PAPER

The Impact of ChatGPT on English Language Learners' Writing Skills: An Assessment of AI Feedback on Mobile

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ABSTRACT

Artificial intelligence (AI) has shown promise in enhancing English as a second language (ESL) writing skills by providing personalized feedback and targeted corrections, thereby facilitating improved grammar and composition proficiency. Despite the potential of AI tools like ChatGPT, their impact on common writing errors in ESL contexts has yet to be explored. This study employed a quasi-experimental design to compare the efficacy of ChatGPT's mobile application feedback against traditional teacher feedback in a senior secondary public school in India. Over eight weeks, the experimental group received feedback on their writing error corrections through the ChatGPT application, while the control group received feedback from teachers. Additionally, participants' attitudes towards using ChatGPT for language learning were assessed through a questionnaire administered post-intervention to 132 students. Data was collected using pre- and post-tests that involved writing stories based on pictures. The study results demonstrated that the experimental group significantly improved writing proficiency, showing a reduction in common errors (third-person singular present, past tense, progressive, past participle, plural, possessive, comparative, and superlative) compared to the control group. Furthermore, most students preferred AI feedback, associating it with noticeable improvements in their writing skills and grammatical accuracy. These findings support the integration of AI tools like ChatGPT into language learning curricula as effective supplements to traditional teaching methods, offering personalized and immediate corrections that enhance learning outcomes.

KEYWORDS

ChatGPT application, personalized feedback, targeted corrections, traditional teaching methods

1 INTRODUCTION

Integrating artificial intelligence (AI) in educational settings, particularly in language learning, offers a promising avenue for enhancing teaching methodologies and student learning outcomes. It is widely accepted that technology intervention in

English language classrooms can help address many challenges language learners encounter in acquiring a language [1] [2]. Using AI-enabled technology can also help address specific issues and problems in enhancing writing skills [3] [4]. The socially altered realities during the pandemic and its aftermath opened up undiscovered and hitherto unexplored avenues of learning and teaching. As a result, we witnessed an increased utilization of AI-powered technology in language classrooms to enhance the different skills of learners.

Writing skills, being a vital part of language proficiency, are a fundamental part of both research and higher education. Language instructors have been utilizing different traditional strategies for improving the writing skills of students. They have shown different results in different situations. As a result of the unexpected developments that the revolution in technology brings about in teaching pedagogies, we are witnessing the emergence of many different kinds of learner-centered approaches. However, one of the approaches that has resulted in significant improvement in learners' proficiency is providing the language learners with feedback during the writing process. The increased integration of AI and ChatGPT in EFL classrooms is one of the most important aspects of the educational process that greatly contributes to the enhancement of the quality of instruction for both instructors and students. Institutions of higher learning are increasingly employing AI-generated feedback to evaluate students' language skills, critical thinking, reasoning, expertise and other different competencies [5].

Multiple studies [41] [42] [43] have examined how AI-assisted language learning tools impact English language learners' learning achievement and skills. They have demonstrated the efficacy of AI-generated feedback to enhance students' writing skills. For example, Song and Song [6] emphasized how understanding the impact of AI feedback became vital as the application of AI became popular in different educational contexts. It emphasized the advantages, disadvantages, and increasing role of AI in learning a language for professionals as well as educators. Escalante et al. [7] investigated foreign language educators' perspectives on using AI to assess and offer written feedback to enhance students' writing skills. It revealed that providing feedback is an effective method for assessing and enhancing writing, especially for foreign language learners with limited writing skills. In educational scenarios, personalized, immediate feedback and adaptable learning possibilities are considered to be one of the best methods to enhance students' writing skills [8]. Athanassopoulos et al. [44] assessed the efficacy of ChatGPT in providing feedback on foreign language writing and improving vocabulary and grammar. The study comprised eight 15-year-old migrant/refugee children acquiring German as a foreign language in a junior high school (Gymnasium) classroom in southern Greece. The study revealed ChatGPT to be a promising language learning tool that could enhance instruction. These studies found that automated writing evaluation (AWE) systems could potentially be utilized for offering individual feedback with the advancement of AI-powered technology. However, it could be noted that empirical research on the direct effects of AI feedback on language learning is conspicuously lacking, especially in contexts where traditional approaches have been popular [48] [51]. It now becomes clear that the impact of AI-generated feedback on the writing process and language acquisition as a whole has largely been overlooked by the current studies.

Through a quasi-experimental design, this study, therefore, compares AI-driven feedback, such as ChatGPT, with conventional teacher feedback to improve English learners' writing skills and reduce errors. It also examines learners' views on using AI for grammar and writing, with the hypothesis that technology may enhance English learning [6].

2   LITERATURE REVIEW

2.1   Artificial intelligence tool-ChatGPT 3.5

ChatGPT 3.5, developed by OpenAI, represents a significant advancement in AI, specifically within the GPT-3 series of generative pre-trained transformers (GPTs). This innovative language model incorporates deep learning to generate human-like text, which makes it suitable for use in education. Its ability to produce coherent and contextually appropriate text distinguishes it as a potent tool for enhancing language learning and teaching. ChatGPT delivers rich linguistic input and practical conversation exercises essential for language practice by integrating advanced AI technologies such as machine learning and natural language processing. It supports learners by offering personalized feedback and adaptive learning experiences tailored to their proficiency levels. Based on learners' skills and needs, AI can develop and personalize electronic instructional tools. AI systems assess learners and clarify complex topics [57].

Multiple studies argued about ChatGPT's utility in language learning and its proficiency in facilitating real-time authentic interactions that significantly improved second language acquisition. For example, Zou et al. [9] argued that large language models (LLMs) like GPT-3 and ChatGPT garnered interest and demonstrated the ability to comprehend texts and maintain human-like conversations. The study analysed the Twitter arguments about ChatGPT, LLMs and GPT-3 using the diffusion of innovation theory. The findings revealed that ChatGPT and GPT-3 discussions largely focused on benefits and compatibility, with ChatGPT being less favourable and GPT3 becoming more positive. The study implied that future research should focus on fully understanding the potential applications and risks of LLMs. Meyer et al. [10] argued how in late 2022 LLMs enabled iterative "chat" and produced human-like text and stated how LLM-based Chatbots could boost academic productivity. It also examined the limitations and benefits of this technology in academic writing, teaching, and programming. The study suggested taking steps to make good use of LLMs and Chatbots, staying away from plagiarism, spotting wrong results and planning for research and academic use. Samala et al. [11] carried out a thorough analysis and assessment of 34 studies on ChatGPT and its possible pedagogical impacts using PRISMA. It examined several research articles from 2018 to the present to assess the advantages and disadvantages of GPT language models in education. The findings showed certain positive aspects, such as customized adaptive learning, immediate feedback, and greater accessibility. Lack of emotional intelligence, an overreliance on technology, and privacy concerns are some of the negative aspects of ChatGPT. The study suggested additional research and risk and restriction evaluations. Synekop et al. [12] investigated and contrasted technical university students' and instructors' perspectives on academic integrity, ChatGPT application in English classes, and strategies. The qualitative analysis of the data collected from 60 students and 22 professors revealed that students held positive attitudes and teachers were neutral. However, both groups believed that ChatGPT improved hard, soft, and English language communication skills. The study recommends using ChatGPT in engineering English sessions to help students while emphasizing academic integrity. Kostikova et al. [13] discussed the challenges of developing a new tertiary-level Law English course, curriculum, and syllabus utilizing ChatGPT and dispelling concerns related to its application and utilization. It also described real-life instances of implementing ChatGPT within an academic English course for college students. Expert assessment, case study, analysis, and synthesis were employed. The findings revealed that

