AI-Powered Tools for Enhancing Writing Skills of English Language Learners: A Systematic Literature Review

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ABSTRACT

In recent years, the integration of Artificial Intelligence (AI) in teaching English as a Second Language (ESL) and English as a Foreign Language (EFL) learners have significantly transformed the approaches to English language learning, especially in the teaching and learning of writing skills. Writing is known as a fundamental component of language proficiency. Hence, technological advancements offer innovative methods to address the persistent challenges often faced by these learners in acquiring writing proficiency. This systematic literature review investigates the impact of AI-powered tools on the improvement of writing skills in second English language learners, such as ESL and EFL learners. Following the PRISMA guidelines, the review synthesises findings from 31 studies published between the year of 2021 and 2025, identifying prevalent AI tools and analysing their effectiveness in enhancing learners' writing skills. Despite traditional instructional methods, persistent challenges in grammatical accuracy, limited vocabulary, and poor organization hinder effective expression among ESL/EFL learners, thereby necessitating the exploration of effective technological aids. The growing reliance on AI for educational support, especially among language learners, raises the need to examine how these tools are applied and what outcomes they generate. The review revealed a range of efficacious AI tools, notably ChatGPT, Grammarly, Quillbot, Gemini and a variety of other AI tools. Next, the review also underscored the significant potential of AI tools to positively impact writing skills such as accuracy in grammar and mechanics, vocabulary and style development, feedback and revision processes and narrative writing abilities. Thus, the findings of this systematic literature review provide evidence-based insights for educators and researchers regarding AI integration to enhance writing skills among ESL/EFL learners.

Keywords: Artificial Intelligence (AI) in Language Education, English as a Second Language Writing, Writing Skills, AI-powered Writing Tools, Systematic Literature Review

INTRODUCTION

The English language is widely known as the global language. The globalised world demands proficiency in English, making English as a Second Language (ESL) or English as a Foreign Language (EFL) education a critical component of academic and professional development. Writing skills in the ESL/EFL contexts are crucial for learners aiming to achieve proficiency in English. Effective writing encompasses various elements such as content, effective organisation of ideas, appropriate use of vocabulary, grammatical accuracy, the ability to produce different genres of text and many more (Chauhan, 2022). It is important for the ESL/EFL learners to grasp these writing skills as it enables them to express and communicate their ideas or thoughts effectively (Vejayan & Melor, 2022).

However, many ESL and EFL learners experience challenges in their writing skills. According to Baharudin et al. (2023), learners frequently grapple with fundamental linguistic hurdles such as limited vocabulary knowledge, grammatical inaccuracies and spelling errors. Furthermore, Kormos (2023) highlighted that the persistent influence of L1 may significantly impede the writing development in a second language (L2). Malip & Abdul Aziz (2022) also asserted a similar point of view in which they stated that the writing process for ESL learners may be complicated because of the errors committed due to the transfer of the L1 rules. It is also

significant to note that Tsuji (2021) stated that the writing quality of second language learners may be hindered, especially among the low proficiency learners, because of their reliance on the L1 structures. These statements highlight a persistent problem faced by ESL/EFL learners in achieving proficiency in writing skills, despite the traditional teaching methods and interventions used by teachers.

Concurrently, the emergence of new and evolving technologies has managed to transform the education field. Among these, Artificial Intelligence (AI) stands out as a powerful tool with the potential to revolutionize language learning. For instance, AI writing tools such as ChatGPT can significantly improve writing skills and motivation among EFL students. These tools provide feedback on organization, coherence, grammar, and vocabulary which are important elements of writing, leading to enhanced proficiency in writing tasks (Song & Song, 2023). The use of AI in writing instruction not only improves technical writing skills but also boosts students' motivation to engage with writing tasks (El-Garawany, 2024). AI technologies also offer personalized feedback systems that are essential for writing development. The incorporation of AI tools can guide the learners in completing their work, which may lead to better writing outcomes by the learners (Losi et al. 2024). This is because the AI tools can analyze students' writing and provide targeted feedback, helping the learners to identify and correct their grammatical or syntax errors (Pan, Guo & Lai, 2024). Thus, AI tools have played a very important role in the ways of teaching writing in the ESL and EFL contexts.

