



THE ROLE OF AI-POWERED FEEDBACK IN IMPROVING ESL WRITING AT PAKISTANI UNIVERSITIES

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Abstract

The rapid advancement of artificial intelligence (AI) has transformed educational practices worldwide, particularly in the field of language learning and writing instruction. AI-powered writing tools such as ChatGPT, Grammarly, QuillBot, and Gemini have increasingly been adopted by students to support various aspects of academic writing, including grammar correction, vocabulary enhancement, organization, and revision. Despite the growing popularity of these technologies, limited research has explored their role in ESL writing development within the Pakistani higher education context. This study investigated the role of AI-powered feedback in improving ESL writing among university students in Pakistan. Adopting a qualitative multiple-case study design, data were collected through semi-structured interviews, reflective learning journals, and writing samples from undergraduate students who regularly utilized AI-assisted writing tools. The collected data were analyzed using Braun and Clarke's thematic analysis framework. The findings revealed that AI-powered feedback contributed positively to students' perceived improvement in linguistic accuracy, academic vocabulary, coherence, organization, learner autonomy, and writing confidence. Participants reported that immediate access to AI-generated feedback encouraged active revision practices and supported independent learning. However, the study also identified concerns regarding the accuracy and contextual appropriateness of AI-generated suggestions, the potential for overreliance on technology, and ethical issues related to academic integrity. Furthermore, students expressed a strong preference for a balanced approach that combines AI-generated feedback with teacher feedback, recognizing the complementary strengths of both forms of support. The study concludes that AI-powered feedback has considerable potential to enhance ESL writing instruction in Pakistani universities when implemented responsibly and pedagogically. The findings contribute to the growing literature on technology-enhanced language learning and provide practical implications for educators, institutions, and policymakers seeking to integrate AI technologies into academic writing instruction.

Keywords: *Artificial Intelligence, AI-Powered Feedback, ESL Writing, Pakistani Universities, Learner Autonomy, Technology-Enhanced Learning,*

1. Introduction

The rise of Artificial Intelligence (AI) has infused educational technology with a rapidly advancing system that provides the means to develop personalized learning paths and automate learning activities as well as support intelligent adaptive systems (Hwang et al., 2023; Dahri et



al., 2024). This rapid technological development has disrupted other sectors including healthcare, business, communication, and education. Recently developed large language models (LLMs) and other natural language processing (NLP) technologies have provided the teaching and learning systems the means to incorporate AI technologies. This has given educational institutions the means to devise creative solutions to their pedagogical problems that have remained unaddressed for long periods of time. Universities have begun to incorporate AI technologies within their instructional systems and self-learning frameworks as a means to optimize the instructional systems for learning and teaching (Chan et al., 2024; Dahri et al., 2024). This has resulted in AI technologies becoming the predominant focus of recent educational research. This is especially true in the areas of learning that require the continual provision of personalized assistance to learning and teaching.

Writing instruction integrates technology better than any other area of language education (Hwang et al., 2023; Rashid et al., 2024). As a skill, writing is complex and demanding. It requires learners to integrate language, organization, and logic with a number of other thinking skills (Hwang et al., 2023; Qadri et al., 2025). When it comes to learning English as a Second Language (ESL), writing is more challenging because ESL learners are not exposed to language as much, and they often know fewer words, struggle with grammar, and don't know how to structure discourse (Shahid et al., 2024; Saleem et al., 2025). In most disciplines in higher education, learners are tasked with producing multiple forms of writing, including essays, writing assignments, reports, journals, and research projects, making the ability to write clear, correct, and coherent discourse that is in the appropriate style and form for the discipline highly important (Dahri et al., 2024). This ability is especially important for ESL students, because they are in high need of writing support and feedback during the writing process (Khalid & Ahmed, 2025). In process-oriented writing pedagogy, feedback is highly valued, because students are able to identify the specific areas that they need to work on and revise for improvement (Escalante et al., 2023; Shi & Aryadoust, 2024).

The role of feedback in ESL writing has gained considerable attention in the contexts of writing and second language acquisition research and literature. Developing writing skills entails not only the ability to identify and correct errors in a writer's product, but also to elicit reflective engagement from learners in the act of writing and in the consideration of their word choices. Feedback has been traditionally the domain of a teacher, provided by means of written comments, markings, or notes on the writing, or by a personal meeting to discuss the writing. Although teacher feedback is considered valuable due to the context and constructiveness of the feedback, the feedback is often limited by several factors, including large class enrollments, limited time for teaching, and insufficient time for writing. In a large number of university contexts, teachers are unable to provide feedback to a writing task before the task is returned, resulting in a situation that greatly limits the potential for meaningful revisions. The same is true for feedback provided by peers. Although peer feedback fosters a level of engagement and participation among learners, peer feedback suffers from a lack of consistency, reliability, and a wide range of language abilities. For these reasons, much of the recent research has sought to develop feedback systems that provide writing support that is timely, relevant, and systematized (Guo et al., 2024; Rad et al., 2023).



The evolution of AI capabilities has spawned a new generation of feedback systems. These are the first technologies able to analyze written text and respond to a myriad of dimensions concerning feedback. Technologies such as ChatGPT, Grammarly, QuillBot, Gemini, and other advanced writing assistants have surged in popularity among students and for good reason (Kurt & Kurt, 2024; Ozdere, 2025). Feedback from these technologies is timely and concerns grammar, word choice, sentence structure, cohesion and coherence, writing style, and overall quality of the written text. While older automated writing evaluation technologies centered on identifying writing errors that were only at the surface level, recent AI technologies have incorporated more sophisticated algorithms and an understanding of language in context to offer more comprehensive and tailored feedback (Yang et al., 2023; Zhong et al., 2025). AI writing feedback systems have revolutionized feedback and writing in educational contexts. These frameworks have the potential to transform writing feedback and instructional writing. This is especially significant in educational contexts where opportunities for feedback from a writing instructor are scarce.

