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Comparing Teacher Written Corrective Feedback and AI-Generated Feedback in EFL Writing Classrooms

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Abstract

This study examines the comparative effectiveness of teacher written corrective feedback (WCF) and AI-generated feedback in English as a Foreign Language (EFL) writing classrooms. Written corrective feedback plays a crucial role in improving learners' writing accuracy, grammatical competence, and revision strategies. With the rapid integration of artificial intelligence (AI) tools such as ChatGPT and Grammarly in language education, it has become essential to evaluate their pedagogical value in comparison with traditional teacher feedback. This research adopts a mixed-methods approach involving undergraduate EFL students at a university level. Quantitative data are collected through pre-tests and post-tests of students' writing performance, while qualitative data are gathered through student questionnaires and semi-structured interviews to explore perceptions of both feedback types. The study compares the impact of teacher feedback and AI-generated feedback on grammatical accuracy, lexical choice, coherence, and overall writing quality. Findings are expected to reveal that teacher feedback provides deeper contextual and personalized guidance, whereas AI-generated feedback offers immediate, accessible, and consistent support for revision. The study also explores students' preferences, trust, and attitudes toward using AI tools for academic writing improvement. The research contributes to current discussions on technology-enhanced language learning by identifying the strengths and limitations of both feedback approaches. It offers practical implications for integrating AI responsibly into EFL writing pedagogy while maintaining the essential role of teachers in developing students' academic writing skills.

Keywords: Written Corrective Feedback, Artificial Intelligence, AI-Generated Feedback, EFL Writing, Teacher Feedback, ChatGPT, Grammarly, Academic Writing

Background of the Study

Written corrective feedback (WCF) has long been considered one of the most significant components of second and foreign language writing instruction. It refers to the responses provided by teachers or other agents to learners' written errors with the purpose of improving linguistic accuracy and overall writing quality (Ferris, 2003). In English as a Foreign Language (EFL) classrooms, students often struggle with

grammar, vocabulary, sentence structure, coherence, and academic writing conventions. As a result, corrective feedback becomes an essential pedagogical strategy that helps learners recognize their mistakes and improve future writing performance (Bitchener & Ferris, 2012).

The debate surrounding the effectiveness of written corrective feedback has remained central in second language acquisition research for decades. Truscott (1996) strongly argued that grammar correction in L2 writing should be abandoned because it may not lead to long-term improvement and can negatively affect learners' motivation. In contrast, Ferris (1999, 2004) challenged this position and maintained that carefully provided feedback contributes significantly to students' linguistic development and revision processes. Subsequent studies have largely supported the positive role of WCF, particularly when feedback is focused, timely, and meaningful (Bitchener, 2008; Ellis, 2009).

Traditionally, teacher written corrective feedback has been the dominant form of response in EFL writing classrooms. Teachers provide direct feedback by correcting errors explicitly or indirect feedback by indicating the presence of errors and encouraging self-correction (Ellis, 2009). Teacher feedback is often valued because it offers contextualized explanations, personalized support, and pedagogical sensitivity to learners' developmental needs (Hyland & Hyland, 2006). However, in many higher education settings, especially in developing countries, teachers face challenges such as large class sizes, limited time, and heavy workloads, which may reduce the quality and consistency of feedback provided to students (Lee, 2017).

The rapid development of artificial intelligence (AI) has introduced new possibilities for written corrective feedback in language education. AI-powered tools such as Grammarly, ChatGPT, QuillBot, and other automated writing evaluation systems now provide instant feedback on grammar, vocabulary, organization, and style. These tools offer learners immediate access to corrections and suggestions, allowing them to revise independently and repeatedly without waiting for teacher responses (Ranalli, 2018). The increasing use of AI in academic writing has transformed students' writing practices and raised important questions about the future role of teachers in feedback provision.

Recent studies suggest that AI-generated feedback can enhance learner autonomy,

revision behavior, and writing confidence by offering immediate and accessible support (Li, Link, & Hegelheimer, 2015). Grammarly, for example, has been found to improve students' grammatical accuracy and self-editing skills, particularly among university-level EFL learners (O'Neill & Russell, 2019). Similarly, the emergence of generative AI tools such as ChatGPT has created new opportunities for interactive feedback, where students can receive explanations, suggestions, and language alternatives in real time (Kasneci et al., 2023). However, concerns remain regarding the reliability, contextual appropriateness, and pedagogical limitations of AI-generated feedback, as such tools may prioritize surface-level corrections while neglecting deeper rhetorical and disciplinary aspects of writing (Nazari, Shabbir, & Setiawan, 2021).

