QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

FROM TEACHER TO TOOL: A COMPARATIVE ANALYSIS OF HUMAN-GENERATED AND AI-GENERATED FEEDBACK ON ESL LEARNERS' GRAMMAR

Rimsha Altaf [1], Dr Fatima Zafar Baig[2]

Abstract

The increasing integration of Artificial Intelligence (AI) in language education has significantly transformed feedback practices in ESL writing. This study examines the comparative effectiveness of human and AI feedback in improving grammatical accuracy among higher secondary ESL learners in Pakistan. Using a quantitative quasi-experimental pre-test–post-test design, 100 students were divided into two groups: one receiving teacher feedback and the other receiving AI-based feedback through tools such as ChatGPT and Grammarly. The study focused on three common grammatical problem areas: articles, prepositions, and verb forms. Data were collected through writing tasks and analyzed by comparing error frequencies before and after the intervention. The findings reveal that both feedback types significantly contributed to improved grammatical accuracy. However, human feedback proved more effective in enhancing learners' comprehension and long-term application of grammatical rules, while AI feedback facilitated immediate correction and increased opportunities for practice. The findings have important implications for teachers, learners, and educational policy in technology-enhanced learning environments.

Keywords: ESL writing, corrective feedback, artificial intelligence, grammatical accuracy, human feedback, AI feedback, second language learning

1. Introduction

The teaching and learning of English as a Second Language (ESL) have evolved significantly in recent years, particularly with the integration of digital technologies into educational practices (Akram et al., 2021, 2022). In multilingual contexts such as Pakistan, English functions not only as an official language but also as a primary medium of instruction in higher education (Ramzan et al., 2020, 2025). As a result, proficiency in English—especially in writing—has become essential for students' academic achievement and future professional success (Hyland & Hyland, 2006; Lightbown & Spada, 2013). Despite extended exposure to formal instruction, many ESL learners continue to struggle with grammatical accuracy in written communication, which remains a critical component of effective writing (Ramzan et al., 2023a, 2023b).

Writing in a second language requires both the ability to communicate ideas and a strong command of grammatical structures. Among higher secondary ESL learners, errors in articles, prepositions, and verb forms are particularly frequent and persistent (Chen & Ramzan, 2024; Ellis, 2006). These difficulties are often influenced by the complexity of English grammar and interference from learners' first language (L1), which in the Pakistani context is commonly Urdu or a regional language such as Punjabi or Sindhi (Lightbown & Spada, 2013). Although students at this level are expected to

[1] M.Phil. English, Department of English, The Women University of Multan.mishi1com19@gmail.com

[2] Assistant Professor, Department of English, The Women University of Multan.fatimabaig_84@wum.edu.pk

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

produce structured and grammatically accurate writing, their work often reflects inconsistencies and gaps in grammatical knowledge.

Corrective feedback has long been recognized as a central component of second language instruction, particularly in the development of writing skills. Teacher-provided feedback plays a vital role in helping learners identify, understand, and correct their errors. Human feedback is valued for its personalized, context-sensitive, and explanatory nature, which supports deeper cognitive engagement and long-term retention of grammatical structures (Bitchener & Ferris, 2012; Hyland & Hyland, 2006). Through interaction and guided support, learners are encouraged to reflect on their errors and gradually develop greater control over language use, aligning with sociocultural perspectives on learning (Vygotsky, 1978).

However, the effectiveness of human feedback is often limited by practical constraints within classroom settings. Large class sizes, heavy teaching workloads, and time limitations can reduce the amount and quality of feedback that teachers are able to provide (Hyland & Hyland, 2006). Consequently, learners may not receive timely or sufficient guidance to overcome persistent grammatical difficulties, particularly in contexts where individualized attention is challenging to maintain.

In response to these limitations, advancements in Artificial Intelligence (AI) have introduced new opportunities for enhancing language learning and feedback practices (Ma et al., 2024, 2026). AI-powered tools such as ChatGPT and Grammarly are increasingly used by students to support their writing processes (Abdelrady et al., 2025, 2026). These tools are capable of identifying grammatical errors, suggesting corrections, and providing immediate feedback, enabling learners to revise their work independently and engage in repeated practice (Ranalli, 2018). The immediacy and consistency of AI-generated feedback make it particularly valuable in contexts where teacher feedback may be delayed or limited. Additionally, AI tools promote learner autonomy by encouraging self-directed learning and continuous engagement with writing tasks.

Despite these advantages, concerns remain regarding the depth and effectiveness of AI-generated feedback. While AI tools are efficient in detecting and correcting surface-level errors, they may lack the contextual awareness and detailed explanations necessary for deeper grammatical understanding (Ranalli, 2018). As a result, learners may correct their mistakes without fully comprehending the underlying rules, which can limit their ability to transfer knowledge to new contexts. This raises important questions about whether AI feedback supports long-term language development or primarily facilitates short-term error correction, reflecting behaviorist principles of reinforcement (Skinner, 1957).

Given the strengths and limitations of both human and AI-generated feedback, there is a growing need to examine their comparative effectiveness in ESL writing. Although previous studies have demonstrated that both forms of feedback can improve writing performance, limited attention has been given to their impact on specific grammatical categories such as articles, prepositions, and verb forms (Ellis, 2006). Furthermore,

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

there is a lack of research focusing on higher secondary ESL learners within the Pakistani context, where these grammatical challenges are particularly prominent.