The introduction of AI-powered feedback systems has spurred academic investigation into the systems' utility for language learning and writing development. Across various educational domains, the literature reports multiple AI writing enhancements (Alghannam, 2024). Researchers have reported improvements in grammar, vocabulary, and overall writing quality. Researchers have described how writing technologies promote learner independence by allowing learners to discover and fix writing issues without needing the instructor (Rad et al., 2023). The provision of instant feedback results in learners engaging in repeated revisions, which are recognized as crucial for the development of writing skills (Setiawan & Alkhowarizmi, 2025). For these reasons, researchers have suggested that AI feedback technologies may supplement classical teaching methods and shift writing technologies from teacher-controlled to learner-controlled (Chan et al., 2024). The increasing evidence of the educational advantages of writing technologies assists teaching. However, there are concerns about how learners understand, use, and respond to AI feedback in actual learning contexts.

The drawbacks and implications of the use of AI in writing instruction have also been the subject of critical discussion. Feedback generated by AI has been found to be problematic due to its complexity regarding writing feedback on aspects of writing such as argumentation and context. It is also feared that an over-reliance on AI tools will undermine learners' ability to think critically and write independently. As generative AI systems have become increasingly advanced and sophisticated, the concerns of the technologies and systems regarding academic dishonesty and ethics have become even greater. These discussions have suggested that improvement in writing performance cannot measure the benefit of AI systems in education. It is also critical to keep in mind the learners and how they interact and engage with these systems. It is of the utmost importance to understand how learners engage with AI feedback within the classroom to understand the value of the feedback and how it is used for the systems to engage and benefit learners in the classroom.

The application and study of AI technologies in higher education is largely new within Pakistan (Dahri et al., 2024; Saleem et al., 2025). English is a primary language of higher education in Pakistan, whereas, developing the advanced writing skills necessary for educational achievement is a major concern for many students (Rashid et al., 2024; Shahid et al., 2024). University level



ESL learners often struggle with writing accuracy, vocabulary, sentence and paragraph structure, and style and tone (Qadri et al., 2025). Difficulty meeting the demand for personalized instruction is a major concern for many teachers and is partially due to the rapid increase in the number of students and the lack of support from educational institutions (Akhter et al., 2025; Saleem et al., 2025). AI based writing programs may help to address these issues (Setiawan & Alkhowarizmi, 2025). For these technologies to be effective, it is essential that students believe that AI writing feedback will be useful, reliable, and improve their writing (Anwer et al., 2025; Khalid & Ahmed, 2025). The AI writing support tools that university students use will continue to improve, however, the amount of research that will study the Writing supports in a ESL Pakistani context has the potential to be very limited (Rashid et al., 2024; Shahid et al., 2024; Tabbassum & Hussain, 2024).

A review of studies and literature on AI-assisted feedback shows that research on AI and feedback systems has primarily been in the advanced educational systems of North America, Europe, East Asia, and the Middle East (feedback studies). Developing educational systems have different pedagogical practices, different educational cultures, and different linguistic practices. Generalizing the findings of feedback studies to developing educational systems may be inappropriate. Most feedback studies have adopted a quantitative methodology that measures improvements in writing performance and writing quality. This has resulted in feedback studies that lack a focus on how learners perceive and construct the meaning of their experiences (feedback studies). AI-generated writing feedback will likely benefit from qualitative studies that explain how university learners interact with AI-generated writing feedback in their educational context. Within the new AI writing technologies, Pakistani ESL learners remain an underrepresented population in research (feedback studies).

To address this gap, this study aims to understand the impacts of AI feedback on the use of ESL writing in Pakistani universities (Rashid et al., 2024). This study uses a qualitative methodology to understand the perceptions of university students towards AI feedback, their use of the AI feedback in the writing process, and their assessment of the feedback in the context of the writing process (Mohammed & Khalid, 2025). The study aims to provide a comprehensive analysis of the positive and negative effects of using AI in ESL writing instruction by exploring the experiences of students using AI-based writing technologies (Ji & Kaur, 2026; Shi & Aryadoust, 2024). The study intends to formulate novel theoretical frameworks and structures based on the findings, and provide recommendations to various stakeholders. These stakeholders include educators and decision-makers in higher education, as well as instructional and curriculum designers interested in the application of AI technologies (Dahri et al., 2024; Zhong et al., 2025).

Research Objectives

RO1. To explore Pakistani university students' perceptions of AI-powered feedback in ESL writing.

RO2. To investigate the perceived contribution of AI-generated feedback to the development of academic writing skills.

RO3. To identify the challenges and limitations associated with the use of AI-powered feedback tools in ESL writing contexts.



RO4. To examine the influence of AI-powered feedback on students' revision strategies and learner autonomy.

Literature Review

Feedback is a key pedagogical element of second language writing instruction. Feedback is integral to the iterative process of writing and is used to develop a writer's language skills and writing skills. In ESL contexts, feedback is of decisive importance, as students typically struggle with writing accuracy, vocabulary, sentence structure, and overall coherence. Escalante et al. (2023) argue that feedback allows writers to identify and address deficiencies in their writing in order to develop writing skills. Shi and Aryadoust (2024) state that feedback is central to the improvement of a writer's skills and development of awareness of writing's linguistic and rhetorical aspects. Feedback that prompts students to engage in the revision process has positive effects on future writing and revision skills (Yang et al. 2023).

There are several ways to interpret feedback within second language acquisition. Interactionist theories state learning occurs when the learner is presented with language feedback that highlights the gap between their usage and the standard target language. Schmidt's Noticing Hypothesis supports this and states feedback is foremost in telling the learner where and what the problematic structures and language are. From the sociocultural perspective, feedback represents the next step in scaffolding. It allows learners to reach a level of understanding, and competency through Piaget's Zone of Proximal Development. When the learner has received and internalized enough feedback, they will have gained the totality of the competency and knowledge in the area, and are subsequently able to use the language autonomously. In support of the aforementioned theories, Rad et. al. (2023) stated the use of AI feedback in writing greatly improved the learner's engagement, feedback literacy, and writing through the active language feedback provided. This theory and study were also supported by Guo et. al. (2024), when it was shown feedback interventions greatly improved the quality of writing revisions and subsequently the overall writing achievement of the EFL learners.