AI enables teachers to teach everything, including generating texts, assignments, quizzes, and answering educational questions. Papadakis and Kalogiannakis [45] examined how children's enjoyment of mobile devices inspired innovative instructional apps. Meta-analysis and research synthesis examined 22 studies 2011–2019. The study coded and analysed 2010–2019 English-language magazine and conference materials. It was found that most educational apps assessed did not improve student learning.

2.2 Errors and mistakes

The differences between error and mistake were first standardized in the 1970s, with the contention that errors should be rectified but mistakes should not. Nowadays, mistakes made by learners are seen positively rather than corrected. The polysemy of the word is of lesser significance than the communicative representation of the deficiencies provided by our respondents [40]. Errors are systemic deviations that happen when students don't have the necessary information [14–15]. They often reflect gaps in a learner's understanding of the target language rules and are consistent until their language proficiency improves. In contrast, 'mistakes' are occasional performance breakdowns that do not necessarily imply a lack of comprehension but rather a failure to apply the rules of language effectively. These can occur due to factors such as fatigue, inattention, or stress and are generally random and not characteristic of the learner's competence [16]. The distinction between errors and mistakes is significant in language education as it helps educators understand the underlying causes of learners' incorrect language use. Errors, being systematic, require instructional intervention to correct underlying knowledge deficits, whereas mistakes are often self-corrected by learners once they are made aware of them. This differentiation also impacts the feedback and corrective strategies employed by educators. While errors might necessitate more explicit and formative feedback to address conceptual misunderstandings, mistakes might only require prompting or awareness-raising for correction [17] [18]. Understanding these distinctions is crucial for developing effective language teaching methodologies that cater to the specific needs of learners, enhancing both the learning and retention of language skills.

2.3 Effect of ChatGPT on English writing errors

Multiple current studies examine the integration of ChatGPT in educational contexts, with an emphasis on writing skills across disciplines. For example, Barrot [16] argued, using a qualitative review methodology, how Chatbots became viable options for language acquisition because of developments in AI. The study examined ChatGPT's advantages and disadvantages for L2 writing. The findings revealed that ChatGPT's real-time tailored feedback could aid L2 writers. However, it raised academic integrity and writing quality issues. The study suggested employing ChatGPT with L2 education to maintain academic integrity and foster skill development. Fitria [17] analysed the effectiveness of ChatGPT in structuring English essays, highlighting the tool's capacity to generate essays with coherent structure and grammar. However, further study suggested further research to validate the grammatical accuracy of these texts, pointing towards the potential of AI tools to support language learning and suggesting their significant implications for educational practices. Moreover, Alam et al. [18] discussed how AI could accelerate scientific writing by aiding non-native English speakers in overcoming language barriers and enhancing

the writing process. This study noted AI's ability to suggest context-appropriate synonyms and rephrase sentences but cautioned against over-reliance due to ethical concerns and potential inaccuracies in AI-generated content. The quantitative analysis and repeated-measures two-way analysis of variance (ANOVA) test revealed that the intervention improved ESL learners' inflectional morpheme writing. Imran and Almusharraf [19] carried out a comprehensive review of the 30 most relevant articles to assess if ChatGPT could be utilized as a writing assistant in educational settings. The study selected 30 relevant papers from 550 thoroughly evaluated publications from December 2022 to May 2023, six months following ChatGPT deployment, using a PRIMA flowchart. The results revealed that the use of AI in education is a continuing process, as demonstrated by the latest instance of ChatGPT. The study suggested that academics should evaluate and change writing class instructions, training, and grading for academic fairness and integrity. Ipek et al. [46] evaluated ChatGPT's impact on education. The data was examined using a systematic review and using pre-set topics and categories. The evaluation covered ChatGPT's educational advantages and disadvantages. It was found that ChatGPT and similar technologies had a positive impact on learning. Karakose et al. [47] conducted an interdisciplinary study to evaluate how the COVID-19 epidemic affected teaching. The data was collected using ChatGPT-3.5 and four contemporaneous interviews and evaluated for accuracy, clarity, and brevity. A trichotomous rating system and Cohen's kappa values measure rater agreement for each category. The results showed that both iterations produced accurate, clear, and complete data.

Mahapatra [20] investigated the impact of ChatGPT as a formative feedback tool on undergraduate ESL students' academic writing skills through a mixed-methods approach. Three different types of tests and a similar number of discussion groups were used to assess tertiary-level ESL students. The findings revealed that ChatGPT improved students' academic writing skills, and they held highly positive attitudes towards it. The study suggested that future studies should investigate the effect of ChatGPT on different aspects of writing. Similarly, Hidayatullah [21] explored how students could utilize ChatGPT to enhance their English writing skills while avoiding plagiarism. The study utilized a qualitative research approach, collecting data via observation, interviews, and analysis of test results. The findings underscore ChatGPT's role in promoting academic integrity and facilitating complex writing tasks, thus preparing students for advanced academic endeavours and lifelong learning. Kumar [22] investigated the usefulness and efficiency of ChatGPT for academic writing in the biological sciences. ChatGPT was provided with five unique inquiry topics. The reliability, content quality, and response time of ChatGPT were all assessed. Urkund software confirmed the legitimacy of the Word file linked to the ChatGPT response. The findings revealed that, while the comments were valid and distinctive, they lacked academic writing depth and other flaws such as word count, reference, and academic merit issues. Lastly, Bašić et al. [23] evaluated ChatGPT-3.5 as a writing tool in a controlled experimental setting with 18 participants. The findings showed no significant improvement in essay grades or writing speed for the ChatGPT-assisted group, suggesting that the effectiveness of AI tools like ChatGPT might largely depend on the user's prior knowledge and skills.

2.4 Effect of ChatGPT on English learning attitude

Language learning attitude encompasses learners' emotions, beliefs and behaviours regarding language learning. This multidimensional concept comprises psychological, behavioural, and cognitive elements that impact learners' motivation,

engagement, and success in language acquisition [24]. A positive attitude towards language learning encourages more significant effort and persistence, enhancing the effectiveness of educational experiences and tools such as AI platforms. For example, when learners find language learning tools like ChatGPT user-friendly and clear and understandable educational content, such as grammar advice and relevant examples, they will likely develop favourable views towards using these tools. This positive cognitive and affective response enhances their motivation and confidence, encouraging continued use and deeper engagement with the language learning process. Essentially, attitudes towards language learning influence how learners interact with educational tools, affecting their overall learning trajectory and outcomes.

