGPT Feedback in Foreign Language Learning

Polakova and Ivenz (2024) examined the efficiency of ChatGPT feedback in improving Gen Z learners' writing skills. The study examined students' ChatGPT engagements both qualitatively and quantitatively, using focus group interviews and pre- and post-tests. The findings revealed that ChatGPT feedback enhanced diverse writing aspects such as conciseness, Grammar, key content, and passive voice. The study offers multiple pedagogical implications. As the study has certain limitations, future research should include a wider age, academic, and cultural sample. Imran and Almusharraf (2023) assessed 30 of the most appropriate articles to determine if ChatGPT could be used for educational writing. Utilizing a PRIMA flowchart, the study examined 550 peer-reviewed publications from December 2022 to May 2023, six months after the launch of ChatGPT. The latest ChatGPT findings have revealed that AI in education is an ongoing process. The study demonstrated that writing instructors should assess and adjust their curriculum, training, and grading practices to maintain intellectual integrity and fairness. Steiss et al. (2024) examined ChatGPT for formative feedback, evaluating human and AI feedback on secondary student essays to assess quality.

Descriptive statistics and effect sizes were used to compare ChatGPT with human feedback for the full sample, compositions of different quality, and native English speakers and learners. It was found that human raters provided learners with better feedback, except for the criteria-based feedback. AI and humans give varied essay-quality feedback. Human and AI responses were unaffected by language. The study suggests that ChatGPT's simplicity and quality of feedback could facilitate the development of generative AI. Koltovskaia et al. (2024) evaluated how six Iranian STEM graduate students revised their academic research articles using ChatGPT. It utilized the concepts of the integrated cognitive, behavioral, and emotional participation paradigm. ChatGPT revised the content using student text and screencasts, incorporating behavioral involvement. Semi-structured interviews, follow-up questionnaires, and students' screencast comments on memory showed cognitive and emotional engagement. It was found that students both saw and understood the feedback, but sometimes questioned its accuracy, indicating high cognitive engagement. They liked ChatGPT for its ability to paraphrase and improve writing professionalism. The study findings hold pedagogical implications as they could help teachers integrate ChatGPT into L2 writing classes. Al Ghamdi (2024) evaluated the writing skills of Saudi University's first-year computer students following feedback from ChatGPT. In the qualitative study, 111 male learners were blindfolded to the changeover from human to ChatGPT feedback to maintain fairness. The findings revealed the students' varied experiences. In weeks four and five, some students found ChatGPT to be a valuable source of feedback for learning and personal growth, but others questioned its customization and consistency. The study suggests that ChatGPT could be advantageous in the classroom and demonstrates the importance of customizing feedback to each student's learning style, emotional response, and educational needs.

Wiboolyasarin et al. (2024) observed that the L2 writing editing and revision skills of Thai college exchange students were enhanced after a three-step cooperative writing treatment that utilized AI feedback. The quasi-experimental research involved 39 younger exchange learners, divided into an experimental group of 18 and a control group of 21. Wiki-based collaborative authoring and ChatGPT were utilized for written corrections. The findings illustrated the beneficial impact of AI-enhanced interventions using collaborative writing techniques on specific writing skills. The study holds immense pedagogical implications, as it offers essential insights into enhancing L2 writing competence through systematic group assignments and tailored AI feedback, thereby impacting both research and pedagogy. Teng (2024) investigated the function of ChatGPT in EFL writing through an exhaustive evaluation of the 20 most pertinent studies. The PRISMA guidelines were used to determine both the inclusion and exclusion of references. It was found that integrating AI into the classroom is a continuous process that has an immense impact on EFL students' writing skills. Mahapatra (2024) examined how ChatGPT's formative feedback impacted the writing skills of undergraduate ESL students. Multiple focus groups and three assessments were utilized to collect data from post-secondary ESL students. It was revealed that students were overwhelmingly pleased with ChatGPT, as it enhanced their academic writing skills. Future studies could investigate how ChatGPT impacts different genres and writing details.

D. Research Question

How does ChatGPT feedback impact Saudi undergraduate learners’ writing skills?

III. Methodology

A. Respondents and Sample

The survey comprised 84 respondents from the first and second years. All of the participants are native Arabic speakers; nevertheless, they have been studying English for the last ten to twelve years. A quasi-experimental study involving 84 EFL learners aged 19-24 from the Colleges of Business Administration and College of Science & Humanities at Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia, who were pursuing different undergraduate programs, volunteered to participate in the study. Two classes were randomly chosen for study. N = 42 was assigned to the experimental group, while N = 42 was assigned to the control group. The experimental group received feedback from ChatGPT, while the control group used conventional methods. All study participants provided informed consent prior to participation. The institution also permitted students access to smartphones and WhatsApp. This ethical compliance guaranteed the study satisfied technology-integration requirements for instruction.