AI technologies are currently showing rapid advancements. These technologies are constantly evolving as new models, tools or functions. For example, although the foundational ChatGPT model has been around since 2019 (Goar et al., 2023), it has gained widespread prominence with its latest iteration, GPT-4, being released in 2023 (Awasthi & Kaveri, 2023). A research done by Krishma & Sharma (2024) on ChatGPT 4.0 found that this version is significantly more accurate than its previous version, ChatGPT 3.5 as the latest version makes fewer errors and performs better on tasks. Aside from that, the updated version of ChatGPT can also manage more complex tasks, which makes it a valuable tool for many fields, such as education (Krishma & Sharma, 2024). These instances demonstrate that AI is a continuously evolving tool, compelling educators and researchers to remain engaged in constant updates for the benefit of the ESL/EFL learners.

Despite advances in AI integration, a comprehensive and detailed synthesis of recent empirical evidence specifically evaluating the effectiveness of various AI tools on the various components of writing skills in ESL/EFL contexts is still developing, leaving a crucial gap in consolidated insights. Based on these rapid evolutions of AI tools, this requires a current and comprehensive systematic review, which is especially vital for educators and learners. This review aims to synthesise recent findings from studies published between the year 2021 and 2025 to provide an up-to-date understanding of AI's practical applications and their impacts on ESL/EFL writing.

Hence, this systematic literature review comprehensively explores the AI tools utilised to enhance writing skills and analyses the impacts of these AI-powered tools on the improvement of writing skills in ESL/EFL learners. The primary goal is to provide educators and researchers with evidence-based insights into AI potentials in enhancing ESL/EFL writing instruction. To address this research need, the review will answer the following research questions, which are framed to fill the identified gap and guide future educational purposes:

RQ1: What are the AI tools have been utilised in research to enhance the writing skills of ESL/EFL learners?

RQ2: How can AI tools help to improve the writing skills of ESL/EFL learners?

LITERATURE REVIEW

Past systematic reviews on ESL/EFL Writing Skills

For ESL/EFL learners, effective writing skills are essential for academic, professional, and social success in the globalized world. Writing skills are widely known as an essential component of second language acquisition. This complex language skill requires a wide range of words and phrases to convey the message correctly (Xu et al., 2023). Similarly, Pandey & Bhusal (2024) also emphasised the importance for the learners to be proficient in writing as it allows them to apply vocabulary, grammar, and syntax in context. However, despite its

importance, ESL and EFL learners often face challenges, especially in their writing skills, partly due to the influence of first language. As cited by Mirzayev (2024), the writing proficiency of ESL and EFL learners is often impeded by first language transfer, which significantly affects their grammatical accuracy, lexical choices, and the organisation of their written discourse.

Recognizing these inherent challenges, numerous systematic reviews have explored various facets of ESL/EFL writing skills, aiming to synthesize evidence on effective pedagogical approaches, common difficulties, and successful intervention strategies. For instance, Rasool et al. (2022) conducted a systematic review from 12 articles on Written Corrective Feedback (WCF) in EFL context. The review synthesizes findings on the effectiveness of direct WCF and indirect WCF. They concluded that many learners prefer direct WCF for clarity and immediate assistance, especially among the lower proficiency learners. However, there's also evidence suggesting a preference of indirect WCF because it encourages self-learning and error correction.

Building on this, Zhang et al. (2023) also contributed to this body of knowledge with their systematic review of 42 articles, focusing specifically on interventions improving university students' EFL writing competence. Their review highlighted the effectiveness of various strategies, including teaching instruction, feedback, cooperative learning, and the judicious use of modern technology to address common writing deficiencies among higher education learners.

While these systematic reviews offer valuable insights into the complexities of ESL/EFL writing and various approaches to support its development, the persistent difficulties encountered by learners, particularly in areas like grammar, vocabulary, and discourse organization, continue to underscore the need for innovative and accessible interventions. The obstacles highlight the potential of innovative tools like AI-powered writing assistants that can offer targeted support and feedback to help ESL and EFL learners to become proficient in writing.