Many studies have investigated how ChatGPT impacts English language learning attitudes. Lui and Ma [25] conducted a study to collect empirical evidence concerning the perceptions and usage patterns of ChatGPT by EFL students outside the classroom. This quantitative cross-sectional study used Davis' technology acceptance model (TAM) to analyse EFL learners' perspectives, motivations, and actual behaviours while using ChatGPT for informal digital English learning. Using all of the mediators of perceived usefulness, the modeling of structural equations revealed that perceived ease of use can impact learners' attitudes but not predict them. Behavioural intention highly predicts students' actual use of ChatGPT for English learning outside of class. The study suggests that ChatGPT is a powerful language-learning tool that assists EFL learners in participating creatively in ecological science CALL. Ajlouni et al. [26] conducted a study at the University of Jordan to examine students' attitudes toward using ChatGPT as a learning tool. This quantitative study utilized a descriptive design and applied the ABC model, which assesses attitudes' affective, cognitive, and behavioural components. The researchers surveyed 623 undergraduates and discovered a predominantly positive attitude toward using ChatGPT for educational purposes. The study revealed that ChatGPT's perceived value reduced its affective impacts, whereas its simplicity directly improved cognitive and behavioural attitudes. This underscores that students' frequent and effective use of ChatGPT is likely when they find the tool valuable and user-friendly. The researchers advocate for integrating ChatGPT into the educational framework of the University of Jordan, albeit with considerations for enhancing data accuracy and improving the user experience. Their findings enrich the broader dialogue on educational technology acceptance and offer valuable insights for refining instructional strategies and tech integration in higher education settings. Bibi and Atta [27] analysed the opinions of learners, experiences and the general level of satisfaction with ChatGPT, an AI-powered English writing assistance, with a particular emphasis on the subtle aspects of their engagement. Conducted at the University of Management and Technology, Sialkot Campus, this research utilized a mixed-method approach that included surveys, interviews, and usability testing to evaluate how ChatGPT affects students' writing proficiency. Involving 150 undergraduate students, the study gathered data on how ChatGPT influenced their writing processes and overall satisfaction with the tool. The results showed that students generally had a favourable opinion of ChatGPT, appreciating the tailored writing support it provided across various English writing aspects. The findings underscore the potential of AI tools like ChatGPT to improve educational outcomes by engaging students more effectively and enhancing their learning experiences. After investigating moral issues such as plagiarism, the study suggested studying the long-term effects of such tools on students' independent writing.

2.5 Aims of the study

While ChatGPT has been recognized for its capacity to enhance writing competencies within educational settings, its effectiveness on mobile in correcting English writing errors and shaping the attitudes of ESL learners toward language learning has yet to be explored. Existing literature highlights the potential benefits and concerns about educational integrity posed by ChatGPT in second language learning. Still, a detailed examination of its impact on the precision of ESL writing and potential changes in learner attitudes is needed. This study addresses this research gap by thoroughly evaluating the effectiveness of the ChatGPT application on mobile in reducing English writing errors among ESL students and investigating its effect on their motivation, confidence, and overall engagement with the English language. The study seeks to clarify the role of the ChatGPT application on mobile in ESL education and how it may influence learners' attitudes toward improving their language skills. This study seeks to address the following questions:

1. How does mobile ChatGPT feedback impact ESL writing grammar error correction?
2. What impact does the ChatGPT mobile app have on ESL learners' language learning attitudes, motivation and writing confidence?

3 METHODOLOGY

3.1 Participants and sampling

The participants in the study were chosen using a process of convenience sampling. The researcher uses convenience sampling because it is practical, affordable, and easily accessible to the sample [28]. This research used a convenience sample technique since having students physically present in the classroom was necessary. Action research is a systematic study that uses spiral design cycles consisting of planning, action, observation and reflection [33]. It enables educators or teachers to concentrate on classroom dynamics and enhance the teaching and learning process. In a quasi-experimental study at a senior secondary public school in India, 132 ESL students aged 18 to 20 from the twelfth grade participated. A total of 132 students were divided equally into two groups, utilizing a purposeful sampling method. It consisted of two complete groups: one was used as a control (N = 66) and the other as a treatment (N = 66). All participants in both groups were familiar with using Android mobile and navigating the internet. The study's participants were all learners who shared Hindi as their first language. The participants had previously studied English for over 10 years, on average, before the current study began. Furthermore, the researcher assumed the position of instructor for both groups to track and deal with any possible differences in training. We obtained the students' consent after giving them suitable background information before they took part in the study.

3.2 Experimental group

Over eight weeks, English learners in the experimental group received training through the ChatGPT mobile application, with sessions conducted four times

weekly, each lasting an hour. The students were primarily exposed to the functions of ChatGPT, with an emphasis on how it could enhance their English writing skills. The training comprised several structured steps to enhance their understanding and application of grammatical rules. The first step involved the students writing a 200-word story based on a picture on A4 paper. Subsequently, in the second step, they manually typed this story into the ChatGPT app using a specific prompt that instructed the AI to identify grammatical or structural errors, explain these errors, and provide examples to help clarify the corrections needed (prompt: As a learner of English, I have written a story in English based on a picture. I seek help to identify and understand any grammatical errors in my story. Your task is to review my story, pinpoint the errors, explain each type of error, and provide examples that will help clarify these explanations. This assistance is crucial for enhancing my understanding of English grammar and composition). In the third step, students reviewed the feedback from ChatGPT, which helped them understand the errors in their initial submissions. The final step required them to revise their original handwritten story by applying the corrections and suggestions offered by ChatGPT.

3.3 Control group

Participants in the control group were asked to compose a story based on the picture in English on an A4 sheet of 200 words. Then, researchers examined the errors in their English writing sheets. Based on the errors committed, researchers gave feedback and explained the rules of grammar. Then, based on the feedback, the participants were asked to revise their original written text with the teachers' feedback. The process continued for eight weeks, with sessions held four times a week for one hour each.

3.4 Collection of data

Data collection for this study was systematically carried out in two stages: a preliminary test and a final test, each involving a picture interpretation task. The participants were given 30 minutes to compose a narrative by utilizing a word-processing application based on a given picture. This preliminary phase established a baseline for the participants' writing skills. After interventions were applied to the experimental and control groups, the final test replicated the initial task under identical conditions to evaluate any improvement in writing skills. Different pictures were used for the pre- and post-tests to prevent participants from recalling specific details from the first picture, thus ensuring that any observed improvement in writing skills could be confidently attributed to the educational interventions rather than familiarity with the picture. The systematic method enabled an extensive comparative investigation of the participants' enhancements throughout the study.