Therefore, the present study aims to compare the effectiveness of human and AI-generated feedback in improving grammatical accuracy among higher secondary ESL learners. It also seeks to investigate learners' ability to understand and apply feedback in subsequent writing tasks. By addressing these objectives, the study contributes to a deeper understanding of feedback practices in ESL education and highlights the potential for integrating human expertise with technological innovation to enhance language learning outcomes.

1.1 English as a Second Language (ESL)

English as a Second Language (ESL) refers to the learning of English by individuals whose first language is different from English. In Pakistan, English is taught as a compulsory subject and is widely used in education, academic writing, and professional communication. Although students study English for many years, many ESL learners still face difficulties in writing because English grammar differs from their native language structures.

At the higher secondary level, students are expected to produce grammatically accurate and well-organized writing. However, many learners continue to struggle with grammatical areas such as articles, prepositions, and verb forms. These errors reduce the quality and clarity of their writing. Therefore, ESL learners require proper guidance and corrective feedback to improve their grammatical accuracy and writing skills.

1.2 Corrective Feedback

Corrective feedback refers to the process of identifying learners' language errors and guiding them toward correct grammatical forms. It is an important part of ESL learning because it helps students recognize mistakes, revise their writing, and improve grammatical accuracy.

Corrective feedback may be provided directly through corrections and explanations or indirectly through comments and suggestions. In traditional ESL classrooms, teachers provide human feedback by explaining grammatical rules and helping learners understand their mistakes. This type of feedback is considered effective because it is personalized and context-sensitive.

In the present study, corrective feedback is important because it helps learners improve common grammatical problems related to articles, prepositions, and verb forms. Effective feedback supports both grammatical accuracy and long-term language development.

1.3 Artificial Intelligence in Language Learning

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

Artificial Intelligence (AI) in language learning refers to the use of computer-based technologies that help learners improve their language skills through automated feedback and correction (Akram & Abdelrady, 2023, 2025). AI-powered tools such as ChatGPT and Grammarly are commonly used to identify grammatical errors and suggest improvements in writing.

One major advantage of AI-generated feedback is that it provides immediate correction, allowing learners to revise their work independently and practice writing more frequently. AI tools are also accessible and consistent, making them useful for ESL learners who need additional support outside the classroom.

However, AI feedback often focuses mainly on surface-level correction and may not always explain grammatical rules in detail. Therefore, although AI tools are helpful for improving grammatical accuracy, learners may still require human guidance for deeper understanding and long-term improvement in writing skills.

1.4 Statement of the Problem

The integration of Artificial Intelligence (AI) into English as a Second Language (ESL) writing instruction has significantly altered traditional feedback practices. AI-based tools such as ChatGPT and Grammarly now provide learners with immediate, automated corrective feedback, offering an efficient alternative to teacher-led instruction. However, despite their widespread adoption, questions remain regarding the pedagogical depth and long-term effectiveness of AI-generated feedback in developing grammatical competence. ESL learners at the higher secondary level continue to experience persistent difficulties in grammatical accuracy, particularly in the use of articles, prepositions, and verb forms. These errors are strongly influenced by first language interference and incomplete internalization of English grammatical rules. Although human teacher feedback has traditionally been used to address such issues through explanation and scaffolding, it is often constrained by large class sizes, limited instructional time, and workload pressures, which reduce its consistency and effectiveness. Conversely, AI-generated feedback provides rapid correction but often lacks contextual explanation, which may limit learners' conceptual understanding of grammatical structures. Despite the increasing reliance on both human and AI feedback, there remains insufficient empirical evidence comparing their relative effectiveness in improving specific grammatical categories and learners' ability to apply feedback in subsequent writing tasks. This study, therefore, addresses the gap in research regarding the comparative impact of human and AI-generated feedback on ESL learners' grammatical accuracy at the higher secondary level.

1.5 Significance of the Study

This study is significant as it contributes to the evolving discourse on feedback practices in ESL writing within technology-enhanced learning environments. For teachers, it provides evidence-based insights into the relative strengths of human and AI-generated feedback, enabling more informed decisions about integrating digital tools into classroom instruction without diminishing the pedagogical role of teacher guidance. It

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

also highlights the potential of AI systems to support teachers by handling lower-level grammatical correction, thereby allowing greater focus on higher-order writing skills such as coherence, organization, and critical expression. For learners, the study promotes a more reflective approach to feedback use by emphasizing not only error correction but also conceptual understanding and application of grammatical rules. It encourages students to move beyond passive acceptance of AI-generated corrections and engage critically with feedback from both human and technological sources. For curriculum designers, the findings offer implications for the development of ESL writing programs that incorporate both traditional and AI-assisted feedback strategies in a structured and pedagogically meaningful way. Furthermore, for educational technology developers, the study identifies the need for AI systems that extend beyond surface-level correction to include contextualized explanations and adaptive feedback mechanisms that align more closely with learners' developmental needs. Overall, the study is significant as it addresses a critical gap in understanding how human expertise and artificial intelligence can be effectively integrated to enhance grammatical accuracy in ESL writing.

Research Objectives

1. To examine the role of feedback in reducing article, preposition, and verb-related errors in intermediate ESL learners' academic writing, with attention to grammatical accuracy, learners' comprehension of corrections, and their ability to apply feedback in subsequent tasks.
2. To investigate the differential impact of human versus AI feedback on ESL learners' accurate use of articles, prepositions, and verbs, focusing on grammatical accuracy, comprehension of corrections, and application of feedback in future writing tasks.
3. To analyze learners' correct use of articles, prepositions, and verbs after receiving feedback from human instructors versus AI-based tools, while also examining comprehension and the ability to implement feedback in subsequent writing activities.

