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An Examination of the Relationship Between Feedback Quality and Student Self-Regulation in Generative AI-Supported English Writing Instruction at Tertiary Level in Middle Asia

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ABSTRACT

This study examines the relationship between feedback quality and student self-regulation in generative AI-assisted English writing instruction at tertiary level in Uzbekistan. In contemporary writing pedagogy, feedback is considered not only an element supporting textual revision, but also a fundamental formative mechanism shaping student's capacity to plan, monitor, and improve their writing processes. In this context, the pedagogical value of generative AI becomes more meaningful when the feedback it produces is clear, applicable, and capable of guiding students to interact with their texts in a reflective way in Middle Asian universities.

The study is theoretically framed through the interaction between feedback quality and self-regulation in AI-assisted writing environments at tertiary level in Middle Asia. It is argued that high-quality feedback can strengthen student's attention regulation, revision decisions, and strategy use by making the writing process more visible and manageable. Accordingly, the study concludes that generative AI-assisted writing instruction can contribute more effectively to student development when feedback functions as a structured guide for autonomous and sustainable participation in writing tasks in Middle Asia at tertiary level.

Keywords: EFL writing, AI-assisted writing, self-regulation, feedback quality.

1. INTRODUCTION

In recent years, research on educational technology has increasingly argued that learning outcomes should be interpreted from an integrated perspective encompassing cognitive, metacognitive, and pedagogical dimensions. In this discussion, generative artificial intelligence has emerged as a powerful teaching resource because it can provide instantaneous responses, text-based suggestions, revision support, and adaptive feedback that directly influence how students interact with academic tasks at tertiary level in Middle Asia. The current literature reveals that the pedagogical value of AI in writing instruction becomes apparent not as a dominant authority managing the learning process, but rather when it functions as a learning partner supporting teacher guidance and prompting students to think more deeply about their own texts (Li et al., 2025; Gabay et al., 2026). This perspective is particularly important in English writing instruction, where the quality of feedback greatly shapes the depth and continuity of student learning.

This issue becomes more visible in the context of English as a foreign language (EFL) writing. Writing in English requires learners to coordinate idea generation, linguistic accuracy, discourse organization, revision, and self-monitoring within the same task. For multilingual learners, generative AI tools may ease lexical limitations, make the organization of ideas more visible, and support revision awareness through immediate and personalized responses. Some studies also suggest that such support can strengthen confidence, motivation, and writing self-efficacy. Yet the same body of literature emphasizes that these benefits remain educationally meaningful only when the student continues to participate actively in the thinking, decision-making, and reconstruction processes involved in writing (Li et al., 2025; Laoha et al., 2025; Gabay et al., 2026). In other words, the pedagogical contribution of AI-assisted writing is closely related to how feedback is structured and how learners process that feedback during writing development.

At this point, the concept of feedback quality provides an essential theoretical basis for understanding learning in AI-supported writing environments. In educational settings, feedback is commonly defined as an instructional intervention that clarifies the distance between a learner's current performance and the desired level of achievement, while also indicating possible paths for improvement. Foundational scholarship has shown that effective feedback addresses three core questions: where the learner is going, where the learner currently stands, and what should follow next (Hattie & Timperley, 2007). More recent studies in writing pedagogy similarly underline that feedback has a broader function than marking correctness; it guides revision, supports learner awareness, and contributes to longer-term learning habits (Fidan & Çakırt, 2025; Van Beuningen, 2010). In this respect, feedback quality refers to the extent to which feedback is clear, specific, timely, constructive, usable, and capable of encouraging students to engage actively with improvement processes (David & David, 2018; Nicol & Macfarlane-Dick, 2006; Austen & Malone, 2018; Haughney et al., 2020).

The importance of feedback quality becomes even greater in generative AI-supported environments. Unlike conventional feedback channels, AI-based systems can provide immediate, continuous, and individualized responses during multiple stages of the writing process. Recent comparative studies suggest that generative AI feedback can improve some dimensions of writing, including grammar, sentence variety, revision frequency, and engagement. However, these studies also indicate that AI feedback alone is often insufficient for more complex dimensions such as organization, critical thinking, and intellectual depth. Hybrid models that combine AI support with human guidance appear to yield stronger results in motivation, text development, and feedback perception (Zhang et al., 2025; Mekheimer, 2025). These findings suggest that the educational value of AI-generated feedback depends less on its availability and more on its pedagogical quality and interpretive use by learners.