A structured Likert-scale questionnaire with twelve items was used to collect data on learners' experiences and attitudes towards using ChatGPT for English grammar learning. Participants rated their responses from strongly agree (SA) to strongly disagree (SD). The questionnaire covered various aspects of using ChatGPT on mobile devices, including the ease of navigation, clarity of text and grammar suggestions, relevance of examples, enjoyment of interaction, motivation to practice grammar,

understanding of grammar, confidence in writing skills, effectiveness of feedback, overall satisfaction and likelihood of recommending ChatGPT to others. These items provided detailed insights into the effectiveness of ChatGPT as a learning tool, assessing both subjective perceptions and objective improvements.

3.5 Analysis of errors

To analyse the data, the study utilized the enhanced version of Grammarly, an automated essay scoring (AES) system known for its superior accuracy in identifying errors in English texts written by second-language learners, outperforming traditional human assessors [29]. By leveraging Grammarly, the research facilitated a meticulous identification of errors in the students' compositions. A systematic classification of these errors was followed to discern patterns and quantify their frequency, enabling a comprehensive analysis of common writing challenges faced by students across both classrooms. This methodological approach helped ensure a precise assessment of the interventions' effectiveness in improving English writing skills.

3.6 Analysis of data

The study utilized repeated measures ANOVA to analyse changes in dependent variables under varied conditions. This method proved beneficial for assessing the same subjects in different scenarios, enabling analysis of changes over time and differences between experimental and control groups. It specifically examined the main effects of grammatical errors across categories like present tense and past tense, the interaction effects between these errors and group variables, and different testing times. This approach offered a nuanced view of how grammatical accuracy evolved during the study and how various types of feedback affected learner outcomes.

The data from the questionnaire regarding learners' attitudes toward using ChatGPT on mobile for English grammar learning was analysed using descriptive statistics to summarise and interpret the distribution of responses across different categories: SA, Agree (A), Neutral (N), Disagree (D) and SD. Each questionnaire item was examined to calculate the percentage of responses in each category, reflecting the learners' agreement or disagreement with the statements about their experiences using ChatGPT.

4 RESULTS

4.1 Impact of ChatGPT on mobile devices on English as a second language learners' writing errors

The results from the repeated measure the ANOVA test provided a comprehensive analysis of the effects and interactions in the study. The main effect of errors related to present tense, past tense, progressive, past participle, plural, possessive, comparative and superlative was significantly impactful. $F_{(7, 59)} = 51.731$, $p < .001$, indicating a substantial influence on the dependent variables, with a large effect size as evidenced by a partial eta squared of .860. Figure 1 shows the mean values

of grammatical errors in ESL writing, arranged from the most frequent to the least frequent. The present tense posed the most significant challenge for learners, with a mean error of approximately 5.15. Errors in the past tense and plural forms followed, with mean values close to 3.71 and 3.05, respectively. The progressive form and past participle also presented notable difficulties, with mean values around 2.80 and 2.92. Slightly less common were comparative errors, with a mean value just above 2.33. The least frequent errors occurred with possessive and superlative forms, with the lowest mean values at approximately 2.33 and 2.72, suggesting learners managed these structures more effectively. Similarly, the main effect of groups (experimental, control) was also significant (F (1, 65) = 13.745, p < .001), suggesting notable differences among the groups. Figure 2 indicates that the learners in the experimental group, who received feedback through the AI tool ChatGPT, demonstrated a reduction in writing errors compared to the control group, which received traditional feedback from teachers. This suggests the effectiveness of AI-driven feedback in addressing ESL writing errors. Moreover, the effect of tests also showed a strong influence, F (1, 65) = 123.676, p < .001, indicating significant variability based on the test conditions. Figure 3 shows ESL learners' pre-test and post-test errors, indicating reduced errors from the pre-test to the post-test. In addition, the interactions between these factors were also notable: the interaction of errors across groups revealed a significant effect (F (7, 59) = 47.602, p < .000), presenting the variation of errors across groups. Figure 4 compares grammatical error occurrences between two ESL learner groups. The experimental group, aided by ChatGPT feedback, generally made fewer errors in key grammatical areas than the Control Group, which relied on teacher feedback. However, the trend was reversed in the specific areas of comparative and superlative use, with the control group committing fewer errors than the experimental group. This data suggests that ChatGPT feedback may be more conducive to correcting English writing errors in ESL learners than traditional teacher feedback. Also, the errors*tests interaction was significant, F (7, 59) = 8.869, p < .001, suggesting that the type of errors interacted meaningfully with the testing conditions. Figure 5 provides a comparative analysis of English writing errors recorded during pre-tests and post-tests. Each grammatical category, including present tense, past tense, progressive, past participle, plural, and possessive, except comparative and superlative, shows a noticeable error reduction from the pre-test to the post-test phase. However, these interactions between groups and tests and between errors, groups, and tests did not demonstrate significant variation, with p-values greater than .425 and .129, respectively.
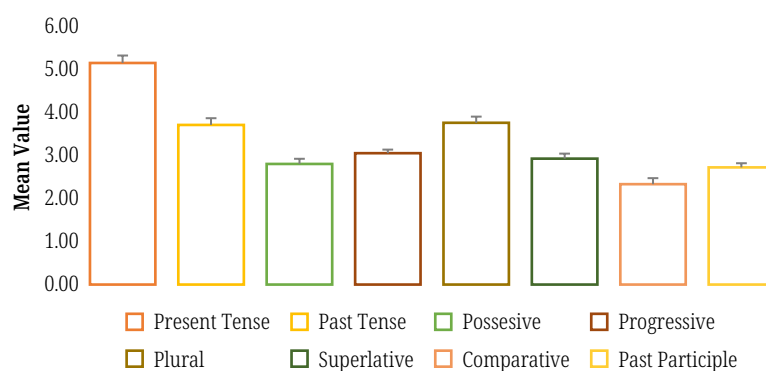

Fig. 1. Mean value of errors in English as a second language writing for different grammatical categories
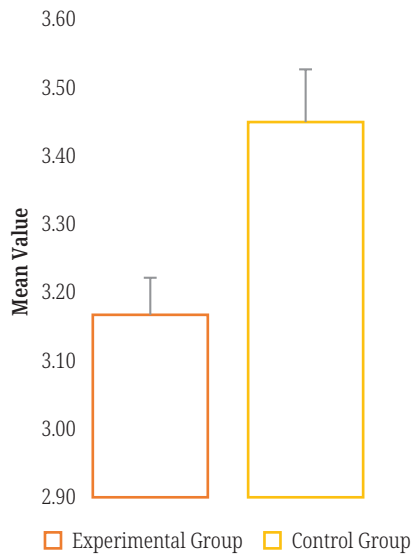
Fig. 2. Comparison of mean value of errors between experimental and control groups
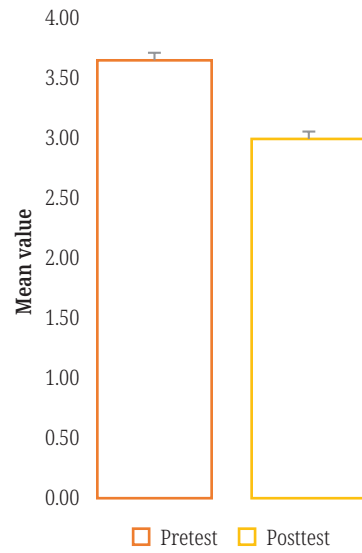