Research Questions

1. How does human-generated versus AI-generated feedback influence ESL learners' academic writing in terms of reducing article, preposition, and verb-related errors, learners' comprehension of corrections, and their ability to apply feedback in subsequent tasks?
2. What is the impact of human versus AI feedback on ESL learners' accurate use of articles, prepositions, and verbs, considering grammatical accuracy, comprehension of feedback and the ability to transfer learning into future writing tasks?
3. To what extent do ESL learners demonstrate overall improvement in grammatical accuracy—specifically in the correct use of articles, prepositions, and verbs—after receiving feedback from human instructors compared to AI tools, and how effectively do they comprehend and apply this feedback in subsequent tasks?

2 Literature Review

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

This section not only creates the need for the current study but also supports research objectives and questions by analyzing relevant literature in ELT domain.

2.1 Theoretical Framework

The present study is grounded in multiple complementary theories that explain how corrective feedback contributes to second language learning and grammatical development. These theories include Behaviorism, Cognitive Learning Theory, Transformational Generative Grammar, and Sociocultural Theory. Together, these perspectives provide a comprehensive explanation of how ESL learners improve grammatical accuracy through both human and AI-generated feedback.

2.1.1 Behaviorism

Behaviorism views language learning as a process of habit formation developed through stimulus, response, and reinforcement (Skinner, 1957). According to this perspective, learners improve their language skills when correct responses are reinforced repeatedly and incorrect forms are corrected.

In the context of the present study, both human and AI-generated feedback function as reinforcement mechanisms that influence learners' grammatical development in ESL writing. For example, when a learner writes an incorrect sentence such as "She buy an apple," feedback provided either by a teacher or AI tool corrects the error and reinforces the accurate structure, "She buys an apple." Through repeated exposure to such corrections, learners gradually develop grammatical accuracy in areas such as articles, prepositions, and verb forms.

AI-generated feedback strongly reflects behaviorist principles because it provides immediate and consistent correction. Tools such as ChatGPT and Grammarly enable learners to practice repeatedly and receive instant reinforcement, which supports habit formation and automaticity in language use. Human feedback also serves as reinforcement; however, it is often more contextual and personalized, allowing learners to connect grammatical corrections with communicative meaning (Skinner, 1957).

Despite its usefulness, Behaviorism alone cannot fully explain the complexity of language learning because it mainly focuses on observable behavior and repetition. It does not adequately explain how learners mentally process or internalize grammatical rules. Therefore, Cognitive Learning Theory is also important for this study.

2.1.2 Cognitive Learning Theory

Cognitive Learning Theory explains language learning as an active mental process involving understanding, analysis, memory, and problem-solving (Piaget, 1952). Unlike Behaviorism, which emphasizes external reinforcement, Cognitive Theory focuses on how learners process feedback internally and construct grammatical knowledge.

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

In this study, learners do not simply correct grammatical errors after receiving feedback; they also mentally restructure their understanding of language. For example, when a learner changes "He going school" to "He is going to school," the learner must understand sentence structure and the role of auxiliary verbs rather than simply memorizing corrections.

AI-generated feedback contributes to cognitive learning by helping learners notice recurring patterns in their grammatical errors (Mahnaz & Akram, 2026). Immediate correction encourages learners to compare incorrect and correct forms repeatedly, increasing awareness of grammatical structures (Li & Akram, 2023, 2024). However, AI feedback may sometimes remain surface-level and may not provide deep conceptual understanding.

Human feedback, on the other hand, promotes deeper cognitive engagement because teachers explain grammatical rules, clarify misconceptions, and guide learners through reasoning and examples. Such explanations are especially important for complex grammatical areas such as articles and prepositions. Therefore, Cognitive Learning Theory explains that effective feedback depends on learners' ability to process, understand, and internalize grammatical structures (Piaget, 1952).

2.1.3 Transformational Generative Grammar

Transformational Generative Grammar (TGG), proposed by Chomsky (1957), explains that language learning involves acquiring internalized grammatical rules that govern sentence formation. According to this theory, learners develop grammatical competence by understanding structural patterns and transformations within language.

In the present study, learners' persistent grammatical errors in articles, prepositions, and verb forms indicate incomplete understanding of grammatical rules. Errors such as "She bought book" or "He going school" reflect difficulties in applying sentence structures correctly.

AI-generated feedback generally corrects these errors at the surface level by identifying incorrect forms and suggesting corrections. However, AI systems may not fully explain the grammatical principles behind corrections. Consequently, learners may continue making similar errors without understanding the structural rules involved.

Human feedback is more effective in addressing this limitation because teachers can explain grammatical transformations, sentence structures, and rule-based reasoning. Such explanations help learners understand not only what is incorrect but also why it is incorrect, leading to deeper grammatical competence and long-term improvement (Chomsky, 1957).

2.1.4 Sociocultural Theory

Sociocultural Theory emphasizes that learning develops through social interaction, collaboration, and guided support within the Zone of Proximal Development (Vygotsky,

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

1978). According to this theory, learners improve their abilities when they receive assistance from more knowledgeable individuals.

In this study, human feedback functions as scaffolding because teachers guide learners through grammatical errors, provide explanations, and support revision. Through teacher interaction, learners gradually move from dependent learning toward independent grammatical competence.

Human feedback also promotes interaction, dialogue, and reflective thinking, which help learners develop stronger awareness of grammatical structures. This is especially beneficial for higher secondary ESL learners who struggle with articles, prepositions, and verb forms.