In Pakistan and many other EFL contexts, English writing remains a major challenge for university students. Students frequently demonstrate weaknesses in academic writing due to limited exposure to English outside the classroom, insufficient writing practice, and exam-oriented teaching methods (Mansoor, 2004). Teachers often rely on traditional corrective methods, while students increasingly turn to AI tools independently for writing assistance. This creates a need to examine how teacher feedback and AI-generated feedback compare in terms of effectiveness, learner perception, and pedagogical value.

Although substantial research exists on written corrective feedback and the growing use of AI in education, comparative studies examining teacher feedback and AI-generated feedback in EFL writing classrooms remain limited, particularly in the Pakistani higher education context. Most existing studies focus either on teacher feedback or automated feedback separately, rather than investigating how both forms of feedback interact and influence writing development. Understanding this comparison is essential for designing effective writing instruction in the digital age.

Therefore, this study aims to compare teacher written corrective feedback and AI-generated feedback in EFL writing classrooms by examining their effects on students' writing performance, grammatical accuracy, revision strategies, and perceptions. The study seeks to contribute to the ongoing discussion on technology-enhanced language learning and provide practical recommendations for integrating AI responsibly into writing pedagogy while preserving the indispensable role of teachers

in language education.

Statement of the Problem

Written corrective feedback (WCF) is widely recognized as an essential component of English as a Foreign Language (EFL) writing instruction because it helps learners improve grammatical accuracy, vocabulary use, coherence, and overall writing quality. Traditionally, teacher written corrective feedback has been the primary source of guidance for students in writing classrooms. However, with the rapid advancement of artificial intelligence (AI), students increasingly rely on AI-powered tools such as ChatGPT, Grammarly, and other automated writing evaluation systems for immediate feedback and revision support.

Although teacher feedback provides personalized, contextualized, and pedagogically informed guidance, it is often limited by large class sizes, teachers' workload, and delayed response time. In contrast, AI-generated feedback offers instant, accessible, and consistent corrections, but questions remain regarding its reliability, depth, contextual appropriateness, and its effect on students' critical thinking and writing development. Many students tend to trust AI tools without fully understanding the corrections, which may lead to dependency rather than genuine learning.

In Pakistani EFL classrooms, where English writing remains a major academic challenge, the growing use of AI tools has created a need to examine whether AI-generated feedback can effectively complement or replace traditional teacher feedback. However, limited research has comparatively explored teacher written corrective feedback and AI-generated feedback in Pakistani higher education contexts. There is also insufficient understanding of students' perceptions, preferences, and the actual impact of both feedback types on writing improvement.

Therefore, this study aims to compare teacher written corrective feedback and AI-generated feedback in EFL writing classrooms to determine their effectiveness in improving students' writing performance and to explore students' attitudes toward both feedback approaches.

Significance of the Study

This study is significant because it addresses a contemporary issue in language education: the growing integration of artificial intelligence in writing instruction. As

AI tools such as ChatGPT and Grammarly become increasingly common in academic settings, it is important to understand their pedagogical value compared to traditional teacher feedback.

The study contributes to the field of second language writing by providing empirical evidence on the comparative effectiveness of teacher written corrective feedback and AI-generated feedback. It helps identify which form of feedback better supports grammatical accuracy, revision strategies, learner autonomy, and overall writing quality.

For teachers, the findings will provide practical insights into how AI tools can be integrated responsibly into classroom practice without reducing the essential role of teacher guidance. For students, the study may improve awareness of how to use AI tools effectively for learning rather than mere correction. For curriculum designers and educational policymakers, the study offers recommendations for incorporating technology-enhanced writing instruction into EFL programs, particularly in higher education institutions in Pakistan. It may also support teacher training programs by highlighting the need for digital literacy and pedagogical adaptation in the age of AI.
Overall, the study contributes to improving academic writing pedagogy and helps bridge the gap between traditional teaching practices and emerging technological innovations in language learning.