Past systematic reviews on Artificial Intelligence in Enhancing ESL/EFL Writing Skills

AI tools are transforming language education by significantly enhancing the writing skills of ESL and EFL learners. These tools offer diverse functionalities, from automated grammar and spelling checks to vocabulary suggestions and personalized feedback on writing style and clarity. Their growing accessibility, illustrated by Automated Writing Evaluation (AWE) tools like QuillBot and Grammarly, alongside more advanced Large Language Models (LLMs) such as ChatGPT and DeepL further supports this transformation (Losi et al., 2024). They provide the learners with continuous and on-demand support beyond the traditional classroom hours. Next, AI's ability to deliver immediate and customized feedback targets specific areas for improvement, often overlooked in large classroom settings (Diasamidze & Tedoradze, 2024). Furthermore, AI can stimulate creativity through writing prompts and help overcome writer's block (Kumar, 2025). This can help to guide the learners with the correct structure and help them to generate ideas, which is beneficial especially for learners who struggle with coherence and original expression.

The rapid interest in AI's role in language education, particularly for writing improvement, has naturally led to a growing number of systematic literature reviews (SLRs). These reviews are crucial to consolidate the existing evidence on AI tools' effectiveness and challenges in fostering writing proficiency. For instance, several recent SLRs have broadly examined the integration of AI tools in second language learning. Pratama & Sulistiyo (2024) reviewed 10 articles and discovered that AI technologies, such as ChatGPT, efficiently facilitate writing revisions through immediate feedback on grammar, punctuation and style. Additionally, it also offers brainstorming support and vocabulary suggestions to enhance creative writing. These findings are supported by Roa & Halim (2024), whose systematic review of 114 articles examined the various types of AI-powered software used in L2 writing and their effects on the learners' writing performance. Their synthesis highlights how AI tools, including AWE and more advanced models like ChatGPT, can provide convenient and effective guidance, facilitating revisions and sparking creativity through features like instant feedback and prompt generation.

Aside from that, other systematic reviews also have focused on specific categories of AI. Automated Writing Evaluation (AWE) tools is one the categories that have been a particular area of interest, with reviews analysing their efficacy in providing feedback and improving writing quality. Aldosemani et al. (2023) conducted a

comprehensive systematic review of 16 articles about AWE tools in higher education contexts. Their findings revealed that AI AWE is effective in providing ESL/EFL learners with immediate feedback on grammar and mechanics. However, they also highlighted the limitations of AWE tools to assess higher-order writing skills. Similarly, Llausas et al. (2024), who reviewed 10 articles, and Zhai & Ma (2022), with their review of 26 articles, independently examined AWE research focusing on tertiary and secondary education levels. Both reviews largely agreed on AWE's benefits for surface-level error correction, but they also emphasised the need for teachers' roles in order to foster deeper learning.

Collectively, these systematic reviews affirm the value of AI tools for providing immediate, rule-based feedback on grammar and mechanics. Next, they also emphasise the importance of teachers' involvement to address more complex writing issues and develop comprehensive skill development.

Limitations of Past Systematic Reviews

There are two limitations and gaps found in the discussed systematic reviews. Firstly, a significant limitation across the existing systematic reviews (Aldosemani et al., 2023; Rasool et al., 2022; Roa & Halim, 2024; Zhai & Ma, 2022, Zhang et al., 2023) is their inclusion criteria for the studies they reviewed as they often focused on articles published before the year of 2023. This means that while they are valuable, they may not comprehensively capture the rapid advancements and widespread adoption of newer AI technologies, particularly the surge of large language models (LLMs) like advanced versions of ChatGPT, which have gained significant traction and research attention since early 2023. Hence, their conclusions might not fully reflect the most current capabilities, applications, and challenges of the latest AI tools in ESL/EFL writing. Secondly, some reviews might not have systematically categorised and explored the AI tools' impacts on diverse aspects of writing proficiency such as grammar and mechanics, vocabulary, feedback and revision processes and narrative writing skills in sufficient details across their findings. Therefore, this systematic literature review aims to address these identified gaps by synthesizing the latest evidence on AI-powered tools, to offer more precise and comprehensive insights into their applications and profound impacts on the various key areas of ESL/EFL writing.