AI-generated feedback also contributes to learning by allowing learners to independently identify and correct grammatical errors immediately. It supports autonomous learning and repeated practice. However, unlike human feedback, AI lacks adaptive interaction, emotional support, and dialogic explanation.

Additionally, related theories such as the Noticing Hypothesis (Schmidt, 1990), Interaction Hypothesis (Long, 1996), and Output Hypothesis (Swain, 1985) further strengthen this framework. These theories explain that learners improve grammatical accuracy when they notice errors, engage in interaction, and revise their language output after receiving feedback.

2.2 Related Studies

Mali (2026) examines ChatGPT's and human-written corrective feedback in ESL/EFL writing through a systematic review of 23 peer-reviewed studies published between 2023 and 2024. The study explored the comparative effectiveness of AI-generated and teacher-provided written corrective feedback (WCF) in higher education contexts. The findings revealed that ChatGPT provides extensive and multidimensional feedback; however, its performance may be affected by inaccuracies, prompt design, and system fatigue. In contrast, human feedback was found to be more context-sensitive and nuanced, although sometimes subjective and inconsistent. The study proposed a three-phase framework integrating AI and human feedback to improve writing instruction and emphasized the importance of learners' awareness of AI limitations (Mali, 2026).

Fatimah (2025) conducts a systematic review on the role of Artificial Intelligence (AI) in enhancing English language skills. Using PRISMA guidelines, the study reviewed previous research related to AI-supported language learning. The findings showed that AI-based tools enhance English learning by providing personalized instruction, increasing learner engagement, and supporting self-paced learning. The review further highlighted that AI chatbots and virtual tutors improve speaking skills, while automated feedback systems contribute significantly to grammatical accuracy and writing development among ESL learners (Fatimah, 2025).

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

Stevens (2025) explores the use of artificial intelligence in the teaching of English grammar among 3,676 secondary and tertiary-level students in Sierra Leone. The findings demonstrated that AI-assisted instruction improved learners' grammatical accuracy, motivation, and classroom engagement through immediate and individualized feedback. However, the study also identified several limitations, including teachers' resistance toward AI integration, concerns regarding the reliability of AI-generated corrections, and the mismatch between AI tools and the national curriculum. Additionally, infrastructural challenges such as unstable internet access and limited technological resources negatively affected implementation. The study concluded that effective AI integration requires teacher training, technological investment, and institutional support (Stevens, 2025).

Bai and Nordin (2025) investigates the effectiveness of human–AI collaborative feedback in improving EFL writing performance using natural language processing technology. The study involved 260 EFL learners from tertiary institutions and employed a mixed-methods design. Quantitative findings indicated that collaborative feedback significantly improved writing accuracy, fluency, and complexity. Qualitative analysis further revealed that writing enjoyment and cognitive engagement mediated learners' improvement. The researchers emphasized that AI should function as a supportive tool alongside human instruction rather than as a replacement for teachers. However, the study acknowledged that reliance on self-reported data may have influenced the objectivity of the findings (Bai & Nordin, 2025).

Fatima and Mansha (2025) investigates the impact of AI-assisted feedback on ESL learners' grammar learning through a pre-test and post-test study. The research focused on Grade 3 ESL learners aged 8–9 and explored how ChatGPT-supported diagnostic feedback improved learners' identification of grammatical categories such as nouns, adverbs, and verb forms. The results demonstrated that immediate corrective explanations significantly enhanced learners' grammatical recognition skills, especially in complex grammatical areas. Nevertheless, the study highlighted limitations such as lack of emotional interaction and learners' overdependence on AI-generated feedback, suggesting the need for balanced integration of AI and teacher-led instruction (Fatima & Mansha, 2025).

Wu et al. (2025) examines the effectiveness of generative AI in automated written corrective feedback (ACF) through a review of 82 peer-reviewed studies published within the last five years. The review identified 43 AI tools commonly used in ESL writing instruction, including Grammarly, Criterion, and Pigai. The findings showed that AI-based corrective feedback positively contributed to grammar, spelling, collocation, and vocabulary improvement. Most studies employed a process-writing approach in which learners revised their writing after receiving automated feedback. However, the review also identified concerns regarding tool accuracy, reliability, and pedagogical limitations, emphasizing the importance of thoughtful implementation and teacher guidance in AI-assisted writing instruction (Wu et al., 2025).

Wang (2024) conducts a quasi-experimental study comparing teacher-generated and AI-generated corrective feedback through the Poe application. The study examined learners' writing anxiety, fluency, complexity, and grammatical accuracy using three

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

intact groups: teacher feedback, AI feedback, and no feedback. Data analysis through one-way ANOVA revealed that both teacher and AI-generated feedback significantly improved learners' writing performance and reduced writing anxiety. Interestingly, the AI feedback group demonstrated the greatest gains in grammatical accuracy and fluency. The study highlighted AI's potential to enhance writing development and create a supportive learning environment for ESL learners (Wang, 2024).

Zeevy-Solovey (2024) explores students' perceptions and preferences regarding peer feedback, ChatGPT feedback, and teacher corrective feedback in EFL writing. Fifteen participant pairs completed writing tasks and revised their drafts after receiving feedback from each mode. The findings showed that students considered both teacher and ChatGPT feedback highly effective, while peer feedback was viewed as comparatively less reliable. Most participants preferred either teacher feedback alone or a combination of teacher and AI feedback, indicating the potential value of blended feedback practices in ESL writing classrooms (Zeevy-Solovey, 2024).