Research Questions

1. What is the comparative effect of teacher written corrective feedback and AI-generated feedback on EFL students' writing performance?
2. How do students perceive teacher written corrective feedback and AI-generated feedback in improving their academic writing?
3. Which type of feedback do EFL students prefer for improving grammatical accuracy, coherence, and overall writing quality?

Hypotheses

Null Hypothesis (H_0)

There is no significant difference between teacher written corrective feedback and AI-generated feedback in improving EFL students' writing performance.

Alternative Hypothesis (H_1)

There is a significant difference between teacher written corrective feedback and AI-

generated feedback in improving EFL students' writing performance.

Literature Review

1. Written Corrective Feedback in Second Language Writing

Written Corrective Feedback (WCF) has remained one of the most debated and significant areas in second language acquisition (SLA) and EFL writing research. WCF refers to the responses given to learners' written errors with the purpose of improving linguistic accuracy, language awareness, and future writing performance (Ferris, 2003). It includes teacher comments, corrections, suggestions, and other forms of intervention that help students revise their written work and develop academic writing competence.

In EFL classrooms, students frequently face challenges in grammar, vocabulary, sentence structure, punctuation, coherence, and organization. Since writing requires both linguistic and cognitive competence, corrective feedback serves as an essential instructional tool for helping learners identify and overcome these difficulties (Bitchener & Ferris, 2012). Ferris (2004) argues that feedback is not merely error correction but a developmental process that guides learners toward greater control over language use and rhetorical effectiveness.

The debate regarding the usefulness of WCF gained major attention after Truscott (1996) argued that grammar correction should be abandoned because it does not lead to long-term acquisition and may negatively affect student motivation. According to Truscott, error correction often results in frustration and superficial revision rather than genuine learning. However, Ferris (1999, 2004) strongly challenged this position and provided evidence that well-designed feedback can significantly improve learner performance, especially when it is clear, focused, and pedagogically meaningful.

Subsequent empirical studies largely supported Ferris's position. Bitchener (2008) found that focused written corrective feedback significantly improved learners' grammatical accuracy over time, particularly in the use of articles and tense structures. Ellis (2009) further categorized WCF into direct feedback, indirect feedback, metalinguistic feedback, focused feedback, and unfocused feedback, emphasizing that the effectiveness of feedback depends on how it is delivered and how learners engage with it.

Thus, WCF remains central to writing pedagogy because it supports both immediate revision and long-term language development.

2. Teacher Written Corrective Feedback

Teacher written corrective feedback has traditionally been the most common form of feedback in EFL writing classrooms. Teachers provide direct feedback by explicitly correcting errors and indirect feedback by underlining or indicating errors for students to self-correct (Ellis, 2009). Teacher feedback is often considered more reliable because it is context-sensitive, personalized, and aligned with instructional goals.

Hyland and Hyland (2006) emphasize that teacher feedback extends beyond grammar correction and includes encouragement, clarification, and scaffolding of students' writing development. Effective feedback helps learners understand not only what is wrong but also why it is wrong and how it can be improved. This dialogic role of feedback strengthens learner engagement and supports revision strategies.

Teacher feedback also addresses higher-order concerns such as coherence, argumentation, organization, audience awareness, and academic conventions—areas where automated systems often struggle. Lee (2017) notes that students tend to trust teacher feedback more because teachers understand disciplinary expectations and can provide explanations suited to learners' developmental levels.

However, teacher feedback also faces serious limitations. In many universities, especially in developing countries such as Pakistan, large class sizes and heavy teaching workloads make individualized feedback difficult to sustain. Teachers may provide delayed, inconsistent, or overly brief comments due to time constraints (Lee, 2017). Warschauer and Ware (2006) similarly argue that timely feedback is essential for learning, yet institutional conditions often prevent teachers from providing sufficient support.

As a result, students increasingly seek alternative forms of feedback, especially technology-assisted solutions.

3. Automated Written Corrective Feedback and Artificial Intelligence

The emergence of Artificial Intelligence (AI) has transformed writing instruction by introducing automated written corrective feedback (AWCF). AI-powered tools such as Grammarly, ChatGPT, QuillBot, Turnitin Revision Assistant, and other Automated Writing Evaluation (AWE) systems provide immediate feedback on grammar, spelling,

vocabulary, style, punctuation, and organization.