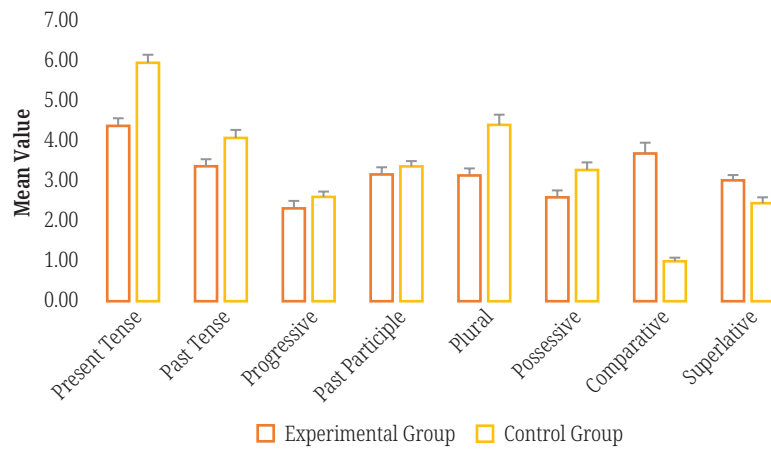**Fig. 3.** Mean error values in pre- and post-tests

Fig. 4. Comparison of mean error values across grammatical categories between experimental and control groups
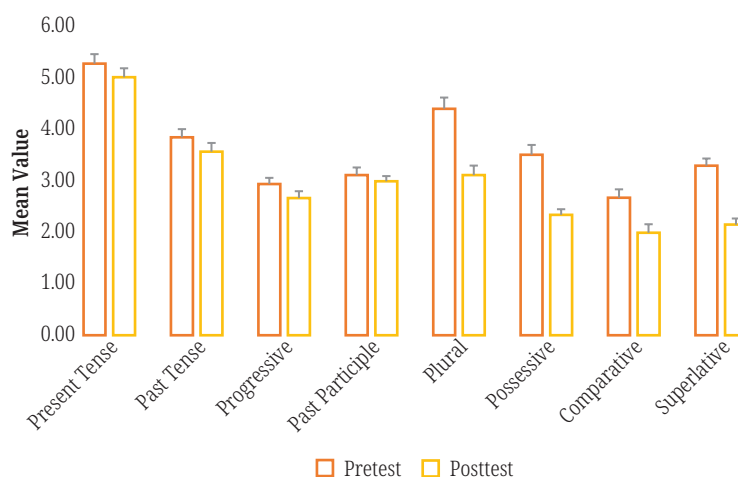
Fig. 5. Variation of error values from pre-test to post-test

4.2 Learning attitude of learners toward English as a second language grammar learning through ChatGPT

Table 1. Assessment of English as a second language learners' attitudes towards ChatGPT application of mobile

	Questionnaire Items	SA		A		N		D		SD	
1	The ChatGPT interface on mobile is easy to navigate.	55	83.33	5	7.57	3	4.54	2	3.03	1	1.51
2	I can easily read and understand the text Provided by ChatGPT on my mobile screen.	41	62.12	9	13.63	2	3.03	11	16.66	3	4.54
3	The grammar and writing suggestions provided by ChatGPT are clear and understandable.	46	69.69	13	19.69	1	1.51	1	1.51	5	7.57
4	The examples used by ChatGPT are relevant and helpful for learning English grammar.	42	63.64	17	25.76	2	3.03	3	4.55	2	3.03
5	Interacting with ChatGPT makes learning English grammar is enjoyable.	51	77.27	6	9.09	2	3.03	2	3.03	5	7.58
6	I feel motivated to practice English Grammar regularly using ChatGPT.	33	50	21	31.82	1	1.52	6	9.09	5	7.58
7	My understanding of English grammar has improved since using ChatGPT.	39	59.09	13	19.7	1	1.52	2	3.03	11	16.67
8	I feel more confident in my English writing Skills after practicing with ChatGPT.	45	68.18	4	6.06	4	6.06	5	7.58	8	12.12
9	ChatGPT addresses my specific questions and difficulties effectively.	54	81.82	8	12.12	1	1.52	2	3.03	1	1.52
10	The feedback from ChatGPT is tailored to my level of English proficiency.	32	48.48	21	31.82	3	4.55	4	6.06	6	9.09
11	I am satisfied with my overall learning experience with ChatGPT on mobile.	49	74.27	13	19.7	2	3.03	2	3.03	0	0.00
12	I recommend using ChatGPT on mobile to others learning English grammar.	45	68.18	10	15.15	7	10.61	4	6.06	0	0.00

Notes: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree.

The Table 1 presents survey results on learners' attitudes toward using ChatGPT on mobile devices for learning English grammar, indicated by their responses to a Likert scale with options ranging from SA to SD. For the statement about the ease of navigation of ChatGPT on mobile, 83.33% of participants responded with SA. Similarly, 62.12% found the text provided by ChatGPT easy to read and understand, while approximately 69.69% agreed that the grammar and writing suggestions were clear and understandable. When considering the relevance and helpfulness of examples provided by ChatGPT, 63.64% of respondents strongly agreed. A significant portion, 77.27%, found interacting with ChatGPT enjoyable, and exactly half of the participants felt motivated to practice English grammar regularly using ChatGPT. The majority, 59.09%, stated they had a better understanding of English grammar after using ChatGPT, and 68.18% said they felt more comfortable writing in the language. Furthermore, 81.82% agreed that ChatGPT effectively addressed their questions and difficulties. However, ChatGPT's feedback tailored to their proficiency level had a divided response, with 48.48% strongly agreeing and 31.82% simply agreeing. There was a high level of satisfaction (74.27% strongly agreeing) with the whole learning experience, and 68.18% strongly agreed that ChatGPT should be recommended to others.

5   DISCUSSION

The study's findings demonstrated that using ChatGPT on mobile significantly impacts ESL learners' writing errors, with the experimental group experiencing fewer errors across multiple grammatical categories (third-person singular, present, past tense, progressive, past participle, plural, possessive, and comparative and superlative) compared to the control group that received traditional teacher feedback. This underscores the potential of AI-driven feedback to enhance ESL education. Additionally, the survey results revealed a positive learner attitude towards using ChatGPT for English grammar learning. Most respondents found the mobile interface user-friendly, and the content, especially the grammar and writing suggestions, was straightforward and beneficial. The interactive nature of ChatGPT not only made learning enjoyable but also encouraged regular practice, boosted confidence, and improved understanding of English grammar among learners. Despite some mixed responses regarding feedback customization to proficiency levels, the overall satisfaction with ChatGPT was high, with many participants willing to recommend it to others. These findings highlight the effectiveness of ChatGPT as an educational tool in ESL settings, suggesting that its careful integration can significantly improve language learning outcomes.