B. Experimental Group

The ChatGPT smartphone software instructed experimental English language learners over a period of seven weeks. Sessions lasted for an hour, five times a week. Learners received instruction on how ChatGPT could improve their writing proficiency. This approach helped students understand and use language. Students composed a 300-word tale utilizing an image. The second step was to enter this story into the ChatGPT app and ask it to highlight grammatical and structural mistakes, explain them, and provide examples to assist the user in fixing them. It read, "I created a story in English using a picture as an English learner." I need to examine my story, as I require assistance with learning to correct English grammar errors in composition and language. In the third step, students assessed ChatGPT's feedback to understand the issues with their first submissions. The following stage was to edit the handwritten story utilizing ChatGPT's suggestions and changes.

C. Control Group

The control group participants were instructed to write an English story about the given image on a provided piece of paper. They were instructed to write a story of at least 300 words. Next, the researchers examined their English writing sheets for errors. The researchers assessed grammar rules and identified faults. Following that, participants received feedback and were asked to revise their original essay, incorporating their instructor's suggestions. The seven-week approach consisted of five one-hour sessions per week.

D. Data Collection Method

This study collected data utilizing a preliminary and final evaluation involving an image interpretation task. Before the activity, participants received an image and half an hour to write a story inspired by it in a word processor. This initial stage evaluated participants' writing skills to set a baseline. To determine whether treatments enhanced writing skills in both the experimental and control groups, the final assessment replicated the preliminary assignment under the same conditions. To prevent respondents from recalling specific aspects of the original image, alternative pictures were used for the pre- and post-tests. This was done to attribute any writing enhancement to the teaching sessions rather than to the participants' familiarity with the pictures. The study's design allowed for a detailed assessment of individual improvement.

E. Error Analysis

The study analyzed data utilizing an enhanced Grammarly, an automated essay scoring (AES) system. Grammarly is recognized for accurately identifying errors in English texts generated by foreign-language learners, surpassing the accuracy of conventional human assessors (McAteer, 2013). The study utilized Grammarly to evaluate student writing errors meticulously. The identical challenges with writing plaguing both groups were analyzed in detail after classifying these errors. The classification revealed error frequency and patterns. This method of analysis facilitated an accurate assessment of the interventions' impact on English writing improvement.

F. Data analysis and Interpretation

A two-way analysis of variance (ANOVA) was used to investigate the differences between the pre-test and post-test results of each group. This approach provides a reliable assessment of ChatGPT feedback's effectiveness, allowing for an in-depth analysis of the growth in respondents' writing skills during the intervention. The impacts of grammatical errors on multiple groups, including those in present and past tenses, were thoroughly examined, along with group characteristics and testing at different intervals. This method assisted researchers in evaluating how different feedback styles impacted learners' outcomes and grammatical accuracy throughout the experiment.

IV. Results and Findings

The two ANOVA tests revealed an extensive analysis of study impacts and interactions. Significant results were found regarding the effect of eight inflectional morphemes ('-s' for plurals, '-s' for possession, '-ing' for progressive, '-s' for third person singular present, '-ed' for past tense, '-en' for past participles, '-er' for comparative adjectives, and '-est'

for superlatives) on error frequencies across two groups (experimental and control) and two testing times (pre and post). The analysis showed a significant effect of inflectional morpheme type, $F(1, 56) = 170.172$, $p < .001$, with a partial eta squared (η^2p) of .781, indicating a higher error rate for the morphemes '-ed' past tense, '-s' for plurals, and '-s' for third person singular present, compared to others like '-ing' progressive, '-s' for possession, '-en', '-er', and '-est' (Fig. 1). A significant main effect was found for group $F(1, 56) = 134.238$, $p < .001$, $\eta^2p = .878$, where the experimental group demonstrated fewer errors than the control group (Fig. 2). Moreover, the data revealed a significant main effect for the test occasions, $F(1, 56) = 81.700$, $p < .001$, $\eta^2p = .582$, suggesting reduced pre-test to post-test errors across participants (Fig. 3).