Feedback from teachers has long been seen as the main support ESL teaching programs can rely on. Feedback teachers give is personalized and detailed because of their understanding of the discipline, pedagogy, and the learning context. Feedback is given in many different ways. Research suggests, and many students will confirm, that teacher feedback is constructive and relevant because it is written with expectation in mind. Through teacher feedback, students can learn about the errors in their writing, but also about the quality of their writing in terms of argument and organization and also the audience and the overall writing. Alshahrani and Al Inbari (2025) discovered that EFL learners perceived instructor feedback to be contextually relevant and pedagogically meaningful in comparison to automated feedback. In the same way, Makwana (2025) explained that students, in general, preferred teacher feedback in dealing with higher order writing concerns. Clearly feedback from teachers is important, but it has its problems as well. Feedback from teachers can be delayed and insufficient, meaning the potential to positively impact learning is lost. Akhter et al. (2025) observed that the collaboration of teachers and AI has great potential to address the feedback problems in teaching.

Recently, expert feedback has become an increasingly important step in process-oriented writing instruction. Since feedback relies on the principles of collaboration, peer review requires students



to participate in the process of assessing and discussing one another's work. Participants in review activities sharpen their critical reading skills, encounter new ways of writing, and gain insight into their own writing skills. Evidence suggests that expert feedback supports writer independence, improves motivation, and creates a culture of ownership toward learning. For example, Guo et al. (2024) reported that AI-assisted peer feedback achieved a higher level of writing comments and improved writing. Similarly, Chan et al. (2024) reported that participatory feedback frameworks improved participation and engagement in writing. Despite this body of work, the quality and reliability of peer comments are a cause for concern. Most students lack the ability and the language skills to identify and explain higher order issues that need to be addressed in writing, and give sophisticated critique in the context of significant language writing. Because of this, the success of peer feedback is highly contingent on the peer review process, and is only possible with training, and frameworks and processes designed by the instructor.

AI-Powered Feedback and Writing Development

Artificial intelligence is altering the methods of feedback. It makes the interaction between the writer and the text more dynamic. This new system makes revision more engaging and less tedious. Feedback systems have advanced with the emergence of more refined algorithms and large-scale models. These systems are capable of generating suggestions and corrective measures for texts that have been analyzed and appraised. Hwang et al. (2023) state that with the introduction and incorporation of these modern AI systems, language learning has become more personalized, contextual, and adaptive. The advances in these AI systems have transformed the paradigms of automated writing evaluation from surface level grammatical correction to more sophisticated evaluation of elements such as, vocabulary, coherence, style, tone, organization, and rhetorical effectiveness. Shi and Aryadoust (2024) remark that the newer AI feedback systems have moved beyond error detection and now address gaps in writing at the linguistic and discursive levels. The advancements in automated feedback have stretched the possibilities of instructional practices and placed AI at the forefront of disruption in language teaching and learning.

One of the primary benefits of AI-integrated feedback systems is the enhancement of linguistic precision reported by users. Learners of English as a Second Language (ESL) often experience difficulties with writing related to grammar, the consistency and application of verb tenses, articles, prepositions, sentence boundaries, and several other challenges. ESL learners using AI writing systems are better able to address their writing challenges as these systems identify writing issues and deliver improvement suggestions. According to Escalante et al. (2023), correcting language-related issues with the assistance of AI-generated feedback improves the language quality of writing. Alghannam (2024) also mentions that automated feedback systems positively impact grammatical issues and language improvement in English Foreign Language (EFL) learners. Learners solve challenges in the writing system as the AI feedback is instantaneous, engaging them in the writing system. This instant feedback increases the writing system opportunities for the learner to notice, to reflect, and to learn. AI feedback is corrective and provides the learner multiple opportunities for language improvement through the process of revision. As noted by Yang et al. (2023), participatory engagement with AI feedback fosters language improvement.



AI systems show the capacity to add value to vocabulary and lexical sophistication development, in addition to providing support with grammar. Precision, variety, and contextual vocabulary, in accordance with discipline, is essential in the case of academic writing. These aspects of writing often present great challenges to ESL learners. Maintaining an academic tone, word choice, and avoiding lexical repetition often present major challenges to students. Writing tools that incorporate AI offer learners a greater range of linguistic options by providing recommendations for synonyms, word choice, and style. Bodaubekov et al. (2025) suggested that AI writing tools provided students with an enhanced vocabulary and greater writing fluency due to the exposure to a variety of lexical options. Similarly, Kurt and Kurt (2024) stated that learners received guidance on variation and style in writing when using feedback provided by ChatGPT. Continuous use of such recommendations may assist students in developing vocabulary and the confidence required to articulate complex ideas. This feature of AI systems is highly relevant to learners in an academic setting.

AI-driven feedback services enhance textual organization and coherence. Effective writing is related to the ease and clarity of logical idea presentation in addition to the appropriate use of language. Many learners have difficulty with paragraph development and transitions and with the structure of academic writing as a whole. State-of-the-art AI systems are able to recognize the challenges posed by the structure of writing and offer suggestions to improve coherence and flow and offer guidance on the sequencing and structure of paragraphs and discourse. Guo et al. (2024) note the value of AI-driven feedback in developing students' feedback skills and feedback usage in the areas of coherence and organization, which translated into the development of students' writing skills. Alsofyani and Barzanji (2024) also reported that AI-induced feedback provided learners with clear suggestions for the improvement of a text and fostered learners' perceptions with regard to the organization and coherence of writing. AI feedback services facilitate and foster writing development. Feedback of this nature moves writing direction beyond word and sentence accuracy and fosters the development of coherent texts that are user friendly. AI feedback services support a writing development services that encourages improvement in the local and global areas of writing.