This discussion is directly related to student self-regulation. Self-regulation refers to the learner's capacity to plan, monitor, evaluate, and reorganize cognitive, motivational, affective, and behavioral processes in accordance with learning goals. In writing instruction, this includes setting goals, selecting strategies, managing attention, reviewing drafts, responding to feedback, and making deliberate revision decisions. Current studies at the intersection of generative AI and self-regulated learning show that AI can support metacognitive reflection, cognitive scaffolding, feedback engagement, and writing performance. At the same time, the

literature warns that these outcomes do not emerge automatically. When AI is used as a framework for planning, reflection, goal orientation, and self-evaluation, its contribution to self-regulation becomes more visible; when it is used as a shortcut that offers ready-made solutions, the risk of dependency, superficial revision, and weakened critical engagement increases (Wang et al., 2025; Özturan, 2025; Weng & Fu, 2025; Anders & Speltz, 2025).

The tension between autonomy and dependency is therefore central to AI-supported English writing instruction. Research in EFL settings shows that many learners perceive generative AI as a useful complement for idea generation and content improvement, yet they do not necessarily view it as a replacement for teacher-led instruction. This indicates that effective pedagogical integration rests on purposeful, selective, and critical use rather than unreflective reliance on technological output (Lee et al., 2025; Saleh & ElSayary, 2026). From this perspective, feedback quality becomes one of the key conditions through which AI can either strengthen or weaken student self-regulation. Feedback that directs students toward reflection, comparison, interpretation, and independent revision can support their regulatory capacities. Feedback that encourages passive acceptance may reduce the learner's sense of cognitive responsibility.

Within this framework, the present study aims to examine the relationship between feedback quality and student self-regulation in generative AI-supported English writing instruction at tertiary level in some Middle Asian State universities. The study is built on the assumption that feedback quality should be considered a central pedagogical factor in determining whether AI functions as a meaningful support mechanism in writing education in Uzbekistan State universities. More specifically, it is argued that clear, actionable, and development-oriented feedback can strengthen learner's capacity to regulate their writing processes, while low-quality or overly directive feedback may limit reflective engagement and independent revision. By addressing feedback quality and self-regulation together, this study seeks to provide a theoretically grounded and pedagogically relevant framework for understanding how generative AI can be integrated into English writing instruction at tertiary level in Middle Asia in more effective and responsible ways.

2. MATERIALS AND METHODS

This study was designed as a theoretical literature review examining the relationship between feedback quality and student self-regulation in generative AI-supported English writing instruction. Rather than relying on direct empirical data collection, the study draws on current academic literature addressing AI-assisted writing, feedback processes, and self-regulated learning.

The analysis was organized around three main themes: the pedagogical role of generative AI in English writing instruction, the characteristics of high-quality feedback, and the function of self-regulation in writing development. Through a thematic and interpretive approach, the study evaluates how feedback quality may shape learner's capacity to plan, monitor, and revise their writing in AI-supported environments.

This design makes it possible to discuss the issue within a coherent conceptual framework and to clarify the pedagogical conditions under which generative AI can support more reflective and autonomous writing practices.

3. FINDINGS

3.1. The Concept of Artificial Intelligence and its Transformation in an Educational Context

Artificial intelligence (AI) has become increasingly central to educational research as a technological field that enables the performance of cognitive functions—such as pattern recognition, decision-making, language processing, learning, and problem-solving—which are considered unique to the human mind, through computational systems. In the context of education, this transformation is not limited to supporting teaching processes with digital tools; it points to a multi-layered paradigm shift that reshapes the structure of learning environments, teacher roles, the understanding of assessment, and student autonomy. With the widespread adoption of generative AI applications, AI is no longer considered merely a technical assistant system that processes data or performs predefined tasks. It is now regarded as a cognitive partner capable of generating text, visuals, audio, and multimodal content, interacting with users, and providing personalized learning support. This trend indicates a significant shift in AI in education from its instrumental use to its transformative impact on pedagogical development (Law, 2024; Portilla et al., 2025).

The main characteristic that differentiates generative AI technologies from previous AI applications is their capacity to create original content based on patterns learned from large datasets, going beyond the function of classifying or predicting existing data. These systems, based on large language models, have had a remarkable impact on language teaching because they can perform functions such as context-sensitive text generation, linguistic formatting, rewriting, summarizing, explaining, exemplifying, and generating feedback. The text-focused operation of generative AI is strongly aligned with the fundamental structure of language education. This feature makes it possible for these technologies to go beyond simply generating supplementary content in language teaching and be used as an educational support system that can interact with the learner, offer real-time guidance, and support the learning process in a multidimensional way. Indeed, recent studies on language teaching and learning reveal that generative artificial intelligence research has intensified rapidly since 2022, the field has quickly become a distinct area of study, and this rise is clustered around writing, feedback, attitudes, and application strategies (Law, 2024; Deane, 2011).

