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Article

Integrating AI-powered tools into ESL writing instruction: A conceptual framework for enhancing writing skills and learner perceptions

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ABSTRACT

The emergence of artificial intelligence (AI) in education has opened unprecedented opportunities for supporting English as a Second Language (ESL) learners, particularly in writing instruction. ESL students often struggle with coherence, grammar, vocabulary, and organization—areas where AI-powered tools such as Grammarly and ChatGPT can offer real-time assistance. This conceptual paper proposes a pedagogically informed framework for integrating AI tools into ESL writing instruction, drawing on second language acquisition (SLA) theories, the writing process model, and the concept of cognitive scaffolding. The framework outlines how different AI tools can support various stages of writing—from prewriting to editing—while encouraging reflective learning and ethical use. The paper also explores challenges, including plagiarism, over-reliance, and issues of digital literacy. By proposing guidelines for teachers, learners, and policymakers, this paper contributes to ongoing conversations on the meaningful use of AI in ESL writing pedagogy and provides directions for future research.

Keywords: AI in education, ESL writing, writing instruction, AI-powered tools, second language acquisition

INTRODUCTION

Over the last decade, artificial intelligence (AI) has evolved from being an experimental innovation to becoming a central feature of contemporary education. AI technologies are now embedded in adaptive learning platforms, automated assessments, intelligent tutoring systems, and language learning applications. The COVID-19 pandemic accelerated the adoption of such tools, and their integration has continued post-pandemic as institutions worldwide strive to enhance accessibility and personalization in learning (Lee & Lee, 2024).

In the context of English language education, AI has been increasingly employed in vocabulary acquisition, grammar checking, reading comprehension, and writing support. Among the four language skills, writing remains one of the most cognitively demanding tasks, requiring not only linguistic accuracy but also organizational coherence, idea generation, and rhetorical awareness. ESL learners often perceive writing as their most significant academic challenge (Nhan et al., 2025). Limited access to timely teacher feedback further exacerbates the issue, leaving many learners struggling in isolation.

AI-powered writing assistants such as Grammarly and ChatGPT have emerged as potential solutions to these challenges. Grammarly provides grammar correction and stylistic feedback, QuillBot assists in paraphrasing and cohesion, Writefull supports lexical precision through corpus-informed suggestions, while ChatGPT facilitates idea generation, outlining, and content drafting. Learners value these tools for their immediacy, personalization, and accessibility. However, concerns remain regarding plagiarism, over-reliance, loss of authentic voice, and the reliability of AI-generated content (Unlocking EFL learners' insights, 2025).

This paper proposes a conceptual framework to guide the pedagogical integration of AI-powered tools into ESL writing instruction. Grounded in SLA theories, writing pedagogy, and principles of scaffolding, the framework emphasizes reflective use, teacher mediation, and ethical considerations. By offering structured guidance, this paper seeks to contribute to ongoing debates on how educators and learners can use AI not as a replacement for human instruction but as a complementary scaffold to enhance writing proficiency.

LITERATURE REVIEW

The rise of AI in education has been marked by the development of intelligent tutoring systems, automated essay scoring, and adaptive learning technologies. These systems aim to personalize instruction, reduce teacher workload, and provide real-time support (Yu et al., 2024). In higher education, AI integration aligns with broader initiatives such as Education 4.0, which emphasizes innovation, creativity, and digital literacy.

Research in the last five years has increasingly focused on the use of AI for writing support in ESL/EFL contexts. Yu, Kong, and Hao (2024) reported that African learners of Chinese as a second language improved in syntactic complexity and fluency when using AI-powered corrective feedback tools. Similarly, studies in Southeast Asia have found that students in Thailand and Vietnam used ChatGPT to brainstorm, outline, and revise essays, although concerns about accuracy and critical thinking persisted (Using ChatGPT for second language writing, 2024). Lee and Lee (2024) highlighted that learners valued AI feedback for its immediacy and personalization but cautioned that students still needed teacher mediation to interpret and apply suggestions effectively. Nhan, Nguyen, and Luong (2025) further emphasized that while AI enhanced students' motivation and writing fluency, it raised concerns about originality and plagiarism.

Learners' perceptions of AI vary depending on gender, proficiency level, and frequency of use. A recent study revealed that male and frequent users of ChatGPT reported greater confidence in AI-generated suggestions, whereas female learners were more cautious and critical (Unlocking EFL learners' insights, 2025). Yang and Chen (2025) found that model version (GPT-3.5 vs GPT-4) and the prompt language significantly influenced the quality of automated feedback in L2 Chinese writing. These findings underscore the need for structured pedagogical frameworks that balance AI assistance with critical literacy.