The role of AI-focused feedback in driving revisions and promoting learner autonomy has also come to the forefront. After completing a writing activity, traditional feedback is usually given. This delays the chances to quickly revise and try out new ideas. AI-based technologies, on the other hand, have the potential to be used during the writing activity, making the learners more likely to engage in multiple drafts, revisions and edits. This is more aligned with the writing pedagogies that are process-focused and that look at revisions based on pedagogies and focused on timed corrections and pedagogies. More autonomy and independent monitoring of one's writing are observed as positive outcomes of the more autonomous writing feedback systems (Qadri et al., 2025). Positive outcomes from the AI feedback systems also include greater feedback literacy as well as self-directed learning (Rad et al., 2023). The AI feedback systems also engender a positive motivation to improve writing as well as confidence to solve feedback problems (Mohammed & Khalid, 2025). Eventually, learners become more self-regulated as they lose dependence on the feedback systems. Students also participate more actively in evaluating the quality of their writing through self-feedback, resulting in positive effects on their metacognitive awareness of effective writing strategies.



Learner Perceptions of AI-Assisted Writing

Learner perceptions have become a major focal point of contemporary research concerning AI-assisted language learning. The attitudes and perceptions of learners regarding the usefulness, safety, and educational value of AI technologies have become the primary determinants of the acceptance and use of AI tools by learners (Rashid et al., 2024). The adoption of AI-based technologies to support learning is directly related to the quality of learning that the technology is designed to support (Dahri et al., 2024).

According to previous literature, learners prefer writing AI tools because they are convenient, easy to use, and readily available when assistance is needed. Students can receive feedback without the delay of an instructor response, which is beneficial when writing in a time-constrained situation. The speed at which AI tools respond to the user helps make the revision process more fluid and allows learners to more actively participate in the revision process as problems in the writing are addressed. Qadri et al. (2025) state that AI writing tools help ESL learners view writing support in a more positive light and aid learners in self-revision. In a similar study, Chan et al. (2024) discuss the use of generative AI as a writing aid and state that AI helps learners save time and helps users of the tool develop language skills. Students also state that the availability of AI tools reduces the anxiety of writing. Mohammed and Khalid (2025) show that AI-generated tools help writing learners feel better emotionally and more confident in their writing. This supports a greater willingness to write.

In the literature, the most common theme is the use of AI and its association with learner autonomy. Many learners regard AI-based feedback systems positively, viewing them as resources promoting autonomous learning and self-focused revision. Learners no longer need to depend solely on the teacher for support. Systems provide support as revisions will be based on feedback. This sort of autonomy and independence is especially advantageous in the realm of higher education as scholars are expected to take control of their own learning. According to Qadri et al. (2025), the use of AI-based writing tools promoted learner autonomy as students had the opportunity to manage, assess, and redesign the quality of their writing of their own accord. In addition, it was said that the use of AI tools focused on self-learning and writing in the Pakistani context in Khalid and Ahmed (2025) helped students become self-directed learners. In addition, the authors mentioned that those students who actively engage with the feedback provided by the AI tools are most likely to develop a higher capacity to self-manage and self-regulate, as well as an improved ability to solve writing-related problems, with an increased awareness of their writing (Rad et al., 2023).

AI-assisted writing prompts have come under criticism from learners for other reasons. Different studies cite reliability, accuracy, and context appropriateness when considering problems with AI writing help. Learners even struggle when trying to accept AI help and do so in a way that respects their intended meaning and disciplinary context. Others struggle to understand the difference between quality support and an overly vague, general suggestion. Anwer et al. (2025) assert that learners' trust in AI writing help undermines their acceptance of the feedback and their perceived improvement in writing. Similarly, Ozdere (2025) comments that even when students see some value in AI writing help, students place frameworks of reliability and context over the recommendations. Comments of Alshahrani and Al-Inbari (2025) suggest that many learners place greater value in instructor feedback to deal with more sophisticated techniques,



context, and recursive nature of writing. Comments overall show that learners value convenience of AI writing help and see value in expert human feedback in writing.

The Pakistani ESL Context

The role of English in Pakistan's education system is multi-dimensional as it is a major language of instruction, a language for pedagogy, a language for employment and a language for international interactions (Saleem et al., 2025; Shahid et al., 2024). At the university level, English dominance in education posits students to engage with various educational materials and assessments as well as publications. Thus, English proficiency is paramount (Khalid & Ahmed, 2025; Rashid et al., 2024). Nonetheless, the dominance of English in higher education has not alleviated the barriers many students in Pakistan face in relation to the acquisition of advanced English skills for writing (Tabbassum & Hussain, 2024). These barriers have spurred growing concern and interest among educators and researchers to ameliorate the proficiency of English among students and boost their academic performance (Anwer et al., 2025; Saleem et al., 2025).

Pakistani ESL learners encounter challenges due to an amalgamation of linguistic, educational, and socio-cultural issues. For instance, the education system leads students to university with little exposure to genuine English-speaking environments. Students also arrive with differing English language skills (Khalid & Ahmed, 2025). Writing-related challenges manifest in lexical and grammatical issues and poor organization of ideas and constructs in addition to several conventions of academic discourse (Kurt & Kurt, 2024). As a result of these challenges, a results-focused approach to teaching is evident that emphasizes memorization of content and repeated information, and undermines students' ability to think critically and write in a procedural way (Mohammed & Khalid, 2025). Therefore, a number of studies have shown that challenges lead to students not being able to meet the demands and standards of academic writing at university (Jamshed et al., 2024; SARA, 2025).

Feedback-related challenges also exist in Pakistani higher education (Tabbassum & Hussain, 2024). The large number of students and poor staff-to-student ratios have led teaching staff to provide insufficient feedback on writing assignments (Makwana, 2025). As a result, students lack opportunities for meaningful revision, and reflective writing. Given this situation, the use of technology to provide traditional feedback has become popular in Pakistani higher education.

Methodology

This research used a qualitative multiple-case study design to assess the application of AI-powered feedback in enhancing ESL writing in Pakistani universities. Because the qualitative methodology considers the participants' experiences when gathering and analyzing data, it allows researchers to focus on the experiences, perceptions, and interactions of learners with AI feedback, rather than restricting them to the identification of relationships between variables. The qualitative design was appropriate for this study because of the rapid growth of AI feedback and writing technologies in higher education, and because it enabled the researcher to explore the way students understood AI feedback and writing and the way they used AI feedback and technology for the purpose of developing their writing.