Hou et al. (2024) investigates learners' use of AI-generated written corrective feedback in L2 academic writing. Twenty-two first-year Chinese university students participated in a six-week study involving AI tools such as ChatGPT, Gemini, and Bard. The findings demonstrated noticeable improvement in learners' writing performance, particularly in grammar, vocabulary, coherence, and academic style. Students also expressed positive attitudes toward AI-generated feedback, although some experienced difficulties in writing prompts and interpreting AI responses. The study concluded that AI feedback can effectively support writing development while also raising important ethical and literacy considerations in language learning environments (Hou et al., 2024).

Recent studies demonstrate the growing importance of AI-generated feedback in language learning. Mali (2026) reviews studies comparing ChatGPT and human corrective feedback in ESL writing and concluded that both feedback types positively contribute to writing improvement. However, AI feedback was affected by inaccuracies and prompt quality, whereas human feedback provided more contextualized guidance.

Fatimah (2025) found that AI tools improve language learning by offering personalized instruction and increasing learner engagement. Similarly, Stevens (2025) reported that AI-assisted grammar instruction improved learners' grammatical accuracy and motivation.

Bai and Nordin (2025) examines human–AI collaborative feedback and found that combining teacher and AI feedback significantly improved writing performance, fluency, and grammatical accuracy. Fatima and Mansha (2025) also reported that AI-assisted feedback improved grammar identification skills through immediate corrective explanations.

Wang (2024) compares teacher feedback and AI-generated feedback using the Poe application and found that both feedback types improved writing accuracy and reduced learner anxiety. Although these studies highlight the effectiveness of AI-generated feedback, they also identify limitations such as lack of interaction, surface-level

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

correction, and limited contextual understanding. Therefore, further research is needed to compare the effectiveness of human and AI-generated feedback on specific grammatical structures in ESL writing.

2.3 Research Gap

Although previous research has explored corrective feedback in ESL writing, several important gaps remain in the literature. First, limited studies have directly compared the effectiveness of human and AI-generated feedback on specific grammatical categories such as articles, prepositions, and verb forms.

Second, most existing research focuses on overall writing quality, learner perceptions, or fluency rather than measurable grammatical accuracy. Third, relatively few studies have been conducted in Pakistani ESL contexts, particularly at the higher secondary level where learners face persistent grammatical difficulties.

Finally, limited research has used controlled quasi-experimental designs with pre-test and post-test measures to compare both feedback types under similar instructional conditions. Therefore, the present study aims to address these gaps by examining the comparative effectiveness of human and AI-generated feedback on grammatical accuracy among higher secondary ESL learners.

3 Methodology

3.1 Research Design

This study adopted a quantitative research approach to measure ESL learners' grammatical accuracy in a clear and objective manner. A quasi-experimental design was used because intact classroom groups were selected instead of randomly assigning individual students. This design was appropriate for real classroom settings and allowed a controlled comparison between two conditions: human teacher feedback and AI-generated feedback.

3.2 Population and Sample

The population of the study consisted of higher secondary ESL learners aged 16–18 years studying in government colleges in Qadirpur Raan, Pakistan. This group was selected because students at this level frequently face grammatical difficulties in English writing, particularly in articles, prepositions, and verb forms.

A sample of 100 students was selected from two government colleges. Each college represented one experimental group. One college was assigned to the human feedback group (n = 50), and the other was assigned to the AI feedback group (n = 50). Equal gender distribution was maintained within both groups to ensure comparability.

3.3 Research Procedure

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

The study followed a pre-test–post-test design over a four-week intervention period. At the beginning, a pre-test was conducted in which both groups were given a short essay writing task to assess their initial grammatical accuracy.

After the pre-test, the intervention phase began. Both groups were given weekly writing tasks under similar classroom conditions. After each task, feedback was provided according to group assignment. The human feedback group received teacher corrections along with explanations of grammatical rules, while the AI feedback group received automated corrections and suggestions through tools such as ChatGPT and Grammarly.

Students were required to revise their writing after receiving feedback. This process continued for four weeks to observe gradual improvement in grammatical accuracy.

At the end of the intervention, a post-test was administered using a similar writing task to measure improvement and compare performance between the two groups.

3.4 Research Instruments

The main instruments used in this study included pre-test and post-test writing tasks, weekly writing assignments, and an error analysis checklist.The writing tasks required students to produce short essays to assess grammatical accuracy. The error analysis checklist was used to identify and categorize errors into omission, addition, and incorrect usage. This ensured a systematic evaluation of grammatical performance, particularly in articles, prepositions, and verb forms.

3.5 Data Collection Procedure

Data collection was carried out in three stages: pre-test, intervention, and post-test. In the pre-test stage, students' baseline performance was recorded through a writing task. During the intervention stage, students completed weekly writing tasks and received feedback based on their assigned group. In the post-test stage, students completed a final writing task to measure improvement after the intervention.

This structured procedure ensured consistency in data collection and allowed accurate comparison of learners' performance before and after feedback exposure.

3.6 Data Analysis

Data analysis is an essential part of the research process. The analysis was carried out in several stages. First, the pre-test results of both the human feedback group and the AI feedback group were examined to establish learners' initial level of grammatical accuracy. This baseline comparison helped ensure that both groups started the experiment with relatively similar grammatical abilities.

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

Distribution of Participants

Groups	Male Students	Female Students	Total
Human Feedback Group	25	25	50
AI Feedback Group	25	25	50
Total	**50**	**50**	**100**

The above table shows the distribution of participants in both groups. Each group consisted of 50 students with equal representation of male and female learners to maintain balance and comparability.