The most common errors made by ESL learners included present tense, past tense, progressive, past participle, plural, possessive, comparative, and superlative, with present tense errors being the most frequent. These findings corroborate the previous studies [3] [30] [19–49] which also found that ESL learners made similar errors in their writing. However, one study [53] is inconsistent with our findings as it found that the most common errors are related to spelling, punctuation, prepositions, word choice, and the use of articles. The study found that using ChatGPT on mobile for feedback improved ESL writing, particularly in terms of addressing third-person singular present, past, progressive, past participle, plural, and possessive grammatical errors. ChatGPT feedback significantly enhances grammatical accuracy across categories. Learners improved most in the present tense, which

initially troubled them. Instead of inconsistent or slow fault resolution, the application's fast, targeted feedback enabled immediate changes and learning. The experimental group receiving ChatGPT feedback differed significantly from the control group receiving traditional teacher feedback. This contrasts with human educators' generalized feedback. Bhutoria [34] argues that AI-driven feedback mechanisms can detect and correct faults better than conventional instructional approaches. This specificity assists students in grasping and remembering grammatical rules and correcting errors, supporting the use of AI systems in language learning contexts for enhanced training. Many studies [35] [50–52] support the use of ChatGPT, and its all-powerful feedback can offer more detailed and specific guidance for enhancing ESL/EFL learners' writing skills. In addition, the study's investigation of interaction effects showed that students' types of mistakes were significantly influenced by the feedback they received. For example, while the experimental group showed general improvements, specific areas like comparative and superlative forms did better under traditional feedback. This suggests that while AI feedback is highly effective, it may require supplementation with human instruction for specific complex grammatical rules [36]. The study's method of comparing pre-test and post-test errors provided clear evidence of improvement in writing skills over time, directly attributable to the type of feedback received. These findings support the integration of AI-driven tools such as ChatGPT in ESL education to enhance the grammatical precision of learners. This analysis answers the first research question.

The study also found that ESL learners held highly positive attitudes towards using the ChatGPT mobile application for English grammar learning. Most participants liked ChatGPT's user interface, text readability, and grammatical advice, supporting its educational value. Most enjoyed ChatGPT and were motivated to practice English grammar. Many learners' English grammar and writing confidence improved using ChatGPT. These studies showed that ChatGPT addressed language queries and enhanced student confidence. Washington [37] found that AI feedback approaches promote autonomy and self-confidence in learners. It was also found that mobile ChatGPT software improved ESL learners' language learning motivation and confidence. The improvement is a result of the ChatGPT interface's engagement and responsiveness, which give learners instant, exact feedback on their English usage of grammar. Maghsudi et al. [38] found that AI-driven education can enhance student confidence and engagement. These tools allow students to receive customized feedback, which is difficult in traditional classes. Multiple other studies [54–56] also corroborate the findings of the study. However, the study highlighted issues about skill-level-specific feedback. Although several learners were dissatisfied with the level of adaptability, most found the feedback corresponded to their needs. Varying responses underscore the need for AI tool upgrades to fulfill all students' educational needs. AI algorithms should be developed to recognize and respond to student competency levels to provide challenging but accessible feedback. These findings support Hooda et al. [39], who emphasize the importance of adaptive learning systems in education. These systems accommodate students' different learning styles and adapt classes to improve academic performance. This analysis answers the second research question.

Overall, the positive influence of ChatGPT on the confidence and motivation of ESL students highlights the transformative power of AI-driven educational tools. By continuously developing and implementing technological advancements, educational institutions can significantly improve the efficacy and accessibility of language learning. This will lead to better results and more enjoyable educational experiences for students.

6   CONCLUSION

This study emphasizes the efficiency of ChatGPT on mobile for enhancing ESL students' English writing skills, demonstrating that AI-driven feedback significantly improves grammatical accuracy in challenging areas such as present, past, and plural tense. This was particularly evident in the experimental group that used ChatGPT compared to the control group receiving traditional feedback, emphasizing AI's capability to deliver precise and personalized corrections. In addition, ChatGPT improved participants' attitudes toward language acquisition by improving motivation and confidence, making the learning experience more engaging and pleasant, resulting in higher overall satisfaction and chances of recommending the tool. However, the study noted flaws such as the short intervention period and variability in feedback quality, suggesting more research to identify long-term impacts and build more advanced AI models tailored to individual requirements. Ultimately, the study supports integrating AI tools like ChatGPT into language curricula, proposing that technological advancements could transform educational methodologies and outcomes by offering personalized, high-quality educational experiences. This foundation encourages further investigation into AI's sustainable integration into education, aiming to enhance learning processes and pedagogical strategies in diverse academic settings.

7   ACKNOWLEDGMENT

8   REFERENCES

[1] I. Roll and R. Wylie, "Evolution and revolution in artificial intelligence in education," *International Journal of Artificial Intelligence in Education,* vol. 26, pp. 582–599, 2016. https://doi.org/10.1007/s40593-016-0110-3

[2] J. Know, "Artificial intelligence and education in China," *Learning, Media and Technology,* vol. 45, no. 3, pp. 298–311, 2020. https://doi.org/10.1080/17439884.2020.1754236

[3] M. Rahimi and J. Fathi, "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,* vol. 35, no. 9, pp. 2627–2674, 2022. https://doi.org/10.1080/09588221.2021.1888753

[4] Z. Wang, "Computer-assisted EFL writing and evaluations based on artificial intelligence: A case from a college reading and writing course," *Library Hi Tech,* vol. 40, no. 1, pp. 80–97, 2022. https://doi.org/10.1108/LHT-05-2020-0113

[5] N. Behizadeh and G. Engelhard Jr., "Historical view of the influences of measurement and writing theories on the practice of writing assessment in the United States," *Assessing Writing,* vol. 16, no. 3, pp. 189–211, 2011. https://doi.org/10.1016/j.asw.2011.03.001

[6] C. Song and Y. Song, "Enhancing academic writing skills and motivation: Assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students," *Frontiers in Psychology,* vol. 14, pp. 1–14, 2023. https://doi.org/10.3389/fpsyg.2023.1260843

[7] J. Escalante, A. Pack, and A. Barrett, "AI-generated feedback on writing: Insights into efficacy and ENL student preference," *International Journal of Educational Technology in Higher Education,* vol. 20, 2023. https://doi.org/10.1186/s41239-023-00425-2