The focus of this research was selected universities in Pakistan where the medium of instruction is English, and where students are required to write in English on a daily basis for academic purposes. These universities are representative of higher education, where students are required to write essays, reports, assignments, write presentations, and carry out writing of a research



nature in English. The rapid growth in the availability of digital technologies and AI-based writing tools in these educational environments provided an opportunity to examine students' experiences with AI feedback.

For this research, participants were chosen using purposive sampling, which involves choosing people who have first-hand experience with what is being studied. For this research, the sample consisted of undergraduate students from English, education, social science, and business programs whom were known to have used AI writing tools including ChatGPT, Grammarly, QuillBot, Gemini, and others for academic writing. The criterion for inclusion was experience with AI feedback and AI-generated text in the context of academic text drafting and/or revision. The sample consisted of twenty undergraduate students from a variety of programs and academic years to ensure a broad range of perspectives and experiences. Engaging students from different programs allowed for an understanding of AI focused feedback in different contexts and in varying writing and learning situations.

Data collection consisted of semi-structured interviews, along with writing samples and journals to capture the participants' level of interaction with AI writing feedback. Sustaining multiple forms of data collection facilitated triangulation, enabling the researcher to consider the phenomenon from multiple angles. Data collection spanned multiple weeks to offer the participants the time they needed to work with AI writing tools and to process their experiences. Apart from the scheduled interviews, participants were asked to keep reflective journals on their learning throughout the study period. The journals provided the participants an opportunity to capture their ongoing experiences with AI feedback, what they thought about the feedback, what they revised, what they thought improved, what they thought got harder, and what difficulties they faced in the writing process.

Once the data were collected, a thematic analysis was performed grounded in Braun and Clarke (2006). Thematic analysis was chosen because of the level of flexibility and the systematic approach it offers to researchers when thinking about a phenomenon and structuring qualitative data. This method is well-suited for a study of this nature because of the level of and the intention behind the participants' interactions with the various research components.

Several strategies were implemented to improve the study's rigor. Lincoln and Guba's criteria of credibility, dependability, confirmability, and transferability, were the standards for the quality of this research. Credibility was achieved through methodological triangulation with interviews, reflective journals, and writing samples. The researcher was able to stabilize emerging findings by verifying findings with writing samples and reflective journals and identifying patterns amongst the different forms of data. In addition, member checking was achieved by sending out the interpretation summaries to the selected participants to ensure that the researcher was correct in their understanding of the participants' experiences.

Findings

The analysis of the data provided by semi-structured interviews, reflective learning journals, and writing samples identified a number of major and minor themes, each describing a different experience or perception of the role of AI in writing feedback in ESL. Thematic analysis identified a number of related perceptions and experiences in writing feedback and AI writing tools (Rashid et al., 2024; Qadri et al., 2025; Khalid & Ahmed, 2025). It was found that the participants viewed AI feedback as an important tool in the development of many facets of



academic writing, from grammar and vocabulary, through structure and organization, to revision and even the development of confidence in practice (Alsofyani & Barzanji, 2024). Some view the feedback and AI tools as a legitimate source; some are concerned about trust in technology, revision aid dependence, and the ethical framework of AI tools and writing (Ozdere, 2025; Ji & Kaur, 2026). Together, the considered themes describe most of the positive and negative aspects of AI feedback in ESL writing from the perspective of Pakistani universities (Saleem et al., 2025; Dahri et al., 2024). The sections that follow separate and expand on these themes while including data from participants in the analysis.

Enhanced Linguistic Accuracy Through AI-Generated Feedback

A significant pattern in previous research was the perceived enhancement of proving linguistic accuracy attributed to AI feedback. Participants in the studies reflected on how AI writing tools identified and supported the editing of grammatical inaccuracies that would be otherwise overlooked in one's own writing. Feedback associated with programs like ChatGPT, Grammarly, and QuillBot assisted students in recognizing and addressing their errors of verb tenses, subject-verb agreement, punctuation, sentence structure, articles, and prepositions (Kurt & Kurt, 2024; Jamshed et al., 2024; Setiawan & Alkhowarizmi, 2025). Many participants of the studies recognized that AI tools would edit their writing instantaneously and thus helped them to revise their writing without the delay of instructor feedback. Consequently, participants of the studies began to recognize their linguistic inequalities, and with the help of AI tools, helped them to improve and focus on those errors to write more linguistically accurately in future.

Analysis of reflective journals showed that students faced several of the same grammatical issues, even after AI-assisted revision helped them, and then corrected them (Yang et al., 2023; Mohammed & Khalid, 2025). Participants felt that seeing and fixing the same grammar issues multiple times helped them fix and even improve their grammar, and most of the participants became more comfortable using grammar by themselves after the program (Tabbassum & Hussain, 2024). Sample revisions showed that participants were better at constructing their revisions after they utilized AI-generated content to assist their grammar (Zhong et al., 2025). Participants felt that AI, and the comments and feedback tool provided to them, was a language tool that described for them an easy way to achieve precision in grammar and a mechanism to support the development of ideas and the overall presentation of the text in an academic form.

Improvement in Academic Vocabulary and Expression

Another major idea evaluated concerns involving the degree of assistance given from AI-powered feedback to the development of vocabulary and academic articulation. Participants highlighted challenges with the selection of appropriate vocabulary, the elimination of redundancy, and maintaining an academic tone within various writing tasks. The participants of the study demonstrated the perception of AI writing tools as highly effective in support of this task as they provided options of different word choices, synonyms, or suggestions to improve an academic tone by suggesting language that is more formal. It was noted that word suggestions and recommendations provided by AI tools may help students to think of vocabulary that they may have not thought of before, thus, enhancing the way that they articulate their writing and broadening their vocabulary (Hwang et al., 2023).