Despite its promise, AI integration in writing instruction faces numerous challenges. Studies have raised concerns about plagiarism, over-reliance, cultural biases, and motivational decline after initial enthusiasm (Interacting with ChatGPT, 2025). Educators also struggle with assessing students' authentic abilities when AI is involved. These challenges necessitate clear academic integrity policies, digital literacy training, and innovative assessment practices that capture both AI-assisted and independent writing skills.

CONCEPTUAL FRAMEWORK

The conceptual framework proposed in this paper is grounded in the principles of second language acquisition, process-oriented writing pedagogy, and cognitive scaffolding. It

emphasizes three interconnected domains that guide the integration of AI tools into ESL writing instruction: writing process integration, scaffolding and cognitive apprenticeship, and reflective feedback loops.

Writing process integration refers to the ways AI tools can be mapped onto the different stages of writing. During the prewriting stage, learners can use generative AI such as ChatGPT to brainstorm ideas, organize thoughts, and create outlines. At the drafting stage, grammar and style checkers like Grammarly or corpus-based platforms like Writefull can provide real-time support to improve sentence structure, vocabulary choices, and clarity. In the revising stage, paraphrasing tools such as QuillBot can enhance cohesion and coherence, while lexical resources enrich variation in expression. Finally, in the editing stage, learners can rely on AI to fine-tune their texts, focusing on grammatical accuracy, stylistic refinement, and fluency.

The second domain is scaffolding and cognitive apprenticeship, where AI tools act as temporary support systems within learners' Zones of Proximal Development (ZPD). Similar to traditional scaffolding, the use of AI should not aim to replace learner effort but rather to guide learners until they are able to internalize strategies and apply them independently. Teacher mediation plays a vital role here, ensuring that students do not passively accept AI-generated content but instead engage with it critically and purposefully.

The third domain, reflective feedback loops, emphasizes the importance of learners critically evaluating the AI support they receive. This process involves maintaining reflective journals to document how AI was used, discussing strategies with peers, and analyzing the usefulness of suggestions in classroom activities. Such reflective practices enhance metalinguistic awareness and prevent over-reliance on AI tools.

The framework can be visualized through a diagram that illustrates the interplay of these three domains. Table 1 depicts the writing process as a cycle supported by AI scaffolding, mediated by teacher guidance, and reinforced through reflective feedback practices.

Table 1. Functions of AI-Powered Writing Tools Across the Stages of the Writing Process

Writing Stage	Functions of AI-Powered Tools	Examples of Tools
Planning / Pre-Writing	Idea generation, brainstorming, outlining, topic exploration	ChatGPT, Jasper, Copy.ai
Drafting	Producing initial drafts, sentence construction, vocabulary enhancement	ChatGPT, Writesonic, Wordtune
Revising	Paraphrasing, rephrasing sentences, improving coherence and cohesion	QuillBot, Wordtune, ChatGPT
Editing	Grammar and spelling checks, style suggestions, readability improvement	Grammarly, ProWritingAid, Microsoft Editor
Publishing / Finalizing	Formatting, citation assistance, plagiarism detection	Turnitin Draft Coach, Grammarly Premium, Scribbr

PEDAGOGICAL IMPLICATIONS

The proposed framework carries important pedagogical implications for teachers, learners, and policymakers. For teachers, the integration of AI should not be incidental but systematic, aligned with curriculum outcomes and designed to complement rather than replace traditional methods of instruction. Teachers must also provide explicit guidance on prompt design to maximize the effectiveness of generative AI systems, while at the same time encouraging students to reflect

critically on the appropriateness and accuracy of the outputs. Classroom practices such as reflective journaling, peer review, and guided discussions help ensure that AI tools become instruments for learning rather than shortcuts to completion.

For learners, AI-powered tools offer opportunities for greater autonomy and personalized feedback. However, students need to be trained to approach these tools critically and responsibly. Rather than accepting suggestions wholesale, learners should evaluate the accuracy, cultural appropriateness, and rhetorical impact of AI-generated feedback. Cultivating digital literacy is crucial in enabling learners to navigate multiple platforms and to make informed decisions about which features to adopt at different stages of the writing process.