Although the development of artificial intelligence in language teaching dates back much further than generative AI, the systems that stood out in the early stages of the field were mostly shaped around limited functions such as error correction, automatic assessment, pronunciation support, vocabulary teaching, and adaptive learning. In later stages, with natural language processing, speech recognition, intelligent tutoring systems, and personalized learning platforms, artificial intelligence has gained more flexible structures that can be adapted to the individual needs of language learners. Current bibliometric and systematic reviews show that AI-assisted language teaching research has increased significantly in recent years; and that numerous subfields have emerged in foreign language teaching, such as automatic writing assessment, personalized learning systems, speech and pronunciation applications, computer-mediated interaction, and systems that monitor learner emotions. This developmental trajectory has entered a new phase with the emergence of generative AI; In language teaching, artificial intelligence functions, which were previously limited to feedback or error detection, have now

reached the capacity of providing holistic text support, content suggestions, revision guidance, and real-time interaction (Law, 2024; Deane, 2011; Purba et al., 2025).

The integration of digitalization and artificial intelligence in English language teaching does not simply mean the introduction of new tools into the classroom. This integration is creating a structural transformation in areas such as instructional design, tracking learning outcomes, student engagement, individualized feedback, and teacher competencies. Current studies show that artificial intelligence can create personalized learning paths for individuals learning English as a foreign language, provide automated assessment and real-time support, but the effective use of these technologies is closely linked to teacher's digital and pedagogical competencies. AI-supported lesson planning, language practice and feedback provision, differentiated instruction, data-driven student monitoring, and awareness of ethical use are considered among the new teacher competencies that stand out in English language teaching today. This picture shows that digitalization in education is not just a matter of technical equipment; it creates a transformation that makes the teacher's functions of guidance, selectivity, critical supervision, and ethical guidance even more visible (Portilla et al., 2025; Laoha et al., 2025).

In foreign language teaching, writing instruction holds particular importance as it is a multi-layered skill area requiring simultaneously the organization of thought, linguistic accuracy, discursive integrity, and awareness of the target audience. Writing is not only a performance indicator directly related to academic success, but also one of the fundamental skills that makes the learner's linguistic knowledge visible at the production level. Second language writing research has developed through product-oriented, process-oriented, and post-process approaches; over time, it has evolved into a broad research area encompassing dimensions such as feedback, self-monitoring, evaluation, and contextual writing practices. Within this framework, writing instruction should not be viewed as a narrow approach aimed solely at producing grammatical accuracy; rather, it should be considered a learning area encompassing processes such as planning, drafting, reviewing, revising, and suitability for the purpose and target audience. Indeed, the second language writing literature shows that writing is crucial for both academic success and the development of linguistic competence; and that difficulties in student's writing performance are often related to the cognitive and strategic dimensions of the writing process rather than superficial language errors (Javadi-Safa, 2018).

The cognitive and pedagogical dimensions of English writing skills are critical to understanding why this skill is being re-evaluated in AI-assisted environments. Writing is not merely the production of sentences; it is a complex cognitive activity involving reading, critical thinking, memory, planning, content selection, organization, evaluation, and restructuring processes. Socio-cognitive approaches emphasize that writing is a practice shaped by both cognitive processes and social contexts. The nature of the writing task, the presence of the target audience, the resources used, the form of evaluation, and the character of the feedback are pedagogical variables that directly affect writing performance. In addition, metacognitive knowledge and self-regulation strategies play a significant role in the second language writing process; the student's understanding of task demands, their determination of writing goals, their ability to monitor their own production throughout the process, and their ability to make revision decisions significantly affect the quality of the written product. The multi-layered

nature of the writing process makes it insufficient to evaluate feedback provided by generative AI solely through criteria limited to technical accuracy. Therefore, this feedback needs to be comprehensively evaluated in terms of its cognitive guidance capacity and pedagogical directional power (Deane, 2011; Portilla et al., 2025; Saffari, 2019).

In this context, generative AI-assisted English writing instruction creates a new learning universe that differs from the use of classic digital tools. The key difference is that the student doesn't simply utilize an online information source; they work with a system that interacts with the text, analyzes it, develops suggestions, offers revision alternatives, and in some cases, directly participates in the learning process. This new structure brings both opportunities and risks to writing instruction. On one hand, there are gains such as individualized support, instant feedback, linguistic awareness, and ease of revision; on the other hand, issues such as over-reliance, superficial learning, weakening of critical thinking, text ownership problems, and violations of academic integrity become apparent. Current research shows that artificial intelligence offers strong contributions as a complementary tool in language teaching; however, for this contribution to be sustainable and pedagogically meaningful, a human-centered teaching approach, teacher guidance, and an ethical framework must be maintained. Therefore, the transformation of the concept of artificial intelligence in an educational context is not a subject of evaluation limited to technological developments. This transformation needs to be considered in conjunction with the unique structure of language teaching, the fundamental principles of writing pedagogy, and the ethical boundaries of the learning process (Gabay et al., 2026; Laoha et al., 2025; Law, 2024).