Several of the participants elaborated that AI tools provided them the ability to replace informal or conversational vocabulary with precise and appropriately academic expressions (Ozdere,



2025; Makwana, 2025). Reflection journals indicated that students became more aware of word choice and style, sentence and paragraph structure after interacting with various AI-generated suggestions. Some students suggested that they developed a better understanding of the writing standards of the various academic disciplines after continued impact with AI tools (Alsofyani & Barzanji, 2024; Guo et al., 2024). While assessing numerous writing samples, the researchers reported that there was a visible impact in lexical variety and an academic tone after the drafts in question were modified with the help of AI-assisted tools (Kurt & Kurt, 2024; Jamshed et al., 2024). Collectively, the synthesis of the results indicated that the responses provided by AI tools helped participants refine their academic writing and elevate their writing to a more formal and professional level (Qadri et al., 2025).

Development of Coherence, Organization, and Writing Structure

Participants mentioned AI-enhanced feedback and how it positively impacted the organization and overall coherence of their writing. Many described having trouble organizing their thoughts and writing them out logically and coherently, despite having no issues generating assignment ideas. Surveys have shown that AI-based writing tools have been used to analyze paragraph structuring and idea flow and the necessary transitions for developing overall text flow and coherence (Zhong et al., 2025). Feedback generated through AI was seen as an effective means for participants to recognize the need for improvement in the organization of their writing and the effectiveness of the restructuring (Kurt & Kurt, 2024).

The interviews revealed an appreciation for feedback on paragraph development, including topic sentences, supporting details, and the logical order of ideas (Ozdere, 2025; Makwana, 2025). A number of participants mentioned that feedback motivated them to think about how their writing would be interpreted by readers, and as a result of this, paid more attention to the organization and overall coherence of their writing (Hwang et al., 2023; Yang et al., 2023). The use of AI-assisted feedback during the revision process led to a heightened consideration of text flow and overall readability. The reflective journals made this most clear. Revision made clear the advances made toward structuring paragraphs and logically ordering ideas. Feedback offered through AI concerning the organization of the text was viewed as an aid in writing a text that conveys ideas clearly and one that is reader-friendly (Zhong et al., 2025; Kurt & Kurt, 2024).

Increased Learner Autonomy and Self-Regulated Revision Practices

All the studies contained the same central idea—the effect of AI-based feedback on learner's independence and self-regulated learning. AI tools were, once again, convenient/self-help tools for participants that addressed their writing problems outside of the classroom and didn't require reliance on their instructors or peers (Khalid & Ahmed, 2025; Rad et al., 2023). Instant feedback meant writers were able to read and refine their work when they were most comfortable leading to control on how they managed the writing process (Escalante et al., 2023; Setiawan & Alkhowarizmi, 2025).

Participants overwhelmingly stated that AI-integrated feedback prompted them to improve and to invest themselves fully to the revision process—a critical and necessary procedure that was almost always neglected in the pre-AI writing era. Students were no longer in the habit of submitting first drafts with only minor edits. Instead, they began to adopt a more self-critical approach to their written work and engaged in multiple rounds of revision.



The evidence in the reflective journals suggested that this process increased students' awareness of their writing behavior and significantly strengthened their self-regulation of writing (Rad et al., 2023; Mohammed & Khalid, 2025). A few participants actually appreciated and enjoyed the fact that they were able to fix and polish their writing problems without help, saying the process was a big boost to their self-efficacy and also to their personal and academic development (Bodaubekov et al., 2025).

The findings suggested that feedback generated through artificial intelligence builds self-directed learning practices. Outside the classroom, students often turned to AI tools to practice writing, modify drafts, and try different wordings (Chan et al., 2024; Dahri et al., 2024). Participation in these activities likely indicated that the feedback provided through AI systems was constructive and cultivated learner autonomy by fostering active involvement in the writing process.

Greater Confidence and Reduced Writing Anxiety

Participants stated that AI-generated writing feedback strengthened confidence in writing. Writing tasks in English caused some anxiety for even the most confident individuals (Khalid & Ahmed, 2025). Paper reviews becoming a source of negative feedback and concern over incorrect grammar and the use of subpar vocabulary caused a lack of confidence in the quality of writing. However, AI writing feedback became a support resource that demonstrated guidance and assurance throughout the writing process (Mohammed & Khalid, 2025).

Participants stated that the reality of receiving feedback improved confidence and fear of negative feedback was eliminated, allowing for the use of advanced writing language. It was described that the ability to receive and review feedback before the final submission of the written task helped build confidence (Alghannam, 2024; Alsofyani & Barzanji, 2024). A reflection journal was a tool that highlighted a decrease in writing task anxiety and increased participation in the revision process.

Participants noted the psychological advantages of having a support system available at all times. Conventional feedback arrives once tasks are completed. In contrast, AI-supported feedback offers suggestions in real time (Setiawan & Alkhowarizmi, 2025; Kurt & Kurt, 2024). Students noted that such support bolstered their competency and increased their willingness to participate in academic writing (Dahri et al., 2024). Thus, AI-backed feedback served not just as linguistic support, but as emotional support during writing (Mohammed & Khalid, 2025; Chan et al., 2024; Hwang et al., 2023).

Perceived Efficiency and Accessibility of AI-Powered Feedback

Another emerging theme was the speed and the ease of access of AI Feedback. Participants consistently mentioned the benefit of being able to access help with writing from anywhere and at any point in time. Unlike feedback systems that rely on the availability of the instructor, AI systems responded to the submissions of the students, enabling students to progress their work (Escalante et al., 2023; Setiawan & Alkhowarizmi, 2025). This was even more appreciated during the deadline and examination periods as students needed help with writing support more urgently (Khalid & Ahmed, 2025).

Participants noted that AI Feedback saved an enormous amount of time that would otherwise have been spent on the revision. Rather than having to search grammar books or wait for help from outside, learners received instant suggestions and made corrections without any delay (Alghannam, 2024; Kurt & Kurt, 2024). AI systems were for many participants an instant, easy



and practical way to improve writing and increase productivity (Jamshed et al., 2024). Participants' reflective journals showed that the availability of AI Feedback created openness and a disposition to revise frequently and to experiment with different writing techniques.

Students considered AI technologies friendly, learning companions, who offer support and assistance during all writing activities (Hwang et al., 2023). The friendly nature of the AI technologies was a major consideration in the acceptance and use of AI systems for writing among participants.