At the institutional and policy level, the growing presence of AI in classrooms calls for updated guidelines on academic integrity and responsible use. Policymakers must recognize that AI-assisted writing can no longer be dismissed as a passing trend and instead provide frameworks that encourage ethical and productive adoption. Clear institutional policies are needed to define acceptable boundaries of AI assistance in academic work, while investment in infrastructure and training ensures that access to AI technologies is equitable across socioeconomic contexts. Teacher training programs should also be expanded to include practical modules on AI literacy, so that educators are equipped to mediate its use effectively. Table 2 summarises the major functions of common AI-powered writing tools and illustrates how they can be positioned across the different stages of the writing process.

Table 2. Pedagogical Applications of AI-Powered Writing Tools Across the Writing Process

Writing Stage	Potential Pedagogical Use	Examples of Tools	Pedagogical Implications
Planning / Pre-Writing	Brainstorming prompts, generating topic ideas, and outlining essay structure	ChatGPT, Jasper	Teachers can guide students to critically evaluate AI-generated ideas, encouraging originality and alignment with learning outcomes.
Drafting	Supporting sentence construction, vocabulary enhancement, and style variation	ChatGPT, Wordtune, Writesonic	AI can scaffold weaker writers, but teachers should emphasize ownership and critical reflection to avoid overreliance.
Revising	Paraphrasing, reordering sentences, and enhancing coherence and cohesion	QuillBot, Wordtune	Students can use AI to refine drafts, while teachers can highlight differences between AI suggestions and student intent to develop awareness of writing style.
Editing	Grammar, spelling, style, and readability checks	Grammarly, ProWritingAid, Microsoft Editor	Teachers can encourage students to compare AI corrections with their own revisions, fostering grammar awareness and autonomy.
Publishing / Finalizing	Formatting, citation assistance, and plagiarism detection	Turnitin Draft Coach, Scribbr	AI tools can support academic integrity, but educators must stress ethical use, proper citation, and the importance

Writing Stage	Potential Pedagogical Use	Examples of Tools	Pedagogical Implications
			of human judgment.

LIMITATIONS AND ETHICAL CONCERNS

While the integration of AI in ESL writing instruction offers exciting possibilities, it is not without challenges. One of the most pressing concerns is the issue of plagiarism and authenticity. With the ability of generative AI systems to produce near-complete drafts, educators face difficulty in ensuring that student writing reflects original thought. Equally problematic is the tendency for some learners to become overly dependent on AI suggestions, potentially stunting the development of independent writing strategies.

Another challenge relates to bias and accuracy. AI systems are trained on large datasets that often reflect cultural biases, which may inadvertently shape learner output. Moreover, inaccuracies in AI-generated feedback can mislead learners who lack the skills to verify information independently. Motivation is also a concern, as initial enthusiasm for using AI may decline once the novelty wears off, leading to disengagement from the writing process (Interacting with ChatGPT, 2025). Finally, the presence of AI complicates assessment. Teachers struggle to distinguish between the learner's authentic ability and the contributions of AI, making it necessary to rethink approaches to evaluating writing proficiency.

These concerns underline the importance of establishing clear policies, integrating digital ethics into the curriculum, and designing assessment models that include both AI-assisted and independent writing tasks.

FUTURE DIRECTIONS

Future research should empirically test the proposed framework across diverse ESL contexts. Studies could examine the comparative effectiveness of AI tools across different proficiency levels, exploring whether beginner, intermediate, and advanced learners benefit in the same way. Longitudinal studies are also needed to investigate how sustained AI use influences writing development over time. Another promising area is the exploration of teacher perceptions and classroom strategies for balancing AI assistance with more traditional methods of instruction. In addition, cross-cultural studies could shed light on how learners from different educational backgrounds perceive the ethical implications of AI in writing. Finally, there is a need to develop blended assessment models that combine AI-assisted writing tasks with independent compositions, ensuring that student achievement is both authentic and measurable.

CONCLUSION

AI-powered tools hold significant promise for transforming ESL writing instruction by offering scaffolding, autonomy, and engagement. This conceptual paper proposed a framework grounded in SLA theory, the writing process, and reflective practice. Teacher mediation, learner reflection, and ethical use were identified as central to meaningful integration. Future research should test and refine this framework to ensure that AI adoption in ESL classrooms is not only innovative but also ethical, equitable, and pedagogically sound. By laying this foundation, the paper contributes to a more intentional and principled use of AI in language education, one that values both technological advancement and human creativity.

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