3.2. Productive AI-Powered English Writing Training

Generative AI-assisted English writing instruction stands out as a new transformative field profoundly impacting the pedagogical understanding of developing writing skills in foreign language teaching. This transformation cannot be explained simply as the introduction of a new technological tool into the classroom; more comprehensively, it means the restructuring of the planning, production, review, reorganization, and evaluation phases of the writing process using digital intelligence systems. Current studies show that generative AI research in the field of language education has rapidly increased in a very short time, with the most dominant research axis in this literature being directly writing and feedback. These studies, focusing on higher education and groups learning English as a foreign language, reveal that generative AI is no longer seen as a marginal innovation in writing instruction; it has become an influential pedagogical element in instructional design, learning strategies, and assessment understanding (Li et al., 2025).

Generative AI-assisted English writing instruction stands out as a learning environment that holistically restructures the processes of planning, text production, feedback, and revision, going beyond simply evaluating written expression in a foreign language based on the final product. Current systematic reviews show that generative AI research in language education is most heavily concentrated around writing and feedback, with studies largely focused on higher education and groups learning English as a foreign language, and writing becoming the most dominant application area. The main reason for this is that the capacity of large language models to produce contextually sensitive texts, rephrase them, linguistically organize them, and offer instant suggestions directly aligns with the needs of writing instruction. Therefore,

generative AI is considered more than just a tool offering technical functions in English writing instruction; it is seen as a cognitive support mechanism that accompanies the student's efforts to structure their thoughts, improve their text, and manage the writing process more consciously (Li et al., 2025; Law, 2024).

Considering the stages of the writing process, the function of generative AI tools presents a multifaceted picture. Before writing, these tools can facilitate the student's intellectual preparation through functions such as topic limitation, brainstorming, sample generation, and draft planning. During writing, they support the production process by offering alternatives regarding word choice, sentence structure, paragraph integrity, and discourse flow; and after writing, they contribute to the improvement of the text with suggestions for editing, correcting, restructuring, and revision. Comprehensive surveys focusing on academic writing reveal that GenAI use is most concentrated in the process line from planning to revision; the reported contributions are clustered around text organization, fluency, efficiency, and language support. This finding suggests that AI-assisted writing not only facilitates text production but also permeates various stages of process-based writing pedagogy (Gabay et al., 2026).

Chatbots and text-generating systems are at the heart of this transformation. While previous generations of digital writing tools primarily served spell checking or limited error correction functions, systems based on large language models have a structure that can interact with the student, provide explanations, offer comparative suggestions, and generate different revision options. Current syntheses in language education show that chatbots can assume different roles such as conversational partner, feedback provider, resource provider, and requirements analyst; however, they do not completely replace the pedagogical and social functions of the human teacher. Therefore, in English writing instruction, the function of chatbots is defined not as establishing an authoritarian structure at the center of the teaching process, but rather as a supportive learning tool that strengthens teacher guidance and directs the student to think about the text (Li et al., 2025).

The current literature reveals that AI-assisted writing instruction offers various pedagogical benefits. Instant and accessible feedback helps students maintain the writing process without interruption; personalized suggestions can provide a writing experience tailored to the student's level and needs. For multilingual learners and students using English as a foreign language, these systems can reduce limitations caused by lexical deficiencies, make the text organization process visible, and strengthen revision awareness. Some studies suggest that this support can also positively influence confidence, motivation, and self-efficacy in writing. However, these contributions do not appear to be equally sustainable when artificial intelligence takes over the writing process from the student; because the development of writing skills depends not only on the production of correct sentences but also on thought development, decision-making, and text reconstruction processes (Gabay et al., 2026; Li et al., 2025; Laoha et al., 2025).

At this point, the limitations and risks of generative AI-assisted writing instruction become apparent. Current reviews emphasize that unguided and aimless use can lead to excessive dependency in students, weaken critical thinking and original decision-making processes, and highlight issues of academic integrity. Fabricated sources, unverified citations, contextual errors, and ambiguities regarding text authorship are among the most frequently

discussed problems in the context of academic writing. Therefore, teaching writing with generative AI cannot be considered solely within the framework of a technological innovation focused on utility; it must be considered in conjunction with the principles of verification, source utilization, ethical transparency, and human oversight. Indeed, recent synthesis studies indicate that the most reliable approach is an auxiliary but not a substitute usage model; that is, AI can function as a planner, linguistic supporter, and process facilitator, but argument construction, source verification, and final academic responsibility should remain with humans (Gabay et al., 2026; Li et al., 2025).

In this context, the cognitive structure of English writing instruction should also be considered. Writing is a complex production activity involving metacognitive processes such as planning, monitoring, self-evaluation, editing, and revision. Therefore, the pedagogical value of artificial intelligence support increases to the extent that it strengthens the student's self-regulation capacity. The tool is meaningful from an instructional perspective if it creates a framework that facilitates the student's thinking; however, if it makes the student dependent on ready-made solutions, it creates tension with the cognitive development logic of writing skills. For this reason, productive AI-supported English writing instruction should be considered not merely a technology-based convenience, but a new pedagogical framework that needs to be carefully structured in line with the principles of process-oriented writing instruction, self-regulated learning skills, and academic integrity (Gabay et al., 2026; Li et al., 2025).