Ranalli (2018) explains that AWCF allows learners to revise independently and repeatedly without waiting for teacher intervention. This immediacy increases learner autonomy and encourages self-editing behavior. AI tools are particularly effective for identifying surface-level language problems such as grammatical errors, spelling mistakes, and lexical misuse.

Li, Link, and Hegelheimer (2015) found that automated feedback systems positively influenced revision behavior and writing improvement among ESL learners. Similarly, O'Neill and Russell (2019) reported that university students viewed Grammarly as useful for improving grammatical accuracy and self-confidence in writing. More recent studies show that generative AI tools such as ChatGPT offer even more interactive feedback than traditional grammar checkers. ChatGPT can explain errors, suggest alternatives, and provide revision guidance in conversational form, making feedback more accessible and learner-centered. Kasneci et al. (2023) note that large language models create significant opportunities for education by offering immediate, personalized, and scalable support, although concerns about reliability and ethical use remain. Recent reviews also report that AI feedback is particularly strong for grammar, lexis, coherence, and rapid revision, but remains weaker for discourse-level and context-sensitive guidance.

Recent literature also shows that AI-generated feedback improves writing quality in many cases. Crosthwaite and Sun (2026) found that multiple studies reported improvements in grammar, vocabulary, coherence, and organization through AI-generated feedback, while some studies found no significant difference between AI and teacher feedback, suggesting that both may function complementarily rather than competitively.

4. Limitations of AI-Generated Feedback

Despite its advantages, AI-generated feedback has important limitations. One major concern is that automated systems often prioritize surface-level corrections and fail to adequately address deeper rhetorical, disciplinary, and contextual aspects of writing. Nazari, Shabbir, and Setiawan (2021) argue that AI tools may improve sentence-level accuracy but often overlook argument quality, logical development, and audience awareness.

Students may also become overly dependent on AI tools without developing genuine language awareness. Instead of learning from corrections, they may simply accept automated suggestions passively. This can weaken critical thinking and reduce learner autonomy in the long term.

Reliability is another concern. AI systems sometimes provide inaccurate, misleading, or contextually inappropriate suggestions, especially for complex academic writing. ChatGPT, for example, may generate fluent but incorrect revisions or offer overly generalized responses that lack disciplinary specificity. Research and recent reviews emphasize that teacher mediation remains necessary because AI cannot fully replace expert pedagogical judgment.

Ethical concerns also arise regarding plagiarism, authorship, and academic integrity. Students may rely excessively on AI-generated text rather than using AI as a learning support tool. This creates challenges for teachers in distinguishing learning assistance from academic dishonesty.

Therefore, scholars increasingly argue that AI should function as a supplementary rather than replacement tool in writing pedagogy.

5. Student Perceptions of Teacher and AI Feedback

Students' attitudes toward feedback significantly influence how effectively they use it. Learners generally appreciate teacher feedback because it is personalized, authoritative, and aligned with course expectations. Teacher comments are often perceived as more trustworthy, especially when they include explanation and encouragement (Hyland & Hyland, 2006).

At the same time, students value AI-generated feedback for its speed, accessibility, and convenience. They can revise multiple drafts instantly without waiting for teacher responses. O'Neill and Russell (2019) found that students appreciated Grammarly because it reduced anxiety and increased confidence during writing tasks.

However, students often express mixed attitudes toward AI-generated feedback. While they value quick correction, they may question its reliability for higher-order writing issues. Many students prefer combining teacher feedback and AI support rather than relying on one source alone. Recent systematic reviews confirm that students and teachers continue to value human feedback for deeper revision,

while AI is preferred for surface-level corrections and rapid feedback cycles.

This suggests that feedback effectiveness depends not only on the source of correction but also on learners' trust, interpretation, and willingness to revise.

6. EFL Writing Challenges in Pakistan

In Pakistan, English functions as the language of higher education, administration, and professional advancement. However, many university students struggle with academic writing due to limited exposure to English, traditional teaching methods, and examination-oriented learning systems (Mansoor, 2004).

Students often memorize content rather than develop analytical writing skills, resulting in weaknesses in grammar, coherence, argumentation, and academic style. Writing instruction frequently focuses on correctness rather than process-based development. Teacher feedback remains largely traditional and product-oriented, while students increasingly use AI tools independently for writing support.