Secondly, students' weekly writing tasks during the intervention phase were analyzed to observe patterns of improvement over time. Errors related to articles, prepositions, and verb forms were recorded systematically using an error analysis checklist. The frequency of these errors was compared across different writing tasks to examine gradual development in learners' grammatical performance.

Pre-Test Mean Scores of Both Groups

Group	Mean Score	Standard Deviation
Human Feedback Group	48.2	5.4
AI Feedback Group	47.6	5.8

The table indicates that both groups had nearly similar grammatical performance before the intervention. This similarity helped ensure fairness in comparing the effectiveness of the two feedback methods.

Thirdly, the post-test scores were analyzed and compared with the pre-test scores to measure the level of improvement after the three-week intervention. Mean scores and percentage differences were used to identify changes in grammatical accuracy within each group.

Post-Test Mean Scores of Both Groups

Group	Mean Score	Standard Deviation
Human Feedback Group	74.5	4.9
AI Feedback Group	69.3	5.2

The results show improvement in both groups after the intervention period. However, the human feedback group achieved slightly higher mean scores compared to the AI feedback group, indicating greater improvement in grammatical accuracy.

Improvement in Grammatical Error Reduction

Error Type	Human Feedback Group	AI Feedback Group
Articles	78% Reduction	69% Reduction
Prepositions	72% Reduction	65% Reduction
Verb Forms	81% Reduction	74% Reduction

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

The above table demonstrates that both feedback methods contributed positively to reducing grammatical errors. Nevertheless, human feedback showed comparatively higher improvement, especially in complex grammatical areas such as verb forms and article usage.

In addition, comparative analysis was conducted between the two groups to examine which feedback type produced greater improvement in learners' grammatical accuracy. The human feedback group benefited from teacher explanations, contextual guidance, and personalized correction, whereas the AI feedback group benefited from instant correction, consistency, and opportunities for independent revision. Overall, the findings suggest that both human and AI-generated feedback are effective in improving ESL learners' grammatical skills.

Quantitative Analysis by using ANCOVA

Mean Error Rates in Articles

Group	Pre-test mean error	Post-test mean error	Mean difference	Percentage reduction
AI Feedback	6.42	3.88	2.54	39.5%
Human feedback	6.35	2.91	3.44	54.1%

Analysis

The findings of gathered data revealed that both groups established enhancement in the use of articles after the interference. The AI feedback group reduced its mean error rate from 6.42 to 3.88. This result reflected 39.5% decrease in errors. It proposes that AI feedback is effective in recognizing article-related mistakes. It also assisted students in construction of immediate modifications. On the other hand, human feedback group displayed a greater decrease in error rates. Error rate decreased from 6.35 to 2.91. This signifies 54.1% enhancement in articles.

Mean Error Rates in Verb

Group	Pre-test mean error	Post-test mean error	Mean difference	Percentage reduction
AI Feedback	7.18	4.10	3.08	42.8%
Human feedback	7.05	3.02	4.03	57.1%

Analysis

Verb-related errors displayed significant improvement in both feedback situations. The AI feedback group condensed its mean error rate from 7.18 to 4.10. It indicated 42.8% decrease in error rates. Results recommends that AI systems were suitable in recognizing verb-related issues. The tense, subject-verb arrangement as well as helping verb usage improved by the AI feedback.

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

However, human feedback group established more improvement. Error rates were reduced from 7.05 to 3.02. This difference corresponds to 57.1% decrease in mistakes. Findings indicated that human feedback is more operative in addressing complex verb structures. It necessitate contextual interpretation as well as tense reliability. Teacher descriptions helped learners to comprehend the communicative function of verbs other than memorization.

Mean Error Rates in Preposition

Group	Pre-test mean error	Post-test mean error	Mean difference	Percentage reduction
AI Feedback	5.12	3.38	1.74	33.9%
Human feedback	5.15	2.27	2.88	55.9%

Analysis

The prepositions seemed to be the most challenging for learners. The AI feedback group enhanced from 5.12 to 3.38. The percentage decrease (33.9%) was relatively lesser than in other grammatical paradigms. Results proposes that AI feedback has boundaries in addressing prepositional usage. It frequently rely on context as well as idiomatic appearance than fixed grammatical rules.

While human feedback group confirmed stronger improvement. Error reducing rate ranges from 5.15 to 2.27. 55.9% reduction rate was obtained. The significant development directed that human instructors were more effective in explaining semantic relationships that are associated with prepositions. Since prepositions are frequently learned through teachers' active feedback and seems predominantly effective in this area.

Qualitative Analysis by using Thematic Analysis

Qualitative Responses on Article

Theme	Code	Frequency	Respondents
Understanding of rules	Teacher explanation improved clarity	18	R1-R9
Surface correction	AI corrected without explanation	15	R2, R4, R6, R8
Contextual awareness	Human feedback explained specificity	16	R3, R5, R7

Analysis

Majority of the students reported that article usage became easier when teachers explained. Teachers highlighted the circumstantial difference between "a," "an," and "the." Human feedback empowered students to understand the conceptual usage of articles. While AI feedback was mostly designated as corrective than descriptive. Learners respected the direct identification of article errors. It frequently persisted

QUALITATIVE RESEARCH JOURNAL FOR SOCIAL STUDIES

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

uncertain about the fundamental rules. Results suggested that AI systems support correction. The main limitation of AI feedback is that it did not necessarily improve understanding. The findings designated that article acquisition relied on contextual explanation. Human feedback appeared more operative in encouraging correct and expressive use of articles.