METHODOLOGY

This systematic review is aligned with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 statement. It is a guide used to report transparent and comprehensive systematic reviews (Page et al., 2021). Following the latest PRISMA 2020 guidelines, this systematic literature review involved three main steps which are the identification of potentially relevant studies, the screening process of those studies and inclusion of the articles that adhered to the review's criteria.

Identification

The initial phase of this systematic review focused on a comprehensive search of relevant academic databases.

The two widely recognized databases selected for this review are The Educational Resources Information Centre (ERIC) and Web of Science (WoS). These databases were chosen due to their reputation for indexing highquality, peer-reviewed articles and can be accessed openly. To capture the most current research, the search was limited to a five-year period, spanning from the year 2021 until 2025. A set of precisely formulated search strings which are tailored to the specific objectives of this study, was applied to each database (see Table 1). This rigorous search strategy aimed to ensure the identification of all relevant articles pertaining to the research question.

Table 1. Search string used in ERIC and WoS

Database	Search String
ERIC	("Artificial Intelligence" OR "AI" OR "AI-Powered Tools") AND ("Writing Skills" OR "Writing Proficiency") AND ("ESL" OR "EFL" OR "English language learners (ELL)" OR "Second Language Acquisition") AND ("Primary

	School" OR "Elementary" OR "Secondary" OR "Pupils" OR "Students") AND ("Impact" OR "Effectiveness")
WoS	ALL=("artificial intelligence" OR "AI" OR "machine learning" OR "natural language understanding" OR "AI in education") AND ALL=("writing" OR "writing skills" OR "writing proficiency" OR "language learning" OR "essay writing" OR "academic writing" OR "literacy skills" OR "writing instruction") AND ALL=("English language learners" OR "ESL" OR "second language learners" OR "ESL students" OR "EFL" OR "language learners" OR "second language acquisition" OR "English language development") AND ALL=("features" OR "functionalities" OR "characteristics" OR "capabilities" OR "impact" OR "effects")

Screening

Following the initial identification of articles, a rigorous screening process was implemented to ensure the inclusion of only relevant studies. In the first stage of screening, database automation tools were employed to exclude ineligible publications based on pre-defined criteria. These criteria included the exclusion of nonEnglish publications, books, book chapters, articles not related to the ESL or EFL context and articles published before the year 2021. The WoS database was also further refined by focusing on three specific research areas, which are education educational research, linguistics and language linguistics. Several articles were also removed from consideration as they did not provide the reviewer with complete access. This screening process resulted in the exclusion of 341 ineligible articles. A detailed summary of the exclusion and inclusion criteria employed in this phase is provided in Table 2.

Table 2. Inclusion and Exclusion Criteria

Inclusion criteria	**Exclusion criteria**
Articles from journals	Book chapters, reports and thesis paper
Texts written in English	Texts were not written in English
Studies conducted between 2021-2025	Studies conducted before 2021
Related to Artificial Intelligence	Not related to Artificial Intelligence
Related to writing	Not related to writing
Related to ESL or EFL context	Not related to ESL or EFL context