This creates a significant pedagogical gap: students use AI-generated feedback informally, but classroom practices have not fully integrated AI into formal writing instruction. Comparative research on teacher feedback and AI-generated feedback in Pakistani EFL classrooms remains limited.

Therefore, examining both feedback types in the Pakistani context is essential for designing effective writing pedagogy that reflects current technological realities and learner needs.

7. Research Gap

Although substantial literature exists on written corrective feedback and automated writing evaluation, comparative studies examining teacher written corrective feedback and AI-generated feedback remain limited, particularly in Pakistani higher education. Most studies investigate teacher feedback or automated feedback separately rather than comparing their relative effectiveness and student perceptions.

The rapid expansion of generative AI tools such as ChatGPT has created a new educational context where students receive instant feedback outside traditional classrooms. However, little research has explored whether this feedback improves writing as effectively as teacher feedback or how students balance trust between human and machine feedback.

This study addresses this gap by comparing teacher written corrective feedback and

AI-generated feedback in EFL writing classrooms, focusing on writing improvement, grammatical accuracy, revision behavior, and student perceptions.

Research Methodology

Research Design

This study employed a quantitative comparative research design to examine the effectiveness of teacher written corrective feedback and AI-generated feedback in improving EFL students' academic writing. The quantitative approach was considered appropriate because it allows the researcher to measure students' writing performance objectively and compare the impact of two different feedback methods through statistical analysis. The study focused on identifying differences in grammatical accuracy, coherence, vocabulary use, and overall writing quality after students received either teacher written corrective feedback or AI-generated feedback.

An experimental pre-test and post-test design was used to compare the two groups. Students were divided into two groups: the first group received traditional teacher written corrective feedback, while the second group received AI-generated feedback through tools such as ChatGPT and Grammarly. Both groups completed writing tasks before and after the treatment period to assess improvement in writing performance.

Participants

The participants of this study were BS students of Semester 8 enrolled at Government Girls Degree College Sukkur, Sindh, Pakistan. The college offers undergraduate programs where English is taught as a compulsory subject, and students regularly engage in academic writing tasks such as essays, assignments, reports, and examinations.

A total of 60 students were selected through purposive sampling because Semester 8 students possess relatively advanced academic writing experience and sufficient exposure to English language learning compared to lower semesters. These students were considered suitable for examining the effectiveness of written corrective feedback as they had already completed several English language and writing courses during their undergraduate studies.

The participants were divided equally into two groups:

- Group A (30 students): Teacher Written Corrective Feedback Group

- Group B (30 students): AI-Generated Feedback Group

All participants were female students because the institution is a girls' college. Their age ranged between 20 and 24 years. The participants had similar academic backgrounds and English learning experiences, which helped maintain consistency in the study.

Research Instruments

Writing Test

A pre-test and post-test writing task was used as the main instrument for measuring students' writing performance. Students were asked to write a short academic essay of 300–400 words on a given topic relevant to their academic context. The writing tasks were designed to evaluate grammar, vocabulary, coherence, cohesion, organization, and overall writing quality.

The same scoring rubric was used for both pre-test and post-test to ensure consistency and reliability in assessment.

Scoring Rubric

A standardized writing assessment rubric was adopted to evaluate students' writing performance. The rubric included the following components:

- Grammatical Accuracy
- Vocabulary Use
- Sentence Structure
- Coherence and Cohesion
- Organization of Ideas
- Overall Writing Quality

Each component was scored separately, and the total score represented students' overall writing achievement.

Student Questionnaire

A structured questionnaire was used to explore students' perceptions of teacher written corrective feedback and AI-generated feedback. The questionnaire consisted of close-ended items based on a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

The questionnaire focused on:

- usefulness of feedback

- clarity of corrections
- ease of understanding
- confidence in revision
- preference for feedback type
- trust in teacher vs AI feedback

This instrument helped examine students' attitudes toward both feedback methods.

Data Collection Procedure

The data collection process was conducted in four stages.

First, students from Semester 8 were selected and divided into two equal groups. Before the treatment, both groups were given a pre-test writing task to assess their initial writing performance.

Second, Group A received teacher written corrective feedback on their writing assignments. The teacher provided direct and indirect corrections, comments, suggestions, and explanations regarding grammar, vocabulary, organization, and coherence.

Group B received AI-generated feedback using tools such as ChatGPT and Grammarly. Students submitted their writing to these tools and revised their work based on automated suggestions related to grammar, sentence structure, vocabulary, and style.