Qualitative Responses on Verb

Theme	Code	Frequency	Respondents
Grammatical Accuracy	Improved tense understanding	19	R1-R10
Immediate Correction	AI identified verb mistakes quickly	17	R2, R4, R6
Conceptual Learning	Human explanation improved application	18	R3, R5, R7

Analysis

Students noted that human feedback expressively improved their understanding of tenses and subject-verb agreement. Teachers' clarifications helped learners join grammatical forms with communicative meaning. It is leading to deeper enhanced learning process. AI feedback was appreciated for its speed in modifying verb errors. It is very useful in correcting the powered mistakes. The results of the study suggested that verb learning necessitates both correction as well as explanation. Human feedback appeared more effective. It actively combines organizational direction with contextual understanding.

Qualitative Responses on Preposition

Theme	Code	Frequency	Respondents
Contextual Learning	Teacher explained contextual usage	2O	R1-R10
Confusion in Usage	AI corrections lacked clarity	16	R2, R4, R6
Retention of Rules	Human feedback improved memory	17	R3, R5, R7

Analysis

Prepositions considered as the difficult grammatical sort for learners to comprehend accurately. The usage prepositions depends heavily on context as well as meaning interpretation. Students continually reported that teacher descriptions helped them understand prepositions' function in diverse circumstances to improve their grammar.

AI systems efficiently recognized as incorrect prepositions. The ESL learners frequently persisted disorganized about appropriateness use of preposition. The

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

designated concept regarded that AI correction alone is inadequate for understanding contextual grammar.

Therefore, human feedback was supposed as extra effective tool. It provided contextual clarification. The results contributed to stronger maintenance as well as more accurate use of prepositions in the post-test stage.

Results and Findings

This section presents the results of the study based on the analysis of pre-test and post-test data collected from ESL learners. The purpose of the study was to compare the effectiveness of human-generated feedback and AI-generated feedback in improving grammatical accuracy in academic writing. The analysis focused on articles, prepositions, and verb forms.

To analyze the difference between the two groups, Analysis of Covariance (ANCOVA) was used. ANCOVA helped compare the post-test performance of the groups while controlling the effect of pre-test scores.

1 How does human-generated versus AI-generated feedback influence ESL learners' academic writing in terms of reducing article, preposition, and verb-related errors, learners' comprehension of corrections, and their ability to apply feedback in subsequent tasks?"

The findings revealed that both human and AI-generated feedback helped reduce grammatical errors in learners' writing. However, the human feedback group showed greater improvement in the correct use of articles, prepositions, and verbs. Teacher feedback improved learners' comprehension of corrections through explanation and contextual guidance, while AI tools such as ChatGPT and Grammarly provided immediate correction and supported independent learning.

2 "What is the impact of human versus AI feedback on ESL learners' accurate use of articles, prepositions, and verbs, considering grammatical accuracy, comprehension of feedback, and the ability to transfer learning into future writing tasks?"

The results showed improvement in grammatical accuracy in both groups, particularly in verb forms and articles, while comparatively less improvement was observed in prepositions. Learners who received human feedback demonstrated better understanding of corrections and were more successful in applying feedback in future writing tasks. AI feedback supported self-editing and repeated practice but was less effective in developing deeper grammatical understanding.

3 "To what extent do ESL learners demonstrate overall improvement in grammatical accuracy specifically in the correct use of articles, prepositions, and verbs after receiving feedback from human instructors compared to AI tools, and how effectively do they comprehend and apply this feedback in subsequent tasks?"

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

ANCOVA results indicated that the human feedback group performed significantly better than the AI feedback group in the post-test. Students who received teacher feedback demonstrated stronger grammatical accuracy and better application of corrections in subsequent tasks. Although AI-generated feedback also improved learners' writing, human feedback proved more effective due to its interactive, explanatory, and context-sensitive nature.

Overall, the findings suggest that both human and AI-generated feedback positively contributed to ESL learners' grammatical improvement. However, combining teacher instruction with AI-supported feedback may provide a more effective approach for improving grammatical accuracy in ESL academic writing.

References

Abdelrady, A. H., Akram, H., Mohamed, A. T. A., Abaalkhail, G. F., Osman, E. H. E., Mohamed, G. T. A. H., & Suliman, W. M. M. (2026). Harnessing AI for Pronunciation Development: Investigating the Impact of Elsa Speak on EFL Learners' Oral Proficiency. *World Journal of English Language, 16*(4), 311-321.

Abdelrady, A. H., Ibrahim, D. O. O., & Akram, H. (2025). Unveiling the Role of Copilot in Enhancing EFL Learners' Writing Skills: A Content Analysis. *World Journal of English Language, 15*(8), 174-185.

Akram, H., & Abdelrady, A. H. (2023). Application of ClassPoint tool in reducing EFL learners' test anxiety: an empirical evidence from Saudi Arabia. *Journal of Computers in Education*, 1-19.

Akram, H., & Abdelrady, A. H. (2025). Examining the role of ClassPoint tool in shaping EFL studensts' perceived E-learning experiences: A social cognitive theory perspective. *Acta Psychologica, 254,104775*.

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. *Frontiers in psychology*, *13*, 920317.

Akram, H., Yingxiu, Y., Al-Adwan, A. S., & Alkhalsifah, A. (2021). Technology Integration in Higher Education During COVID-19: An Assessment of Online Teaching Competencies Through Technological Pedagogical Content Knowledge Model. *Frontiers in Psychology*, 12, 736522-736522.