3.3. The Concept of Feedback and the Quality of Feedback

In the context of education, feedback is considered a pedagogical structure that makes visible the gap between a student's current performance and the level they are expected to reach, provides guidance to reduce this gap, and generates information that advances the learning process. In this framework, feedback is not merely a narrow evaluation mechanism that indicates the correctness or incorrectness of the work done. It is an instructional intervention that explains to what extent the student has achieved something, in which areas they need support, and how they can progress in the next step. Hattie and Timperley's (2007) classic framework reveals that the effect of feedback varies depending on its content and presentation; effective feedback provides answers to the questions "where am I going, where am I now, what should I do next?". Similarly, current conceptual studies focusing on writing instruction emphasize that feedback is not only intended for error correction but is a multidimensional pedagogical approach that deepens the learning process, strengthens self-regulation skills, and supports long-term learning habits (Hattie and Timperley, 2007; Fidan and Çakırt, 2025).

In the context of writing instruction, the function of feedback becomes even more critical because writing is a complex skill that requires both product and process management, involving planning, drafting, monitoring, reviewing, and rewriting. Therefore, feedback given in written production not only evaluates the text the student has produced but also increases their awareness of the writing process, guides their strategic decisions, and contributes to more conscious action in their subsequent productions. Conceptual framework studies on writing instruction indicate that feedback undertakes functions such as guidance, motivation, and reinforcement; showing the student what they did right, in which dimensions they need improvement, and what steps would be more appropriate for them to take in the future. Theoretical and empirical literature on L2 writing also shows that corrective feedback in

writing has instructional value on writing accuracy because it allows the student to recognize linguistic gaps, test their interlinguistic assumptions, and engage in metalinguistic thinking processes (Fidan and Çakırt, 2025; Van Beuningen, 2010). In addition, the effect of feedback does not depend solely on whether it has been given. How a student perceives, interprets, and uses feedback plays a decisive role. Theoretical approaches to feedback literacy suggest that the student's capacity to make sense of, evaluate, and use the information presented for development determines the actual impact of the feedback. Similarly, the literature on formative assessment and self-regulation does not treat feedback as a one-way transmission of information; rather, it positions it as an interaction-based process that guides the student to monitor, evaluate, and reorganize their own learning process. Studies on student perceptions also show that general or vague interpretations are limited in producing development; students value feedback that is clear, individualized, applicable, and transferable to the next performance. The usefulness of written feedback for students seems to depend on its clear, complete, forward-looking, and relationship-relationship-friendly language (David and David, 2018; Nicol and Macfarlane-Dick, 2006; Austen and Malone, 2018; Marrs et al., 2022).

Generative AI-based feedback systems can produce more than just superficial error-checking; they can generate goal-oriented, human-like, and contextually responsive feedback. However, current findings indicate that while generative AI feedback yields beneficial results in basic writing dimensions such as grammar and sentence variety, it is insufficient on its own for higher-level skills such as organization, critical thinking, and textual depth. Recent studies comparing GenAI and hybrid feedback show that AI-provided feedback improves writing performance to some extent; however, the hybrid model, which combines AI with human input, produces stronger results in terms of organization, intellectual depth, motivation, and perception of positive feedback. Similarly, other experimental studies indicate that AI-powered tools can increase revision frequency, engagement, and certain quality dimensions, but when used without pedagogical awareness, they can foster overconfidence and superficial revision behavior in students. Therefore, the most effective use of AI-assisted feedback appears to be not as an independent mechanism replacing the teacher, but rather as a supportive element that complements teacher commentary and strengthens the student's capacity to process feedback (Zhang et al., 2025; Mekheimer, 2025).

The dimensions of feedback quality are central to this discussion. Reviews of feedback quality in higher education highlight specificity, timeliness, clarity, constructiveness, a positive tone, encouraging student participation, and motivating factors as common indicators of effective feedback. Studies on student feedback preferences similarly show that general praise alone is not considered sufficient; detailed comments that are clear, understandable, personalized, and show what and how can be improved are considered more valuable. Systematic reviews indicate that students find individualized, applicable, and directly corrective feedback more useful; and that the quality of feedback, rather than its quantity, has a stronger impact on motivation, participation, and self-regulation. Taken together, these findings reveal that feedback quality cannot be defined solely by the amount of information conveyed. The quality of feedback; This is shaped by its clarity, which students can easily grasp, its guidance of the developmental process, its provision of concrete focuses at the task and process levels, and its transformation of the student from a passive recipient into an active

subject in the learning process (Haughney et al., 2020; Brandmo and Gamlem, 2025; Austen and Malone, 2018).