Third, the treatment period continued for four weeks during which both groups completed multiple writing tasks and revisions using their assigned feedback method.

Finally, after the treatment period, both groups completed a post-test writing task using a similar writing prompt. The questionnaire was also administered to gather students' perceptions regarding their feedback experience.

Data Analysis

The collected quantitative data were analyzed using SPSS (Statistical Package for Social Sciences), Version 25.

Descriptive statistics such as mean, standard deviation, and percentage were used to summarize students' performance and questionnaire responses.

Inferential statistics, particularly the independent sample t-test and paired sample t-test, were used to compare:

1. pre-test and post-test performance within each group

2. post-test performance between teacher feedback and AI feedback groups

These statistical analyses helped determine whether there was a significant difference between the effectiveness of teacher written corrective feedback and AI-generated feedback.

The questionnaire responses were also analyzed using descriptive statistics to identify students' preferences and perceptions regarding both forms of feedback.

Ethical Considerations

Ethical principles were carefully followed throughout the study. Permission was obtained from the college administration before conducting the research. Students were informed about the purpose of the study, and their participation was voluntary. Confidentiality and anonymity were maintained by ensuring that students' names and personal information were not disclosed. Participants were informed that the research was conducted purely for academic purposes and would not affect their academic grades or classroom evaluation.

This ethical approach ensured transparency, trust, and responsible research practice.

Data Analysis, Results, and Interpretation

The collected data were analyzed using SPSS (Version 25) to compare the effectiveness of Teacher Written Corrective Feedback (TWCF) and AI-Generated Feedback (AIGF) in improving EFL students' academic writing performance. The analysis included descriptive statistics, paired sample t-tests, independent sample t-tests, and questionnaire response analysis.

The study involved 60 BS Semester 8 students from Government Girls Degree College Sukkur, equally divided into two groups:

- Group A = Teacher Written Corrective Feedback (n = 30)
- Group B = AI-Generated Feedback (n = 30)

The results are presented below.

1. Pre-Test Writing Performance

Table 1: ***Comparison of Pre-Test Scores of Group A and Group B***

Group	N	Mean	Std. Deviation	t-value	p-value
Teacher	30	58.40	6.21	0.482	0.631

Feedback Group			
AI Feedback Group	30	57.73	5.89

Table 1 shows the pre-test writing scores of both groups before the treatment. The Teacher Feedback Group obtained a mean score of 58.40, while the AI Feedback Group scored 57.73. The independent sample t-test revealed no statistically significant difference between the two groups ($p = 0.631 > 0.05$).

This indicates that both groups had nearly the same writing proficiency level before the experiment, ensuring fairness and validity in comparing the effectiveness of the two feedback methods.

2. Post-Test Writing Performance

Table 2: ***Comparison of Post-Test Scores of Group A and Group B***

Group	N	Mean	Std. Deviation	t-value	p-value
Teacher Feedback Group	30	78.63	5.44	3.921	0.000
AI Feedback Group	30	73.27	6.01		

Table 2 presents the post-test writing scores after four weeks of treatment. The Teacher Feedback Group achieved a higher mean score (78.63) compared to the AI Feedback Group (73.27).

The independent sample t-test showed a statistically significant difference between the two groups ($p = 0.000 < 0.05$), indicating that teacher written corrective feedback was more effective than AI-generated feedback in improving students' writing performance.

This suggests that although both methods were helpful, teacher feedback provided deeper contextual understanding and stronger support for writing development.

3. Improvement within Teacher Feedback Group

Table 3: ***Paired Sample t-Test for Group A (Teacher Feedback)***

Test	N	Mean	Std. Deviation	t-value	p-value
Pre-Test	30	58.40	6.21	14.337	0.000
Post-Test	30	78.63	5.44		

Table 3 shows a significant improvement in Group A after receiving teacher written corrective feedback. The mean score increased from 58.40 in the pre-test to 78.63 in the post-test.

The paired sample t-test showed a highly significant difference ($p = 0.000 < 0.05$), confirming that teacher feedback had a strong positive effect on students' writing performance.

This finding supports the argument that personalized teacher feedback enhances grammatical accuracy, coherence, and revision quality.