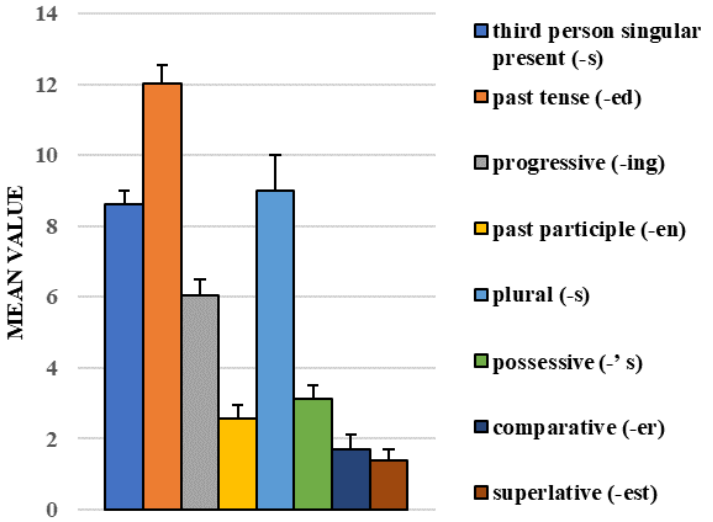

Figure 1. Errors Across Inflectional Morphemes

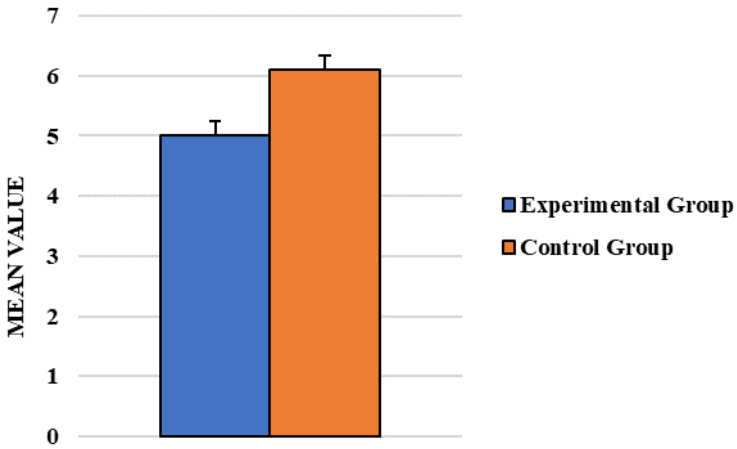

Figure 2. Variations of Mean Across Groups

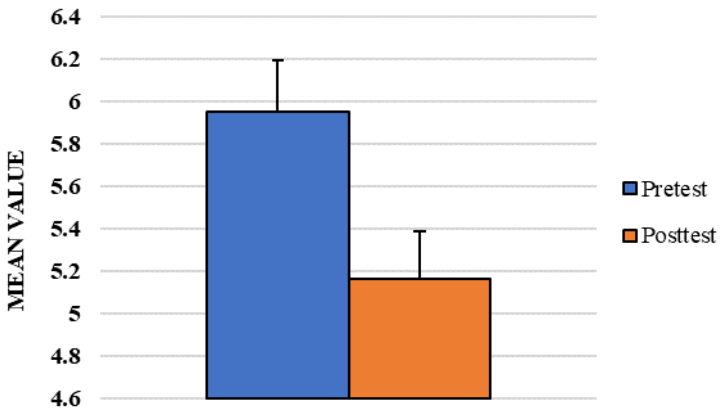

Figure 3. Variation of Means Across Tests

The study also found significant two-way interactions involving the eight inflectional morphemes (‘-s’ for plurals, ‘-s’ for possession, ‘-ing’ for progressive, ‘-s’ for third person singular present, ‘-ed’ for past tense, ‘-en’ for past participles, ‘-er’ for comparative adjectives, and ‘-est’ for superlatives). First, the interaction between the inflectional morphemes and the two groups (experimental and control) revealed a significant effect, $F (1, 56) = 7.530$, $p = .001$, $\eta^2p = .731$, indicating that the experimental group exhibited fewer errors across all morpheme types compared to the control group (Fig. 4). Additionally, there was a significant interaction between the inflectional morphemes and the two tests (pre and post), $F (1, 56) = 4.391$, $p = .002$, $\eta^2p = .551$, showing a reduction in error rates for each morpheme type after the intervention (Fig. 5). Moreover, a significant interaction between the two groups and the two tests, $F (1, 40) = 122.459$, $p = .001$, $\eta^2p = .638$, demonstrated that the experimental group, which used an intervention, had a more significant reduction in error rates across all inflectional morphemes contrasting with the control group, which employed conventional instruction approach (Fig. 6). These results underline the efficiency of educational approaches used in the experimental group in reducing linguistic errors.