3.4. Student Self-Regulation

Student self-regulation is an effective learning capacity explained by the learner's ability to plan, monitor, evaluate, and, if necessary, restructure their own cognitive, motivational, affective, and behavioral processes in line with specific learning goals. In this context, self-regulation is not a narrow characteristic that can be reduced solely to individual willpower or study habits; it is based on the organized functioning of multidimensional processes such as goal setting, strategy selection, attention management, self-monitoring, self-evaluation, seeking help, and organizing the learning environment. Classical theoretical approaches do not view the self-regulated learner as a passive participant who sustains the learning process through external guidance. Instead, the learner is defined as an active subject who consciously monitors their own development, evaluates their performance, and makes strategic decisions appropriate to the task's requirement. In this context, self-regulation is considered not merely an observed outcome of learning success, but rather one of the fundamental processes that establish and guide success (Saleh and ElSayary, 2026; Anders & Dux Speltz, 2025; Panadero, 2017).

The theoretical foundations of self-regulated learning (SRL) have developed around the holistic SRL models of Zimmerman, Pintrich, and subsequent models. While Zimmerman's approach conceptualizes self-regulation as a cyclical process consisting of prediction, performance, and self-reflection phases, Pintrich addresses this structure within a broader learning architecture where cognition, motivation, behavior, and context are regulated together. Panadero's (2017) comprehensive evaluation comparing six models also shows that self-regulated learning is not limited to metacognitive strategies; it also includes elements such as emotion regulation, maintenance of motivation, management of environmental conditions, and adaptability to task demands. Therefore, self-regulation does not only offer an approach that explains how learning occurs in multi-layered tasks such as writing; it also creates a theoretical framework that allows for determining under what conditions, which strategies should be employed, when, and at what level (Zhou et al., 2024; Saleh and ElSayary, 2026).

Self-regulation skills play a more prominent and vital role in the writing process. This is because writing is not merely an activity of directly transferring thought; it is a cyclical cognitive process involving planning, text creation, monitoring, revision, correction, and structuring. Research in the field of EFL writing shows that strong written output is closely related to self-regulatory strategies such as idea planning, goal setting, text processing, utilizing feedback, maintaining motivation, and emotional control. Developed structural models group self-regulated writing strategies into cognitive, metacognitive, socio-behavioral, and motivational regulation dimensions; this reveals that writing requires a multi-layered strategy management approach beyond grammatical accuracy. Indeed, self-regulation-based interventions in writing instruction have been shown to create significant improvements in organization, content development, vocabulary use, monitoring, and revision quality; It has been reported that students participate in writing assignments in a more conscious and sustainable manner (Zhou et al., 2024; Zhang et al., 2025; Özturan, 2025; Tian et al., 2022).

The effects of generative AI use on self-regulation exhibit a twofold perspective. Recent systematic and scientometric studies show that at the intersection of GenAI and self-regulated learning, metacognitive support, cognitive scaffolding, academic writing, feedback, and human-AI interaction are the most prominent aspects. Systematic studies in the context of foreign and second language learning also reveal that generative AI tools, especially ChatGPT, are associated with cognitive, affective, motivational, and metacognitive processes in most studies; the general trend is supportive of self-regulation, but this support is not unconditional and automatic. When artificial intelligence is positioned not as an authority offering absolute truths, but as a learning partner structuring planning, reflection, goal setting, and self-evaluation processes, the effects that strengthen self-regulation become more evident (Wang et al., 2025; Özturan, 2025; Weng and Fu, 2025).

At the empirical level, the relationship between generative AI and self-regulation becomes visible through variables such as writing performance, feedback literacy, critical thinking, and well-being. Recent studies with university students show that both AI literacy and self-regulated learning significantly and positively predict writing performance; in some models, self-regulation even emerges as a stronger explanatory variable than AI literacy. Similarly, studies comparing GenAI and peer feedback report that generative AI can strengthen student's interaction with feedback in goal setting, planning, critical evaluation, and immediate self-reflection processes. These findings suggest that AI can be considered both a content-generating tool and a tool that activates student's capacity to manage their own learning (Shi et al., 2025; Gu et al., 2026).

In AI-assisted learning, the line between self-regulation and dependency is not always clear. Studies developed with a human-centered approach emphasize that GenAI carries the potential to enrich learning, but also the risk of skill erosion, over-dependency, and weakened student activity. Human-supervised usage models structured with a plan-repeat-evaluate cycle aim to transform the student from a blindly adopting AI output into a user who questions, reshapes, and transforms it according to their own purpose. The key factor here is not that AI completely takes over the responsibility for learning. The primary function is to contribute as a scaffolding mechanism that supports the student's regulatory skills, structures the learning process, and strengthens their independent progress. Otherwise, rapid and effortless response generation can weaken the student's self-regulating processes such as goal setting, alternative development, self-monitoring, and error detection (Anders and Speltz, 2025; Wang et al., 2025).