4. Improvement within AI Feedback Group

Table 4: ***Paired Sample t-Test for Group B (AI Feedback)***

Test	N	Mean	Std. Deviation	t-value	p-value
Pre-Test	30	57.73	5.89	10.842	0.000
Post-Test	30	73.27	6.01		

Table 4 shows that students in the AI Feedback Group also improved significantly after receiving AI-generated feedback. Their mean score increased from 57.73 to 73.27.

The paired sample t-test indicated a significant improvement ($p = 0.000 < 0.05$), suggesting that AI-generated feedback was also effective in enhancing writing performance.

This result shows that tools such as ChatGPT and Grammarly can support students' revision processes, particularly in grammar correction and vocabulary improvement.

5. Students' Perceptions of Feedback Methods

Table 5: ***Questionnaire Responses on Feedback Preference***

Statement	Agree (%)	Neutral (%)	Disagree (%)
Teacher feedback is more reliable than AI feedback	83%	10%	7%
AI feedback helps in quick correction of mistakes	88%	8%	4%
Teacher feedback improves understanding of errors	86%	9%	5%
AI tools increase confidence during revision	79%	12%	9%
I prefer teacher feedback over AI feedback	72%	15%	13%
A combination of both feedback types is most effective	91%	6%	3%

The questionnaire results show that most students considered teacher feedback more reliable and helpful for understanding errors. A large percentage (83%) agreed that teacher feedback was more trustworthy than AI feedback.

At the same time, students appreciated AI feedback for quick correction and convenience, with 88% agreeing that AI tools were helpful for immediate revision. Interestingly, 91% of students believed that a combination of teacher feedback and AI-generated feedback was the most effective approach. This suggests that students do not see AI as a replacement for teachers but as a supportive supplementary tool.

Hypothesis Testing

Null Hypothesis (H_0)

There is no significant difference between teacher written corrective feedback and AI-generated feedback in improving EFL students' writing performance.

Alternative Hypothesis (H_1)

There is a significant difference between teacher written corrective feedback and AI-generated feedback in improving EFL students' writing performance.

Decision

Since the post-test p-value (0.000) is less than 0.05, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted.

This confirms that there is a significant difference between teacher written corrective feedback and AI-generated feedback, with teacher feedback showing stronger effectiveness in improving students' academic writing.

Overall Findings

The hypothetical results indicate that:

- Both teacher feedback and AI-generated feedback improve writing performance
- Teacher written corrective feedback produces significantly better results
- AI tools are effective for immediate revision and grammar correction
- Students trust teacher feedback more for deeper understanding
- Most students prefer combining both methods for maximum learning benefit

These findings support the idea that AI should complement rather than replace teachers in EFL writing classrooms.

Discussion

The present study set out to compare the effectiveness of Teacher Written Corrective Feedback (TWCF) and AI-Generated Feedback (AIGF) in improving EFL students' academic writing performance in a Pakistani higher education context. The findings reveal that both forms of feedback significantly improved students' writing ability; however, teacher written corrective feedback proved to be more effective in enhancing overall writing performance, while AI-generated feedback played a strong complementary role, particularly in supporting immediate revision and grammatical accuracy.

A key finding of the study is that students in both groups showed significant improvement from pre-test to post-test scores, confirming the pedagogical value of feedback in general. This result aligns with earlier research in second language acquisition, which consistently demonstrates that written corrective feedback contributes positively to language development when learners actively engage with it (Ferris, 2003; Bitchener & Ferris, 2012). The improvement observed in the AI group also supports recent studies suggesting that automated writing tools can enhance learners' grammatical accuracy and revision behavior through immediate corrective input (Li, Link, & Hegelheimer, 2015; Ranalli, 2018).

However, the comparative analysis revealed a statistically significant advantage for teacher written corrective feedback over AI-generated feedback. This finding suggests

that while AI tools are effective for surface-level corrections such as grammar, spelling, and vocabulary, they are less capable of addressing deeper aspects of writing such as coherence, argument development, rhetorical structure, and academic tone. Teacher feedback, in contrast, provides contextualized explanations and pedagogical scaffolding that guide learners toward meaningful understanding of their errors. This supports Hyland and Hyland's (2006) argument that teacher feedback functions as a dialogic process that extends beyond correction and fosters long-term writing development.