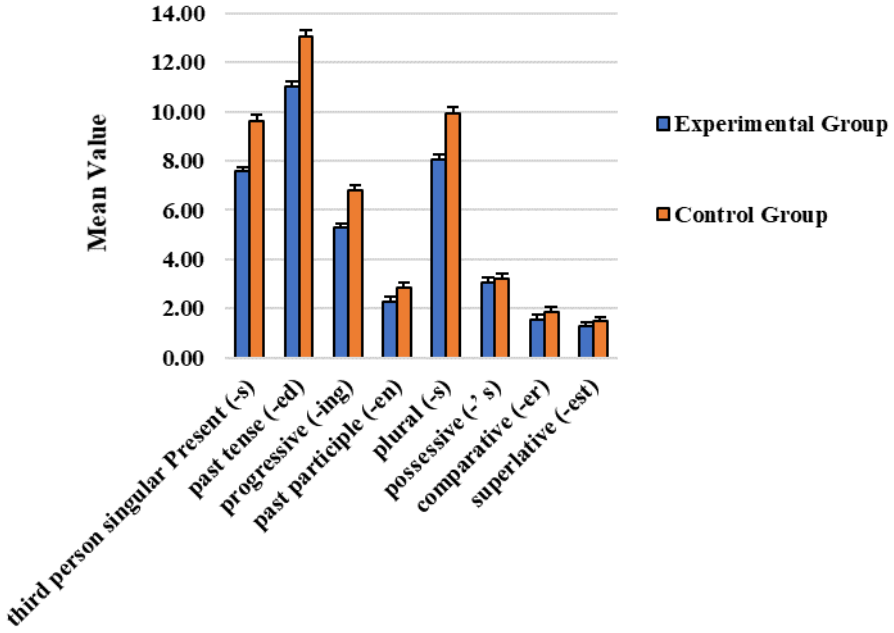

Figure 4. Variations of Means Across Groups Across Each Type of Inflectional Morpheme

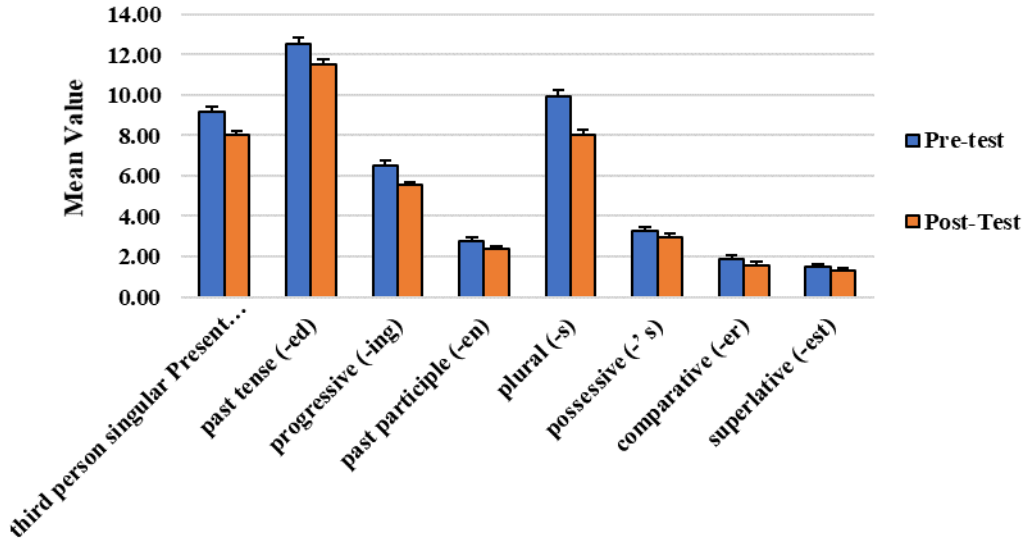

Figure 5. Variations Between Tests Across Each Type of Inflectional Morpheme

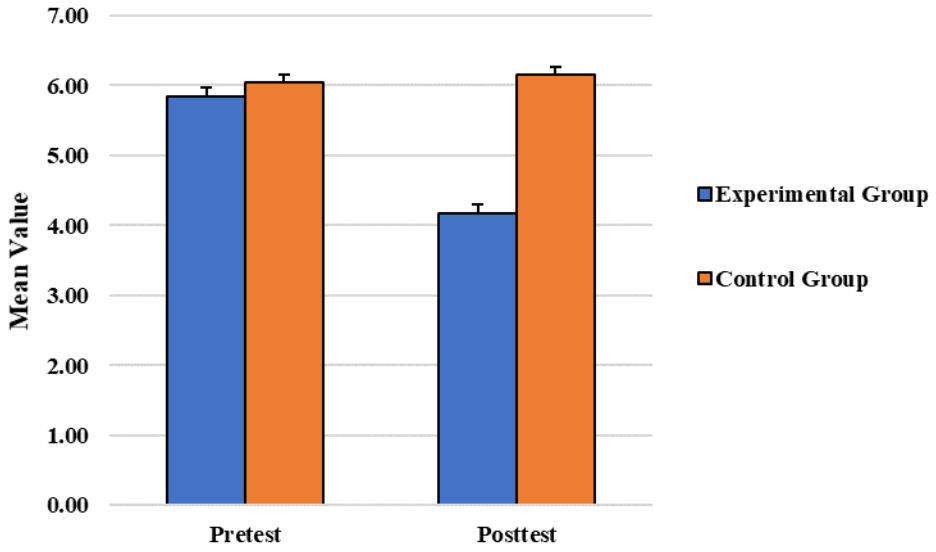

Figure 6. Variations of Means Between Tests Across Groups

The study further identified a significant three-way interaction between the eight types of inflectional morphemes, the two categories (control and experimental), and the two testing periods (pre and post), $F(1, 56) = 7.639$, $p = .001$, $\eta^2p = .519$. This interaction highlighted that both groups commonly made errors in writing across all types of inflectional morphemes, but notably, each error significantly decreased following the intervention. The experimental group demonstrated a more substantial reduction in error compared to the control group using the conventional method. These results suggest that the experimental group's teaching technique was more effective in reducing the number of linguistic errors found in written work, as illustrated in Table 1.