This tension between autonomy and dependence is becoming more pronounced in English writing instruction. Recent studies within the EFL context show that students mostly view generative AI as a useful complement for idea generation and content improvement, but do not position it as a solution to replace traditional teaching. This demonstrates that healthy pedagogical integration does not rely on unconditional attachment to technology; it requires the simultaneous maintenance of critical evaluation and collaborative use. On the other hand, some research indicates that students may tend to use GenAI output as if it were the final product; this can have erosive consequences for deep learning, critical engagement, and original production. Therefore, autonomy is not defined by a complete avoidance of artificial

intelligence; rather, it is explained by the capacity to use this technology in a purposeful, selective, critical, and adaptable manner (Lee et al., 2025; Saleh and ElSayary, 2026).

4. CONCLUSION

The relationship between feedback quality and student self-regulation can be considered one of the most defining structural elements of generative AI-assisted English writing instruction in Uzbekistan State universities. When the studies examined are evaluated holistically, it becomes clear that the quality of feedback provided during the writing process does not limit its impact to textual corrections; it also plays a decisive role in how the student plans, monitors, and directs their learning process. Clear, guiding, timely, and applicable feedback strengthens the student's capacity to monitor their own written work, identify sources of error, make revision decisions, and prepare more consciously for future writing tasks in the aforementioned State universities in Uzbekistan. In this context, feedback is considered more than just an explanatory output provided after performance; it is a pedagogical tool that activates self-regulation processes and shapes the direction of learning at tertiary level education in foreign language teaching and learning in Middle Asia.

This relationship becomes even more apparent in productive AI-powered writing environments. Because AI-based systems can offer students instant, continuous, and often individualized feedback, this encourages students to think about their text more frequently, make more revisions, and participate more actively in the writing process. However, it's difficult to say that this positive effect occurs automatically. For feedback to effectively support self-regulation, it must not be a structure that directly guides students to ready-made solutions, but rather one that activates processes of thinking, comparing, questioning, and making independent decisions. Otherwise, AI-powered feedback can become a facilitator that weakens the student's cognitive responsibility rather than a learning aid that improves self-regulation.

Therefore, a general assessment of the subject shows that the impact of feedback quality on self-regulation is more related to quality than quantity at tertiary level foreign language instructions. Providing more feedback alone does not produce improvement; the real determining factor is the extent to which this feedback activates the student's goal-setting, self-monitoring, self-evaluation, and revision behaviors. Consequently, an effective learning process in generative AI-assisted English writing instruction is built on a balanced structure where high-quality feedback and strong self-regulation skills mutually reinforce each other at tertiary level education in Middle Asia. In this context, pedagogical success is related not so much to how quickly the AI responds, but to the extent to which the student can consciously, critically, and autonomously transform these responses into a learning process.

REFERENCES

Anders, A. D., & Speltz, E.D. (2025). Developing generative AI literacies through self-regulated learning: A human-centered approach. *Computers and Education: Artificial Intelligence, 9,* Article 100482. https://doi.org/10.1016/j.caeai.2025.100482

Austen, L., & Malone, C. (2018). What student's want in written feedback: Praise, clarity and precise individual commentary. *Practitioner Research in Higher Education, 11*(1), 47–58.

Brandmo, C.ve Gamlem, S.M. (2025) Student's perceptions and outcome of teacher feedback: a systematic review. Front. Educ. 10:1572950. doi: 10.3389/feduc.2025.1572950

David Carless & David Boud (2018): The development of student feedback literacy: enabling uptake of feedback, Assessment & Evaluation in Higher Education, DOI: 10.1080/02602938.2018.1463354

Deane, P. (2011, April). *Writing assessment and cognition* (ETS Research Report No. RR-11-14). Educational Testing Service.

Fidan, M. & Çakırt, C. (2025). Feedback in Writing Education: A Conceptual Framework. Academia Journal of Educational Research, 10(2), 96-111. https://doi.org/10.53506/egitim.1643997

Gabay, R. A. E., Funa, A. A., & Ricafort, J. D. (2026). Generative Artificial Intelligence (GenAI) for academic writing in higher education: A scoping review of applications, challenges, and implications. *International Journal of Education in Mathematics, Science and Technology (IJEMST), 14*(1), 200-232. https://doi.org/10.46328/ijemst.5682

Gu, J., Chen, J. and Yan, Z. (2026) Fostering feedback literacy by scaffolding self-regulated feedback: a comparative study of GenAI and human peers. Front. Educ. 10:1736446. doi: 10.3389/feduc.2025.1736446

Haughney, K., Wakeman, S., & Hart, L. (2020). Quality of Feedback in Higher Education: A Review of Literature. Education Sciences, 10(3), 60. https://doi.org/10.3390/educsci10030060