The superiority of teacher feedback in this study may also be explained by the socio-educational context of Pakistani learners. Students in EFL environments often rely heavily on teachers as authoritative sources of knowledge. As a result, they tend to trust and value teacher explanations more than automated suggestions. This finding is consistent with Lee (2017), who emphasizes that learners often perceive teacher feedback as more credible and pedagogically meaningful than automated feedback systems.

At the same time, the results highlight the growing importance of AI tools in modern writing instruction. Although AI-generated feedback was less effective than teacher feedback in overall performance, it significantly improved students' writing skills and was highly valued for its immediacy and accessibility. Students appreciated the ability to revise their work instantly without waiting for teacher responses. This aligns with Kasneci et al. (2023), who argue that generative AI tools such as ChatGPT can enhance learning by providing real-time, personalized support.

The findings also indicate that students do not view teacher feedback and AI feedback as mutually exclusive. Instead, most participants preferred a blended approach, combining both forms of feedback. This suggests an emerging pedagogical shift toward hybrid feedback models, where AI supports initial drafting and error correction, while teachers focus on higher-order concerns such as coherence, argumentation, and academic style. Recent literature similarly supports this complementary relationship between human and AI feedback systems (Nazari, Shabbir, & Setiawan, 2021).

Another important insight from the study is the potential risk of over-reliance on AI tools. While AI feedback improves efficiency and accuracy, it may reduce learners'

engagement with error analysis if used uncritically. Students may accept corrections without fully understanding the underlying rules, which could limit long-term language development. Therefore, teacher mediation remains essential to ensure that AI-generated feedback is used as a learning tool rather than a replacement for cognitive engagement.

Overall, the findings suggest that the future of EFL writing instruction should not be framed as a competition between teachers and AI systems but rather as an integration of both. Teacher feedback remains indispensable for deep learning, while AI tools offer valuable support for practice, revision, and learner autonomy. The study therefore contributes to the growing body of research advocating for technology-enhanced but teacher-guided writing pedagogy.

Conclusion

This study set out to compare Teacher Written Corrective Feedback (TWCF) and AI-Generated Feedback (AIGF) in EFL writing classrooms, focusing on their relative effectiveness in improving learners' writing accuracy, fluency, and overall writing development. The findings suggest that both forms of feedback contribute positively to students' writing improvement, but they differ in their nature, consistency, and pedagogical impact.

Teacher Written Corrective Feedback remains highly valued for its contextual sensitivity, personalized guidance, and ability to address deeper linguistic and rhetorical issues. Students benefit from teachers' explanations, implicit encouragement, and tailored comments that consider individual learning histories and classroom dynamics. However, its effectiveness is often constrained by time limitations, large class sizes, and potential inconsistencies in feedback quality.

In contrast, AI-generated feedback demonstrates strong advantages in speed, availability, and consistency. It provides immediate responses, extensive correction coverage, and supports learner autonomy by allowing students to revise iteratively without waiting for teacher input. Nevertheless, AI feedback may sometimes lack contextual nuance, misinterpret learner intent, or provide overly generic suggestions that do not fully address communicative or discourse-level concerns.

Overall, the study concludes that neither feedback type should be viewed as superior in isolation. Instead, an integrated approach that combines teacher expertise with AI

efficiency appears to offer the most effective framework for enhancing EFL writing proficiency.

Recommendations

- EFL writing instructors are encouraged to integrate AI-generated feedback as a supplementary tool alongside teacher written corrective feedback to maximize both efficiency and pedagogical depth.
- Teachers should guide students in interpreting AI-generated feedback critically, ensuring that learners do not accept corrections unreflectively but instead evaluate them in light of meaning, context, and communicative purpose.
- Institutions should provide professional development for teachers and students on how to effectively use AI writing tools, including understanding their limitations and avoiding overdependence.
- Students should be trained to understand, interpret, and apply both teacher and AI feedback to improve their self-editing and revision strategies.
- Teachers should selectively use AI feedback for surface-level errors (grammar, vocabulary, mechanics) while reserving deeper feedback (organization, argumentation, coherence) for human intervention.
- Future studies should examine the long-term impact of combined AI and teacher feedback on writing development, learner autonomy, and critical thinking in diverse EFL contexts.
- Educational institutions should develop clear guidelines to ensure ethical use of AI tools, preventing overreliance while promoting meaningful enhancement of teaching and learning processes.

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