TABLE 1

S. No.	*Types of Inflectional Morpheme Errors*	*Experimental Group*				*Control Group*			
		Pre-test		Post-test		Pre-test		Post-test	
		M	SD	M	SD	M	SD	M	SD
1.	third person singular present (-s)	8.74	0.46	6.42	0.17	0.34	0.48	9.64	0.48
2	past tense (-ed)	12.22	0.60	9.78	0.28	0.56	0.54	13.22	0.58
3.	progressive (-ing)	6.26	0.42	4.32	0.18	0.36	0.46	6.78	0.46
4.	past participle (-en)	2.68	0.42	1.90	0.15	0.30	0.44	2.84	0.44
5.	plural (-s)	10.22	0.58	5.90	0.28	0.56	0.56	10.22	0.54
6.	possessive (-’ s)	3.36	0.38	2.74	0.22	0.44	0.38	3.22	0.38
7.	comparative (-er)	1.84	0.46	1.26	0.21	0.42	0.46	1.84	0.46
8.	superlative (-est)	1.48	0.32	1.10	0.15	0.30	0.32	1.48	0.32

The study's results indicated that both the experimental and control groups experienced reductions in error rates across eight types of inflectional morphemes from the pre-test to the post-test, suggesting overall improvements in the application of these morphemes. The experimental group consistently showed a more significant decrease in error rates than the control group, particularly for morphemes such as the third-person singular present, past tense, and progressive. This trend was also observed in morphemes associated with the past participle, plural, and possessive, where the experimental group demonstrated more significant improvements. Additionally, while the errors for comparative and superlative morphemes were relatively minor, the pattern of more substantial reduction in the experimental group persisted. These findings suggest that the interventions applied in the experimental group, involving more direct or explicit instructional strategies, were more effective in enhancing morphological accuracy than the potentially traditional methods used in the control group.

V. Discussion and Analysis

The survey found that Saudi undergraduate students made the most significant mistakes with possessives, degrees of comparison, past tense, progressive tense, past participle, plural forms, and third-person singular forms. This finding aligns with multiple studies (Rahimi & Fathi, 2022; Ali, 2024; Alam & Usama, 2023). However, the findings of a study carried out by Mohammadi and Mustafa (2020) are inconsistent with those of our study, as they found that the most frequent mistakes committed by ESL/EFL learners were related to articles, prepositions, punctuation, spelling, and word selection. Similarly, Chaudhary and Al Zahrani (2020) found that the most common mistakes by EFL learners in written composition were related to addition, omission, and incorrect ordering of words. While spelling errors were predominant, demonstrative errors were very uncommon. The study findings also revealed that using ChatGPT

feedback significantly enhanced the writing skills of EFL learners. It was found that the interventions resulted in a reduction of multiple grammar errors, with the experimental group experiencing fewer errors compared to the control group, which received feedback through conventional modes. This finding is consistent with multiple studies (Mahapatra, 2024; Mun, 2024; Marzuki et al., 2023). Werdiningsih et al. (2024) also found that AI-powered tools offered great support for enhancing the essay writing quality of students. However, the study suggested that greater harmonization between AI tools and human judgment was essential for enhanced quality and authenticity. The study also found that ChatGPT feedback enhanced Saudi EFL learners' writing skills by improving various aspects, including the use of the third person singular, past tense, progressive tense, past participle, plural forms, possessives, and comparative degrees. The most common mistakes committed by EFL learners belonged to the morphemes '-ed' past tense, '-s' for plurals, and '-s' for third person singular present, compared to others like '-ing' progressive, '-s' for possession, '-en', '-er', and '-est'. Post-intervention analysis showed that the experimental group significantly decreased error rates more than the control group, particularly for morphemes such as the third-person singular present, past tense, and progressive. It was also found that past participle, possessive, and plural morphemes exhibited significant improvements for the experimental group over the control group. Even with minor errors in comparative and superlative morphemes, the experimental group exhibited greater reductions. This finding aligns with Bhutoria's (2022) findings, which demonstrated that AI-powered feedback systems can identify and correct errors more effectively than conventional instructional methods.