Concerns Regarding Accuracy and Contextual Appropriateness of Feedback

Participants identified both positive aspects and the limitations of the accuracy and context of feedback from AI revision tools. Some students reported instances of suggestions that did not capture the meaning of the text or did not align with the requirements of the respective discipline. Some suggestions were so vague that they produced a revision that did not convey the same idea as the original text.

From the interviews, students reported that revision suggestions from AI tools were not reliable, especially in the context of complex academic feedback and when the AI tool employed advanced or specific lexicon (Ozdere, 2025). Some participants reported instances in which AI recommendations were opposite to the feedback from the instructor, thus creating a dilemma about which recommendation to follow. Feedback from the reflective journals showed that students were inclined to check the feedback from AI tools before applying it to their writing (Rashid et al., 2024).

This engagement from participants demonstrates the need to critically assess AI-generated suggestions. Participants mostly agreed that although AI tools were helpful, they had to be used with caution and in a context that acknowledged the limitations of the suggestions (Akhter et al., 2025; Escalante et al., 2023). Thus, students agreed that feedback from AI tools had to be employed carefully (Rad et al., 2023; Mohammed & Khalid, 2025; Yang et al., 2023).

Ethical Concerns and Academic Integrity Challenges

Ethics were the main focal point when discussing AI-assisted writing. Students started to recognize the difference between using AI to assist with feedback and revision, compared to AI being used to write whole assignments. When used as a learning support tool, participants deemed it acceptable to use AI to assist with feedback, but were concerned with the practices that involved reliance on the assistance of AI-generated feedback to an extreme degree (Ozdere, 2025).

Some participants were unsure about the institutional policies on the AI use in work. Some students claimed that the rapidly grown generative AI technologies impeded the differentiation of what was allowed and what was prohibited regarding such technologies (Ji & Kaur, 2026; Anwer et al., 2025). The use of reflective journals uncovered worries on the originality, authorship and how easily AI technologies could be used to avoid work (Mohammed & Khalid, 2025; Ozdere, 2025).

Responsible AI use was highly valued, as participants pointed out that AI use should assist and add value to one's own thinking (Akhter et al., 2025; Alshahrani & Al-Inbari, 2025). The results show that students know about the ethical issues that AI-assisted writing brings and the need for the responsible use of such technologies (Saleem et al., 2025; Ji & Kaur, 2026).



Students' Preferences for a Balanced Integration of Human and AI Feedback

The last theme described how participants preferred feedback that strikes a balance between AI-generated comments and human assistance. Even though students appreciated the feedback tools' speed and easy access, they believed AI feedback could not substitute the teachers' feedback (Makwana, 2025; Ozdere, 2025). Participants considered AI tools' feedback to be less effective than human feedback in the context of writing commentaries in a nuanced manner, including the critique and analysis of writing and the feedback of a specific discipline.

Nearly all participants considered feedback provided by AI and teachers to be complementary rather than contradictory. While AI feedback was seen as helpful in correcting grammar, choosing appropriate vocabulary, and making revisions, teacher feedback was deemed important to ensure the quality of writing and its context (Escalante et al., 2023; Kurt & Kurt, 2024). Participants preferred the use of AI tools when making preliminary and/or final edits to a draft, but preferred that teachers offer support on more substantive writing issues (Ozdere, 2025; Kurt & Kurt, 2024).

On the whole, a feedback model was supported by participants, employing a technology-augmented model of instruction. This model was designed to maximize the benefits of both human and machine feedback, and reduce their negatives (Shi & Aryadoust, 2024; Alsofyani & Barzanji, 2024). Research has indicated that while students view AI feedback within the context of ESL writing as a valued addition, non-AI feedback is still considered critical for development in this area (Ji & Kaur, 2026).

Discussion

The present study aimed to investigate the potential for AI-driven feedback to advance ESL writing for Pakistani university students. The feedback indicated that for most participants AI writing tools supported the development of linguistic precision, the expansion of academic vocabulary, and the structuring of texts, as well as the development of revision practices and self-confidence in academic writing. The benefits described above were also identified in AI writing technologies studies carried out on ESL and EFL learners in the same region (Qadri et al., 2025). The current study also identified issues regarding the reliability of AI feedback, the reliance on technology, and the use of AI writing tools from an ethics-based approach. These issues were also reported in studies concerning the use of generative AI in the educational context (Alshahrani & Al-Inbari, 2025; Ozdere, 2025; Ji & Kaur, 2026). These issues indicate that if AI feedback aids the development of writing, the real potential lies in the educational engagement of learners with the feedback and the design of the technology within the existing teaching frameworks. The next section discusses the implications of the findings for the relevant literature and the theories concerning feedback, writing development, and technology-based language instruction.

A key outcome from this study is the AI-powered feedback and improving linguistic accuracy. Participants noted the opportunity that AI feedback gave them to spot and fix mistakes and improve text quality and readability. This study complements what is currently known about AI feedback systems and the challenges/needs of ESL learners. Escalante et al. (2023) saw that AI feedback helped learners spot their errors and improve their writing. Alghannam (2024) saw that AI feedback helped learners improve their grammar and language. Alsofyani and Barzanji (2024) found that ChatGPT feedback helped learners improve their writing skills and helped



them better understand the writing process. The immediacy of AI feedback helps learners spot errors in writing and encourages them to fix the error and to continue the writing process. This also helps the learners understand the challenges of the language and helps them achieve their writing goals. AI feedback systems, via its frequent corrective feedback, also aims to develop learners' understanding of grammar.