[8] J. Fleckenstein, L. W. Liebenow, and J. Meyer, "Automated feedback and writing: A multi-level meta-analysis of effects on students' performance," *Frontiers in Artificial Intelligence*, vol. 6, 2023. https://doi.org/10.3389/frai.2023.1162454

[9] W. Zou, J. Li, Y. Yang, and L. Tang, "Exploring the early adoption of open AI among laypeople and technical professionals: An analysis of twitter conversations on #chatgpt and #GPT3," *International Journal of Human–Computer Interaction,* pp. 1–12, 2023. https://doi.org/10.1080/10447318.2023.2295725

[10] J. G. Meyer et al., "ChatGPT and large language models in academia: Opportunities and challenges," *BioData Mining*, vol. 16, 2023. https://doi.org/10.1186/s13040-023-00339-9

[11] A. D. Samala, X. Zhai, K. Aoki, L. Bojic, and S. Zikic, "An in-depth review of chatgpt's pros and cons for learning and teaching in education," *International Journal of Interactive Mobile Technologies (iJIM),* vol. 18, no. 2, pp. 96–117, 2024. https://doi.org/10.3991/ijim.v18i02.46509

[12] O. Synekop, I. Lytovchenko, Y. Lavrysh, and V. Lukianenko, "Use of chat GPT in English for engineering classes: Are students' and teachers' views on its opportunities and challenges similar?" *International Journal of Interactive Mobile Technologies (iJIM),* vol. 18, no. 3, pp. 129–146, 2024. https://doi.org/10.3991/ijim.v18i03.45025

[13] Kostikova, L. Holubnycha, T. Besarab, O. Moshynska, T. Moroz, and I. Shamaieva, "Chat GPT for professional English course development," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 18, no. 2, pp. 68–81, 2024. https://doi.org/10.3991/ijim.v18i02.46623

[14] R. Ellis, *Second Language Acquisition*. The United States: Oxford, 1997.

[15] F. James, *MINUIT: Function Minimization and Error Analysis Reference Manual* (No. CERNLIB-D506). CERN, 1998.

[16] J. S. Barrot, "Using ChatGPT for second language writing: Pitfalls and potentials," *Assessing Writing*, vol. 57, p. 100745, 2023. https://doi.org/10.1016/j.asw.2023.100745

[17] T. N. Fitria, "Artificial Intelligence (AI) technology in OpenAI ChatGPT application: A review of ChatGPT in writing English essay," *ELT Forum: Journal of English Language Teaching*, vol. 12, no. 1, pp. 44–58, 2023. https://doi.org/10.15294/elt.v12i1.64069

[18] S. Alam, M. Usama, M. M. Alam, I. Jabeen, and F. Ahmad, "Artificial intelligence in the global world: A case study of grammarly as an e-tool on ESL learners' writing of darul uloom nadwa," *International Journal of Information and Education Technology,* vol. 13, no. 11, pp. 1741–1747, 2023. https://doi.org/10.18178/ijiet.2023.13.11.1984

[19] M. Imran and N. Almusharraf, "Analyzing the role of ChatGPT as a writing assistant at higher education level: A systematic review of the literature," *Contemporary Educational Technology*, vol. 15, no. 4, p. ep464, 2023. https://doi.org/10.30935/cedtech/13605

[20] S. Mahapatra, "Impact of chatgpt on ESL students' academic writing skills: A mixed methods intervention study," *Smart Learning Environments*, vol. 11, 2024. https://doi.org/10.1186/s40561-024-00295-9

[21] E. Hidayatullah, "Evaluating the effectiveness of ChatGPT to improve English students' writing skills," *Heal*, vol. 1, no. 1, pp. 14–19, 2024. https://doi.org/10.36597/heal.v1i1.1467

[22] A. H. Kumar, "Analysis of ChatGPT tool to assess the potential of its utility for academic writing in biomedical domain," *Biology, Engineering, Medicine and Science (BEMS) Reports*, vol. 9, no. 1, pp. 24–30, 2023. https://doi.org/10.5530/bems.9.1.5

[23] Ž. Bašić, A. Banovac, I. Kružić, and I. Jerković, "ChatGPT-3.5 as writing assistance in students' essays," *Humanities and Social Sciences Communications*, vol. 10, 2023. https://doi.org/10.1057/s41599-023-02269-7

[24] R. C. Gardner, "Attitudes and motivation," *Annual Review of Applied Linguistics*, vol. 9, pp. 135–148, 1988. https://doi.org/10.1017/S0267190500000854

[25] G. Liu and C. Ma, "Measuring EFL learners' use of ChatGPT in informal digital learning of English based on the technology acceptance model," *Innovation in Language Learning and Teaching*, vol. 18, no. 2, pp. 125–138, 2023. https://doi.org/10.1080/17501229.2023.2240316

[26] A. O. Ajlouni, F. A.-A. Wahba, and A. S. Almahaireh, "Students' attitudes towards using chatgpt as a learning tool: The case of the university of Jordan," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 17, no. 18, pp. 99–117, 2023. https://doi.org/10.3991/ijim.v17i18.41753

[27] Z. Bibi and A. Atta, "The role of ChatGPT as AI English writing assistant: A study of student's perceptions, experiences, and satisfaction," *Annals of Human and Social Sciences*, vol. 5, no. 1, pp. 433–443, 2024. https://doi.org/10.35484/ahss.2024(5-I)39

[28] D. Ary, L. C. Jacobs, C. K. S. Irvine, and D. Walker, *Introduction to Research in Education*. Boston, Ma: Cengage, 2019.

[29] M. Mcateer, *Action Research in Education*. London: Sage, 2013. https://doi.org/10.4135/9781473913967

[30] S. Alam and M. Usama, "Does e-feedback impact minimizing ESL writing errors? An experimental study," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 4, pp. 156–169, 2023. https://doi.org/10.3991/ijet.v18i04.36349

[31] M. Usama, "Does blended learning approach affect madrasa students English writing errors? a comparative study," *International Journal of Advanced Engineering Research and Science*, vol. 10, no. 3, pp. 97–108, 2023. https://doi.org/10.22161/ijaers.103.10

[32] M. Usama, S. Alam, S. Tarai, and S. Banu, "The impact of rotation model on minimizing inflectional morphemes errors in English writing: A comparative study of error analysis," *Theory and Practice in Language Studies*, vol. 14, no. 2, pp. 307–318, 2024. https://doi.org/10.17507/tpls.1402.01

[33] S. Alam, M. Usama, A. Hameed, and S. Iliyas, "Analyzing facebook mobile usage: Efficacy and ESL learners' writing proficiency," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 18, no. 3, pp. 60–74, 2024. https://doi.org/10.3991/ijim.v18i03.44959

[34] A. Bhutoria, "Personalized education and artificial intelligence in United States, China, and India: A systematic review using a human-in-the-loop model," *Computers and Education: Artificial Intelligence*, vol. 3, p. 100068, 2022. https://doi.org/10.1016/j.caeai.2022.100068