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

Javadi-Safa, A. (2018). A brief overview of key issues in second language writing teaching and research. *International Journal of Education & Literacy Studies, 6*(2), 12–25. https://doi.org/10.7575/AIAC.IJELS.V.6N.2P.15

Laoha, R., Chomthong, W., & Pongpanich, W. (2025). Artificial intelligence and English as a foreign language (EFL) teacher's competencies: A systematic review. *Higher Education Studies, 15*(3), 262–274. https://doi.org/10.5539/hes.v15n3p262

Law, L. L.-H. (2024). Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review. *Computers and Education Open, 6*, 100174. https://doi.org/10.1016/j.caeo.2024.100174

Lee, Y.-J., Davis, R. O., & Choi, J.-I. (2025). Integrating generative AI into EFL writing: University student's strategies and perceptions. Online Journal of Communication and Media Technologies, 15(4), e202541. https://doi.org/10.30935/ojcmt/17545

Marrs SA, Zumbrunn S and Ekholm E (2022) Measuring Student's Perceptions of Writing Feedback. Curr Res Psychol Behav Sci 3: 1054

Mekheimer, M. (2025). Generative AI-assisted feedback and EFL writing: A study on proficiency, revision frequency and writing quality. *Discover Education, 4*, Article 170. https://doi.org/10.1007/s44217-025-00602-7

Nicol, D., & Macfarlane-Dick, D. (2006). Formative Assessment and Self-Regulated Learning: A Model and Seven Principles of Good Feedback Practice. Studies in Higher Education, 31, 199-218.

http://dx.doi.org/10.1080/03075070600572090

Özturan, T. (2025). Self-Regulated Language Learning and Generative AI: A Systematic Review. *Boğaziçi University Journal of Education*, *42-4*(3), 177–194. https://doi.org/10.52597/buje.1751534

Panadero, E. (2017) A Review of Self-regulated Learning: Six Models and Four Directions for Research. Front. Psychol. 8:422. doi: 10.3389/fpsyg.2017.00422

Portilla, J.E.N., Zapa Cedeño, J. K., León Jácome, G. O., & Manzano Gallegos, L. A. (2025). *Systematic review: Artificial intelligence (AI) in Education 4.0*. *Journal of Educators Online*, *22*(3). https://doi.org/10.9743/JEO.2025.22.3.13

Purba, S. W. D., Silitonga, B. N., & Yang, J. J. (2025). AI-assisted learning: A systematic review. *Turkish Online Journal of Distance Education, 26*(4), Article 5.

Saffari, N. (2019). Metacognitive knowledge and its effect on second language writing: Student's perceptions of writing task. *International Journal of Higher Education, 8*(5), 221–231. https://doi.org/10.5430/ijhe.v8n5p221

Saleh, D. and ElSayary, A. (2026) Generative AI use and self-learning in higher education: the role of learning difficulties. Front. Educ. 10:1737928. doi: 10.3389/feduc.2025.1737928

Shi, J., Liu, W., & Hu, K. (2025). Exploring How AI Literacy and Self-Regulated Learning Relate to Student Writing Performance and Well-Being in Generative AI-Supported Higher Education. Behavioral Sciences, 15(5), 705. https://doi.org/10.3390/bs15050705

Tian L, Liu Q and Zhang X (2022) Self-Regulated Writing Strategy Use When Revising Upon Automated, Peer, and Teacher Feedback in an Online English as a Foreign Language Writing Course. Front. Psychol. 13:873170. doi:10.3389/fpsyg.2022.873170

Van Beuningen, C. (2010). Corrective feedback in L2 writing: Theoretical perspectives, empirical insights, and future directions. *International Journal of English Studies, 10*(2), 1–27. https://doi.org/10.6018/ijes/2010/2/119171

Wang, H., Wang, Z., & Zhou, T. (2025). Generative AI and self-regulated learning in education: A scientometric review: Generative AI and self-regulated learning in education. In *Proceedings of the 2025 4th International Conference on Artificial Intelligence and Intelligent Information Processing (AIIIP '25)*. ACM. https://doi.org/10.1145/3778534.3778581

Weng, Z. & Fu, Y. (2025). Generative AI in language education: Bridging divide and fostering inclusivity. International Journal of Technology in Education (IJTE), 8(2), 395- 420. https://doi.org/10.46328/ijte.1056

Zhang, Z., Aubrey, S., Huang, X., & Chiu, T. K. F. (2025). The role of generative AI and hybrid feedback in improving L2 writing skills: A comparative study. *Innovation in Language Learning and Teaching*. https://doi.org/10.1080/17501229.2025.2503890

Zhou, X., Teng, D., & Al-Samarraie, H. (2024). The mediating role of generative AI self-regulation on student's critical thinking and problem-solving. *Education Sciences, 14*(12), 1302. https://doi.org/10.3390/educsci14121302