The findings of this study are corroborated by Cavalcanti et al. (2021), who conducted a systematic review that showed 65.07% of studies revealed automated feedback enhanced student performance in various assignments, with 82.53% offering no evidence that human feedback is more effective and efficient than automated feedback. Polakova and Ivenz (2024) also illustrated ChatGPT's potential as an innovative instructional tool for developing writing competency among Gen Z students. The study also emphasized the need to integrate AI-driven technology into language learning to meet the demands of modern learners. Nguyen et al. (2024) found that doctoral students who utilized GAI-powered supporting tools for iterative, highly collaborative processes performed better in writing than those who used GAI as an additional information source. Multiple other studies (Nugroho et al., 2024; Wang et al., 2024; Wu, 2024; Zebua & Katemba, 2024) have also emphasized the constructive role of AI-powered tools, such as ChatGPT, in enhancing the writing skills of ESL/EFL learners. However, Steiss et al. (2024) argued that qualified assessors offered more precise feedback compared to ChatGPT. Similarly, Teng (2024) found that ChatGPT offered both advantages and challenges for academic writing. While the study highlighted the advantageous aspects of AI tools, it cautioned against overreliance on them for language instruction.

VI. Conclusion

The study was conducted to investigate the potential impact of ChatGPT and conventional feedback on the writing skills of Saudi undergraduate learners. It was revealed that both the experimental and control groups showed significant improvements in their writing skills. However, the experimental group, which received feedback via ChatGPT, surpassed the control group, which received the conventional feedback. The experimental group's enhancements in writing demonstrate the beneficial effects of technologically sophisticated, adaptable, and interactive learning environments. The study also demonstrates how instructional resources leveraging artificial intelligence (AI) could improve language acquisition. The study incorporates sociocultural theory, the interactions hypothesis, and Krashen's input hypothesis. This highlights the importance of technology-enabled, quick feedback and personalized input in enhancing learner engagement and skill development. Despite its advantages, this study contains limitations. The 7-week intervention limited the lasting impact of ChatGPT feedback on writing skills. These results could be expanded by other research. Research on language training could be enhanced by comparing the performance of AI systems other than ChatGPT.

Acknowledgments

The authors extend their appreciation to Prince Sattam Bin Abdulaziz University for funding this research work through project number (2025/02/34167).

References

[1] Alam, S., & Usama, M. (2023). Does E-Feedback Impact Minimizing ESL Writing Errors? An Experimental Study. *Int. J. Emerg. Technol. Learn*., *18*(4), 156-169. https://doi.org/10.3991/ijet.v18i04.36349

[2] AlGhamdi, R. (2024). Exploring the impact of ChatGPT-generated feedback on technical writing skills of computing students: A blinded study. *Education and Information Technologies*, 1-26. https://doi.org/10.1007/s10639-024-12594-2

[3] Ali, I. (2024). An analysis of English writing errors of Kurdish EFL postgraduate students. *Humanities Journal of University of Zakho*, *12*(1), 67–80. https://doi.org/10.26436/hjuoz.2024.12.1.1270

[4] Almashy, A., Ahmed, A. S. M. M., Jamshed, M., Ansari, M. S., Banu, S., & Warda, W. U. (2024). Analyzing the Impact of CALL Tools on English Learners' Writing Skills: A Comparative Study of Error Correction. *World Journal of English Language*, *14*(6). https://doi.org/10.5430/wjel.v14n6p657