[35] A. P. Cavalcanti *et al.*, "Automatic feedback in online learning environments: A systematic literature review," *Computers and Education: Artificial Intelligence*, vol. 2, p. 100027, 2021. https://doi.org/10.1016/j.caeai.2021.100027

[36] H. Ai, "Providing graduated corrective feedback in an intelligent computer-assisted language learning environment," *ReCALL*, vol. 29, no. 3, pp. 313–334, 2017. https://doi.org/10.1017/S095834401700012X

[37] J. Washington, "The impact of generative artificial intelligence on writer's self-efficacy: A critical literature review," *Social Science Research Network*, 2023. https://doi.org/10.2139/ssrn.4538043

[38] S. Maghsudi, A. Lan, J. Xu, and M. van der Schaar, "Personalized education in the artificial intelligence era: What to expect next," *IEEE Signal Processing Magazine*, vol. 38, no. 3, pp. 37–50, 2021. https://doi.org/10.1109/MSP.2021.3055032

[39] M. Hooda, C. Rana, O. Dahiya, A. Rizwan, and M. S. Hossain, "Artificial intelligence for assessment and feedback to enhance student success in higher education," *Mathematical Problems in Engineering*, vol. 2022, no. 1, pp. 1–19, 2022. https://doi.org/10.1155/2022/5215722

[40] T. Camargo Angelucci and I. M. Pozzo, "Errors and mistakes in foreign language learning: Drawing boundaries from the discourse of Argentine teachers," in *Mistakes, Errors and Failures across Cultures: Navigating Potentials*, E. Vanderheiden and C. H. Mayer, Eds., 2020, pp. 383–398. https://doi.org/10.1007/978-3-030-35574-6_20

[41] L. Zheng, J. Niu, L. Zhong, and J. F. Gyasi, "The effectiveness of artificial intelligence on learning achievement and learning perception: A meta-analysis," *Interactive Learning Environment,* vol. 31, no. 9, pp. 5650–5664, 2021. https://doi.org/10.1080/10494820.2021.2015693

[42] N. Y. Kim, Y. Cha, and H. S. Kim, "Future English learning: Chatbots and artificial intelligence," *Multimedia Assisted Language Learning,* vol. 22, no. 3, pp. 32–53, 2019. https://doi.org/10.15702/mall.2019.22.3.32

[43] L. Wei, "Artificial intelligence in language instruction: Impact on English learning achievement, L2 motivation, and self-regulated learning," *Frontiers in Psychology,* vol. 14, pp. 1–14, 2023. https://doi.org/10.3389/fpsyg.2023.1261955

[44] S. Athanassopoulos, P. Manoli, M. Gouvi, K. Lavidas, and V. Komis, "The use of ChatGPT as a learning tool to improve foreign language writing in a multilingual and multicultural classroom," *Advances in Mobile Learning Educational Research,* vol. 3, no. 2, pp. 818–824, 2023. https://doi.org/10.25082/AMLER.2023.02.009

[45] S. Papadakis and M. Kalogiannakis, "A research synthesis of the real value of self-proclaimed mobile educational applications for young children," in *Mobile Learning Applications in Early Childhood Education,* S. Papadakis and M. Kalogiannakis, Eds., IGI Global, pp. 1–19, 2020. https://doi.org/10.4018/978-1-7998-1486-3.ch001

[46] Z. H. Ipek, A. I. C. Gözüm, S. Papadakis, and M. Kallogiannakis, "Educational applications of the ChatGPT AI System: A systematic review research," *Educational Process: International Journal*, vol. 12, no. 3, pp. 26–55, 2023. https://doi.org/10.22521/edupij.2023.123.2

[47] T. Karakose, M. Demirkol, N. Aslan, H. Köse, and R. Yirci, "A conversation with ChatGPT about the impact of the COVID-19 pandemic on education: Comparative review based on human–AI collaboration," *Educational Process: International Journal*, vol. 12, no. 3, pp. 7–25, 2023. https://doi.org/10.22521/edupij.2023.123.1

[48] H. Yang and S. Kyun, "The current research trend of artificial intelligence in language learning: A systematic empirical literature review from an activity theory perspective," *Australasian Journal of Educational Technology*, vol. 38, no. 5, pp. 180–210, 2022. https://doi.org/10.14742/ajet.7492

[49] J. A. Z. Zebua and C. V. Katemba, "Students' perceptions of using the OpenAI ChatGPT application in improving writing skills," *Journal of Language and Literature Studies,* vol. 4, no. 1, pp. 110–123, 2024. https://doi.org/10.36312/jolls.v4i1.1805

[50] S. Mahapatra, "Impact of ChatGPT on ESL students' academic writing skills: A mixed methods intervention study," *Smart Learning Environments*, vol. 11, 2024. https://doi.org/10.1186/s40561-024-00295-9

[51] S. Marzuki, U. Widiati, D. Rusdin, R. Darwin, and I. Indrawati, "The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective," *Cogent Education*, vol. 10, no. 2, pp. 1–17, 2023. https://doi.org/10.1080/2331186X.2023.2236469

[52] X. Xhao, "Leveraging Artificial Intelligence (AI) technology for English writing: Introducing wordtune as a digital writing assistant for EFL writers," *RELC Journal,* vol. 54, no. 3, pp. 890–894, 2022. https://doi.org/10.1177/00336882221094089

[53] T. Mohammadi and H. R. Mustafa, "Errors in English writing of ESL/EFL students: A systematic review," *Theory and Practice in Language Studies*, vol. 10, no. 5, pp. 520–526, 2020. https://doi.org/10.17507/tpls.1005.05

[54] J. A. Z. Zebua and C. V. Katemba, "Students' perceptions of using the OpenAI ChatGPT application in improving writing skills," *Journal of Language and Literature Studies,* vol. 4, no. 1, pp. 110–123, 2024. https://doi.org/10.36312/jolls.v4i1.1805

[55] U. Hasanah and I. A. Nurcholis, "English education students' perception of the use of ChatGPT in writing articles," *Pubmedia Jurnal Pendidikan Bahasa Inggris,* vol. 1, no. 2, pp. 1–10, 2024. https://doi.org/10.47134/jpbi.v1i2.298

[56] A. Rahma and R. Fithriani, "The potential impact of using ChatGPT on EFL students' writing: EFL teachers' perspective," *Indonesian EFL Journal,* vol. 10, no. 1, pp. 11–20, 2024. https://journal.uniku.ac.id/index.php/IEFLJ/article/view/9222

[57] A. S. Abdelmagid *et al.,* "Interactive digital platforms and Artificial Intelligence applications to develop technological innovation skills among Saudi university students," *International Journal of Interactive Mobile Technologies (iJIM),* vol. 18, no. 11, pp. 64–79, 2024. https://doi.org/10.3991/ijim.v18i11.48877

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