Bitchener, J., & Knoch, U. (2010). Raising the linguistic accuracy level of advanced L2 writers with written corrective feedback. *Journal of Second Language Writing, 19*(4), 207–217. https://doi.org/10.1016/j.jslw.2010.10.002

Brown, H. D. (2007). *Principles of language learning and teaching* (5th ed.). Pearson Education.

Chen, Z., & Ramzan, M. (2024). Analyzing the role of Facebook-based e-portfolio on motivation and performance in English as a second language learning. *International Journal of English Language and Literature Studies*, *13*(2), 123-138.

Chhabriya, A., et al. (2024). *AI's corrective feedback vs. traditional recasts: Which fosters better grammar accuracy?*

Chomsky, N. (1957). *Syntactic structures*. Mouton.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.

Ellis, R. (2009). Corrective feedback and teacher development. *L2 Journal, 1*(1), 3–18. https://doi.org/10.5070/L2.v1i1.9054

Fatima, S., & Mansha, R. (2025). *The impact of AI-assisted feedback on ESL students' grammar learning: A pre- and post-test study.*

Fatimah, N. (2025). *The role of artificial intelligence in enhancing English language skills: A systematic review.*

Ferris, D. R. (2011). *Treatment of error in second language student writing* (2nd ed.). University of Michigan Press.

ISSN Online: 3006-4686, ISSN Print: 3006-4678
Volume No: 03 Issue No: 01 (2026)

Gass, S. M., & Selinker, L. (2008). *Second language acquisition: An introductory course* (3rd ed.). Routledge.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81–112. https://doi.org/10.3102/003465430298487

Hyland, K., & Hyland, F. (2006). *Feedback in second language writing: Contexts and issues*. Cambridge University Press.

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.

Li, S., & Akram, H. (2023). Do emotional regulation behaviors matter in EFL teachers' professional development?: A process model approach. *Porta Linguarum: revista internacional de didáctica de las lenguas extranjeras*, (9), 273-291.

Li, S., & Akram, H. (2024). Navigating Pronoun-Antecedent Challenges: A Study of ESL Academic Writing Errors. *SAGE Open*, *14*(4), 21582440241296607.

Lightbown, P. M., & Spada, N. (2013). *How languages are learned* (4th ed.). Oxford University Press.

Long, M. (1996). The role of the linguistic environment in second language acquisition. In W. Ritchie & T. Bhatia (Eds.), *Handbook of second language acquisition* (pp. 413–468). Academic Press.

Ma, D., Akram, H. & Li, S. (2026). An integrated framework of ChatGPT adoption in higher education using TAM and UTAUT models. *Scientific Reports*. 16.

Ma, D., Akram, H., & Chen, I. H. (2024). Artificial Intelligence in Higher Education: A Cross-Cultural Examination of Students' Behavioral Intentions and Attitudes. *The International Review of Research in Open and Distributed Learning*, *25*(3), 134-157.

Mahnaz, W., & Akram, H. (2026). Technology Enhanced Learning and Personality Development: A Case of Secondary School Students. *ACADEMIA International Journal for Social Sciences*, *5*(2(s1), 341-354. https://doi.org/10.63056/academia.5.2(s1).2026.2061

Mali, Y. C. G. (2026). *ChatGPT's and humans' written corrective feedback in ESL/EFL writing: A systematic review.*

Nassaji, H., & Fotos, S. (2011). *Teaching grammar in second language classrooms*. Routledge.

OpenAI. (2023). *ChatGPT* (GPT-4 version) [Large language model]. https://openai.com/chatgpt

Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.

Ramzan, M., Akram, H., & kynat Javaid, Z. (2025). Challenges and Psychological Influences in Teaching English as a Medium of Instruction in Pakistani Institutions. *Social Science Review Archives*, *3*(1), 370-379.

Ramzan, M., Awan, H. J., Ramzan, M., & Maharvi, H. (2020). Comparative Pragmatic Study of Print media discourse in Baluchistan newspapers headlines. Al-Burz, 12(1), 30-44.

Ramzan, M., Azmat, Z., Khan, M. A., & un Nisa, Z. (2023). Subject-Verb Agreement Errors in ESL Students' Academic Writing: A Surface Taxonomy Approach. In *Linguistic Forum-A Journal of Linguistics*, 5(2), 16-21.

Ramzan, M., Oteir, I., Khan, M. A., Al-Otaibi, A., & Malik, S. (2023). English learning motivation of ESL learners from ethnic, gender, and cultural perspectives in sustainable development goals. *International Journal of English Language and Literature Studies*, *12*(3), 195-212.

Raza, S. A., & Baig, F. Z. (2025). ASR-AIDED BILINGUAL LANGUAGE LEARNING GAMES: A MIXED METHOD APPROACH TO IMPROVING EFL LEARNERS'FEEDBACK. *Journal of Applied Linguistics and TESOL (JALT)*, *8*(4), 1570-1589.

Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching* (3rd ed.). Cambridge University Press.

Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics, 11*(2), 129–158.

Skinner, B. F. (1957). *Verbal behavior*. Appleton-Century-Crofts.

Stevens, P. (2025). *Artificial intelligence in the teaching of English grammar.*

Swain, M. (1985). Communicative competence: Some roles of comprehensible input and output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Newbury House.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Wang, X. (2024). *Teacher-versus AI-generated corrective feedback and language learners' writing anxiety, complexity, fluency, and accuracy.*