[5] Bhutoria, A. (2022). Personalized education and artificial intelligence in the United States, China, and India: A systematic review using a humanin-the-loop model. Computers and Education: *Artificial Intelligence*, *3*, https://doi.org/10.1016/j.caeai.2022.100068
[6] Bodaubekov, A., Agaidarova, S., Zhussipbek, T., Gaipov, D., & Balta, N. (2025). Leveraging AI to enhance writing skills of senior TFL students in Kazakhstan: A case study using "Write & Improve". *Contemporary Educational Technology*, *17*(1), ep548. https://doi.org/10.30935/cedtech/15687
[7] Cavalcanti, A. P., Barbosa, A., Carvalho, R., Freitas, F., Tsai, Y. S., Gašević, D., & Mello, R. F. (2021). Automatic feedback in online learning environments: A systematic literature review. Computers and Education: *Artificial Intelligence*, *2*, 100027. https://doi.org/10.1016/j.caeai.2021.100027
[8] Chan, S. T. S., Lo, N. P. K., & Wong, A. M. H. (2024). Enhancing university level English proficiency with generative AI: Empirical insights into automated feedback and learning outcomes. *Contemporary Educational Technology*, *16*(4), ep541. https://doi.org/10.30935/cedtech/15607
[9] Chaudhary, A., & Al Zahrani, S. (2020). Error analysis in the written compositions of EFL students: A classroom study. *International Journal of English Linguistics*, *10*(2), 357-366. https://doi.org/10.5539/ijel.v10n2p357
[10] Escalante, J., Pack, A., & Barrett, A. (2023). AI-generated feedback on writing: insights into efficacy and ENL student preference. *International Journal of Educational Technology in Higher Education*, *20*(1), 57. https://doi.org/10.1186/s41239-023-00425-2
[11] Fleckenstein, J., Liebenow, L. W., & Meyer, J. (2023). Automated feedback and writing: A multi-level meta-analysis of effects on students' performance. *Frontiers in Artificial Intelligence*, *6*, 1162454. https://doi.org/10.3389/frai.2023.1162454
[12] Graham, S. (2019). Changing How Writing Is Taught. *Review of Research in Education*, *43*(1), 277-303. https://doi.org/10.3102/0091732X18821125
[13] Imran, M., & Almusharraf, N. (2023). Analyzing the role of ChatGPT as a writing assistant at higher education level: A systematic review of the literature. *Contemporary Educational Technology*, *15*(4), ep464. https://doi.org/10.30935/cedtech/13605
[14] Jamshed, M., Allehyani, B., Albedah, F., & Banu, S. (2024). Analyzing ChatGPT's Sustainability as a Language Learning Tool: Saudi EFL Learners' Perspectives, Problems and Pedagogical Prospects. *Theory and Practice in Language Studies*, *14*(12), 3836-3844. https://doi.org/10.5430/wjel.v14n6p657
[15] Koltovskaia, S., Rahmati, P., & Saeli, H. (2024). Graduate students' use of ChatGPT for academic text revision: Behavioral, cognitive, and affective engagement. *Journal of Second Language Writing*, *65*, 101130. https://doi.org/10.1016/j.jslw.2024.101130
[16] Krashen, S. D. (2006). *The input hypothesis: issues and implications*. Crane Resource Centre.
[17] Lingard, L. (2023). Writing with ChatGPT: An illustration of its capacity, limitations & implications for academic writers. *Perspectives on Medical Education*, *12*(1), 261–270. https://doi.org/10.5334/pme.1072
[18] Long, M. H. (1980). *Input, interaction, and second language acquisition*. University of California, Los Angeles.
[19] Mahapatra, S. (2024). Impact of ChatGPT on ESL students' academic writing skills: a mixed methods intervention study. *Smart Learning Environments*, *11*(1), 9. https://doi.org/10.1186/s40561-024-00295-9
[20] Marzuki, Widiati, U., Rusdin, D., Darwin, & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. *Cogent Education*, *10*(2). https://doi.org/10.1080/2331186X.2023.2236469
[21] McAteer, M. (2013). *Action research in education*. London: Sage.
[22] McMartin-Miller, C. (2014). How much feedback is enough?: Instructor practices and student attitudes toward error treatment in second language writing. *Assessing Writing*, *19*, 24-35. https://doi.org/10.1016/j.asw.2013.11.003
[23] Mohammadi, T., & Mustafa, H. R. (2020). Errors in English writing of ESL/EFL students: A systematic review. *Theory and Practice in Language Studies*, *10*(5), 520-526. http://dx.doi.org/10.17507/tpls.1005.05
[24] Mun, C. Y. (2024). EFL learners' English writing feedback and their perception of using ChatGPT. *STEM Journal*, *25*(2), 26-39. https://doi.org/10.16875/stem.2024.25.2.26
[25] Nguyen, A., Hong, Y., Dang, B., & Huang, X. (2024). Human-AI collaboration patterns in AI-assisted academic writing. *Studies in Higher Education*, *49*(5), 847–864. https://doi.org/10.1080/03075079.2024.2323593
[26] Nugroho, A., Andriyanti, E., Widodo, P., & Mutiaraningrum, I. (2024). Students' appraisals post-ChatGPT use: Students' narrative after using ChatGPT for writing. *Innovations in Education and Teaching International*, 1–13. https://doi.org/10.1080/14703297.2024.2319184
[27] Ozfidan, B., El-Dakhs, D. A. S., & Alsalim, L. A. (2024). The use of AI tools in English academic writing by Saudi undergraduates. *Contemporary Educational Technology*, *16*(4), ep527. https://doi.org/10.30935/cedtech/15013
[28] Panadero, E., Jonsson, A., Pinedo, L., & Fernández-Castilla, B. (2023). Effects of rubrics on academic performance, self-regulated learning, and self-efficacy: A meta-analytic review. *Educational Psychology Review*, *35*(4), 113. https://doi.org/10.1007/s10648-023-09823-4
[29] Polakova, P., & Ivenz, P. (2024). The impact of ChatGPT feedback on the development of EFL students' writing skills. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2024.2410101
[30] Rahimi, M., & Fathi, J. (2022). Exploring the impact of wiki-mediated collaborative writing on EFL students' writing performance, writing self- regulation, and writing self-efficacy: a mixed methods study. *Computer Assisted Language Learning*, *35*(9), 2627-2674. https://doi.org/10.1080/09588221.2021.1888753
[31] Steiss, J., Tate, T., Graham, S., Cruz, J., Hebert, M., Wang, J., ... & Olson, C. B. (2024). Comparing the quality of human and ChatGPT feedback of students' writing. *Learning and Instruction*, *91*, 101894. https://doi.org/10.1016/j.learninstruc.2024.101894
[32] Stokel-Walker, C. (2022). AI bot ChatGPT writes smart essays—Should professors worry? *Nature*. https://doi.org/10.1038/d41586-022-04397-7