The results also indicated that participants viewed AI writing tools as effective devices for learning new vocabulary and expanding one's ability to articulate ideas in written form. Some students noted that AI-generated suggestions presented them with different vocabulary options, encouraged them to vary the types of words and expressions they used, and helped them adopt a more formal style of academic writing. These results are important because the inability to employ a varied and rich vocabulary often limits academic writing skills of learners of English as a second language. Bodaubekov et al. (2025) reported similar findings in that AI-driven writing applications presented learners with varied vocabulary options and facilitated not only vocabulary development, but also improvement in writing skills. Moreover, Kurt and Kurt (2024) noted that AI suggested feedback resulted in improved vocabulary and writing style of second language learners. Because of the ability of the AI System to suggest vocabulary or word choices that are relevant to the context, it appears that AI Systems assist learners in broadening and expanding their vocabulary, and in developing improved and complicated writing and word choices. Participants also noted that feedback generated by AI Systems can be used as a remedial tool and can assist in learning by suggesting new and different ways to use language. This supports the findings of Hwang et al. (2023) which state that because AI Systems provide language suggestions that are relevant to the context, they foster individualized language learning. This finding also supports the numerous recent studies on writing that emphasize the importance of varied and multiple examples of real language on developing one's linguistic ability.

Another key discovery examined the role of AI-generated feedback as it pertains to coherence, organization, and the structural elements of writing as a whole. AI-based technologies have reportedly allowed participants to improve on how they develop paragraphs as well as how they order and structure their content. This finding goes beyond the scope of what is typically addressed in feedback provided by machines, as this has typically been bound to the correction of grammar. Given the sophistication of AI Technology as it exists today, it has the potential to address a multitude of writing skills as a whole. According to Guo et al. (2024), as they also claim that the feedback provided by AI improves one's ability to create coherence and order in their writing. Zhong et al. (2025) also explored the positive effects of AI feedback in the context of ESL writing and discourse organization. Writing a high quality academic paper requires the ability to order and structure your thoughts as well as the ability to develop your ideas and arguments. Feedback provided by AI has the ability to address both of these factors.

Implications

This study's outcomes are important for ESL writing pedagogy, higher education policy, and the use of technology in Pakistan's universities. Feedback tools driven by AI develop faster and faster. For this reason, institutions need to devise teaching and learning techniques around these tools that both use the technology to its educational advantage and mitigate the risks the technology brings. AI writing tools, based on the results of this study, have the potential to



develop writing skills through the swift, easy to use, and process-oriented feedback available to learners. Thus, AI-driven feedback should be seen as a useful adjunct to the traditional writing pedagogy. Feedback driven by AI writing technologies and tools is not to be viewed as a challenge to writing pedagogy.

Results of this study indicate AI-driven feedback technologies may be used to improve writing in ESL around linguistic accuracy, vocabulary, coherence, and revision. ESL teachers may decide to employ AI to facilitate students in writing by exposing students to the importance of feedback and revision. Instead of forbidding AI technologies, instructors may aid students' capability in critically assessing the AI-generated prompts and the appropriate context for use in academic writing. This methodology has the potential to magnify students' metacognitive thinking, and self-regulated writing, and may create a writing practice that is more intentional. In addition, the incorporation of AI technologies in a language writing pedagogy aids students in learning the prudent and correct use of technology.

Conclusion

The swift developments in artificial intelligence present various means to innovate teaching methodologies for both language acquisition and writing instruction at the tertiary education level. The present research focused on the potential of AI-driven feedback to enhance the writing of ESL university students in Pakistan and examined the students' perceptions, experiences, and levels of engagement with AI writing technologies. By conducting a qualitative analysis of interview responses, reflective learning journals, and writing samples, the present research shed light on the use of AI-generated feedback by students and their perspective on the role of such feedback in their writing learning process.

The results of the present study indicate that the research participants had a positive perception of AI feedback resources and believed the resources helped them improve the grammar and vocabulary of their writing, the organization of the text, and the revision process. Participants indicated that the use of AI feedback helped them identify and correct mistakes, gain an understanding of the writing conventions, and improve the quality and quantity of their revisions. The convenience and speed of AI writing technologies were viewed positively and contributed to the participants' writing autonomy, self-regulation, and confidence regarding academic writing. The results of the present study indicate that, within ESL contexts, AI writing technologies have the potential to foster writing and self-regulation in the absence of feedback resources.

The study also investigated the limitations of AI-assisted writing. Some participants raised concerns about the contextual relevance and accuracy of AI suggestions, fear of counterproductive reliance on the technology, as well as academic and ethical concerns about AI and academic integrity. These findings show that the use of AI-powered feedback tools in education opens new possibilities, but consideration and care must be taken in their use. Even if the technology is advanced, the effectiveness of AI-assisted writing tools will largely depend on learners' critical engagement with feedback, and appropriate use of feedback in ways that contribute to their learning and writing skills.

An important finding of the study is that participants preferred the combination of AI-assisted feedback and human feedback. Students maintained that the AI technologies helped them and that AI technologies were important; however, technologies were not a substitute for the teachers' skills and experiences, and the teachers' contextual clues and tips. From this



perspective, AI technologies will help in the educational process, but will be a supplementary educational resource; it will not be an alternative to educational teaching. From this perspective, the optimal solution is the combination of the technology and human feedback tools for writing development.

In closing, this research expands the existing literature on the use of artificial intelligence in language education by documenting the experiences of university students in Pakistan. The results show that the incorporation of AI tools in providing feedback can be advantageous for the teaching of ESL writing. Further, these results stress the need for the ethical use, critical thinking, and teaching-based thinking, and AI tools designed for education will need to be continually assessed for their effects and integrated into pedagogical frameworks. The appropriate use of AI tools in educational frameworks will require the balancing of the integrated use of AI tools within educational frameworks and the preservation of the essential role of human interaction and critical thinking to sustain meaningful academic writing.

Recommendations

1. ESL instructors and curriculum designers are encouraged to use AI tools for feedback as a support for students' drafting, revision, and editing and as a means to foster critical reflection on feedback in academic writing courses.
2. AI-related policies and educational programs in universities should encourage the responsible and ethical use of AI in academic writing, fostering academic honesty and awareness.
3. The teachers should use a balanced feedback process, implementing both AI and teacher feedback, enabling students to gain the benefits of AI and also having access to expert feedback for higher-order writing skills.
4. Educational institutions should conduct professional development initiatives to build awareness and competence among their educators on how to integrate AI tools effectively into language learning.
5. Further studies are recommended to examine how AI-enhanced feedback affects ESL writing growth, learner independence, and academic achievement over time; and to assess the performance and impact of various AI tools used for writing in different educational settings.

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