[33] Storch, N. (2018). Written corrective feedback from sociocultural theoretical perspectives: A research agenda. *Language Teaching*, *51*(2), 262–277. https://doi.org/10.1017/S0261444818000034
[34] Taskıran, A., & Goksel, N. (2022). Automated feedback and teacher feedback: Writing achievement in learning English as a foreign language at a distance. *Turkish Online Journal of Distance Education*, *23*(2), 120-139. https://doi.org/10.17718/tojde.1096260
[35] Teng, F. M. (2024). A Systematic Review of ChatGPT for English as a Foreign Language Writing: Opportunities, Challenges, and Recommendations. *International Journal of TESOL Studies*, *6*(3), 36-57. https://doi.org/10.58304/ijts.20240304
[36] Teng, M. F., & Teng, L. S. (2024). Validating the multi-dimensional structure of self-efficacy beliefs in peer feedback for L2 writing: A bifactor-exploratory structural equation modeling approach. *Research Methods in Applied Linguistics*, *3*(3). https://doi.org/10.1016/j.rmal.2024.100136
[37] Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard university press.
[38] Wang, M., & Guo, W. (2023). The potential impact of ChatGPT on education: Using history as a rearview mirror. *ECNU Review Education*. https://doi.org/10.1177/20965311231189826
[39] Wang, C., Aguilar, S. J., Bankard, J. S., Bui, E., & Nye, B. (2024). Writing with AI: What College Students Learned from Utilizing ChatGPT for a Writing Assignment? *Education Sciences*, *14*(9), 976. https://doi.org/10.3390/educsci14090976
[40] Werdiningsih, I., Marzuki, & Rusdin, D. (2024). Balancing AI and authenticity: EFL students' experiences with ChatGPT in academic writing. *Cogent Arts & Humanities*, *11*(1). https://doi.org/10.1080/23311983.2024.2392388
[41] Wiboolyasarin, W., Wiboolyasarin, K., Suwanwihok, K., Jinowat, N., & Muenjanchoey, R. (2024). Synergizing collaborative writing and AI feedback: An investigation into enhancing L2 writing proficiency in wikibased environments. *Computers and Education: Artificial Intelligence*, *6*, 100228. https://doi.org/10.1016/j.caeai.2024.100228
[42] Wu, Y. (2024). Study on the Impact of Utilizing ChatGPT and Other AI Tools for Feedback in EAP Writing Classrooms on the Discursive Writing Performance of English Major Students. *Transactions on Social Science, Education and Humanities Research*, *4*, 143-150. https://doi.org/10.62051/4se95x52
[43] Zebua, J. A. Z., & Katemba, C. V. (2024). Students' Perceptions of Using the OpenAI ChatGPT Application in Improving Writing Skills. *Journal of Language and Literature Studies*, *4*(1), 110–123. https://doi.org/10.36312/jolls.v4i1.1805

Faris Salim Allehyani got his Ph.D. degree in 2020 from Anglia Ruskin University, Cambridge, UK. His areas of interest include Discourse Analysis, ESL/EFL teaching and Intercultural communication. He is currently working as an Assistant Professor at the Department of Languages and Translation, University of Tabuk, 71491, Kingdom of Saudi Arabia.

Nasser Alqahtani is an Assistant Professor of Linguistics at the Applied College, Shaqra University, Saudi Arabia. He earned his PhD in Linguistics from Cardiff University, UK. He has published widely in reputable journals, and his research interests include discourse analysis, academic discourse, and the application of AI tools to enhance language teaching and learning.

Mohammad Jamshed got his Ph.D. degree in 2018 from Aligarh Muslim University, Aligarh, UP (INDIA). His areas of interest include postcolonial literature, travel writings, comparative studies, and ESL/EFL teaching and research. He has presented papers at conferences and published more than 2 dozen articles in Scopus indexed journals of repute both in literature and ESL/EFL teaching and research. He is currently working as Associate Professor, at the Department of English, College of Science & Humanities, Prince Sattam bin Abdulaziz University, Al Kharj, 11942, Kingdom of Saudi Arabia.

Wahaj Unnisa Warda has been working in the Department of English Language and Literature, Prince Sattam Bin Abdulaziz University, Saudi Arabia, for the past ten years. Before that, she worked as a senior lecturer in India for thirteen years. She has presented and published papers at various international conferences and journals in London, India, Australia, and Saudi Arabia. She is a member of various national and international organizations besides being a reviewer for international journals. Her areas of interest are psychoanalysis, Classical Mythology, and detective fiction of the 19th century.