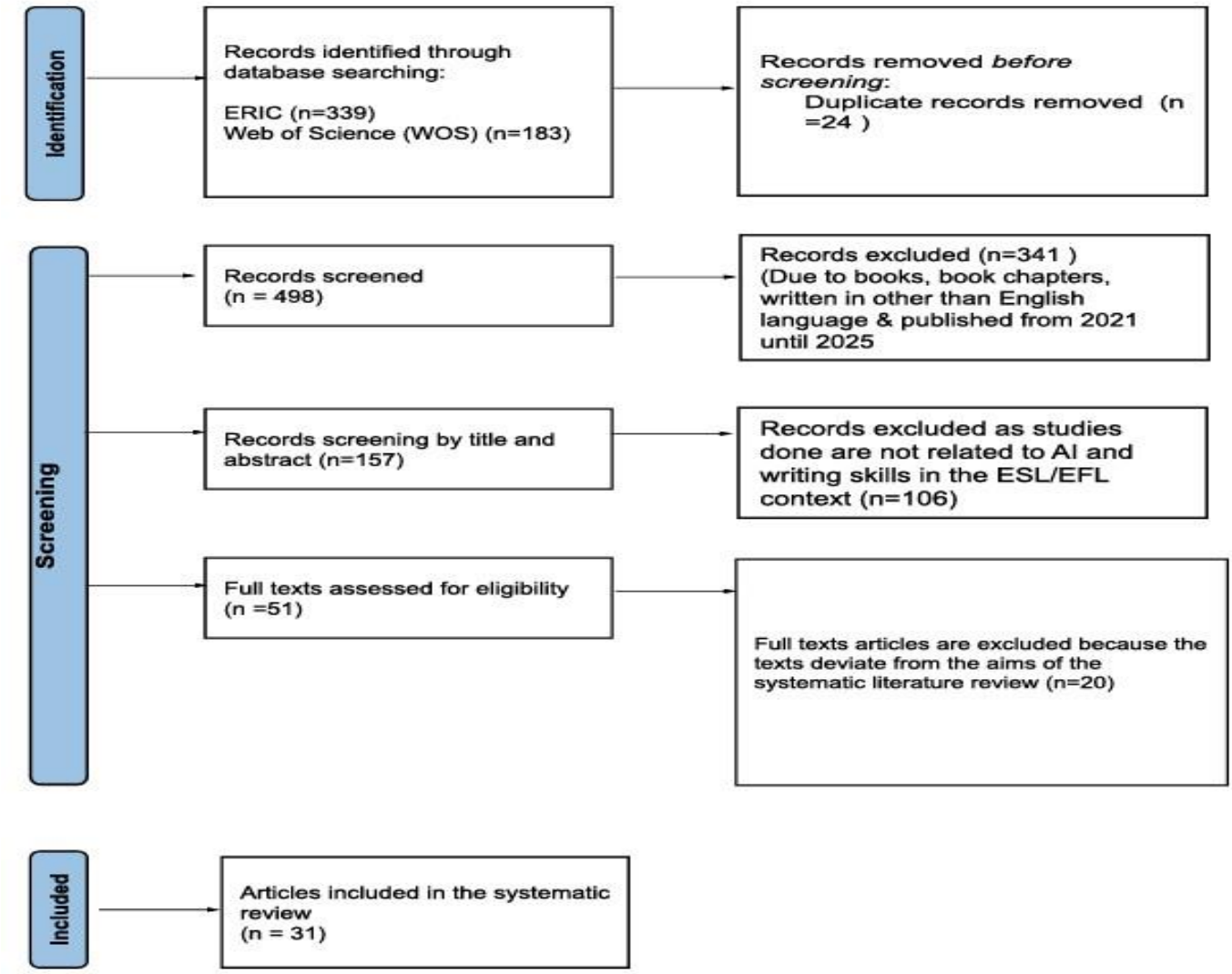
Following the identification of 157 articles, a second screening was conducted to select only those articles directly related to the research questions. Thus, titles and abstracts were carefully checked to ensure criteria were matched. This narrowed the selection to 51 articles for closer review. However, after the full articles were read, 20 articles were removed because their focus was different from the aims of the systematic literature review.

Included

After a rigorous selection process, this review incorporated 31 studies that met the predefined criteria. The complete data collection and selection procedures which conformed to the PRISMA 2020 guidelines, are visually represented in Figure 1. These studies, published between 2021 and 2025, encompassed a diverse range of methodologies such as qualitative, mixed-methods, case study, quasi-experimental and experimental research.

The summary of the findings for each study is tabulated in Appendix 1.

Figure 1. PRISMA Diagram



RESULTS

Methodological Stratification of Included Studies

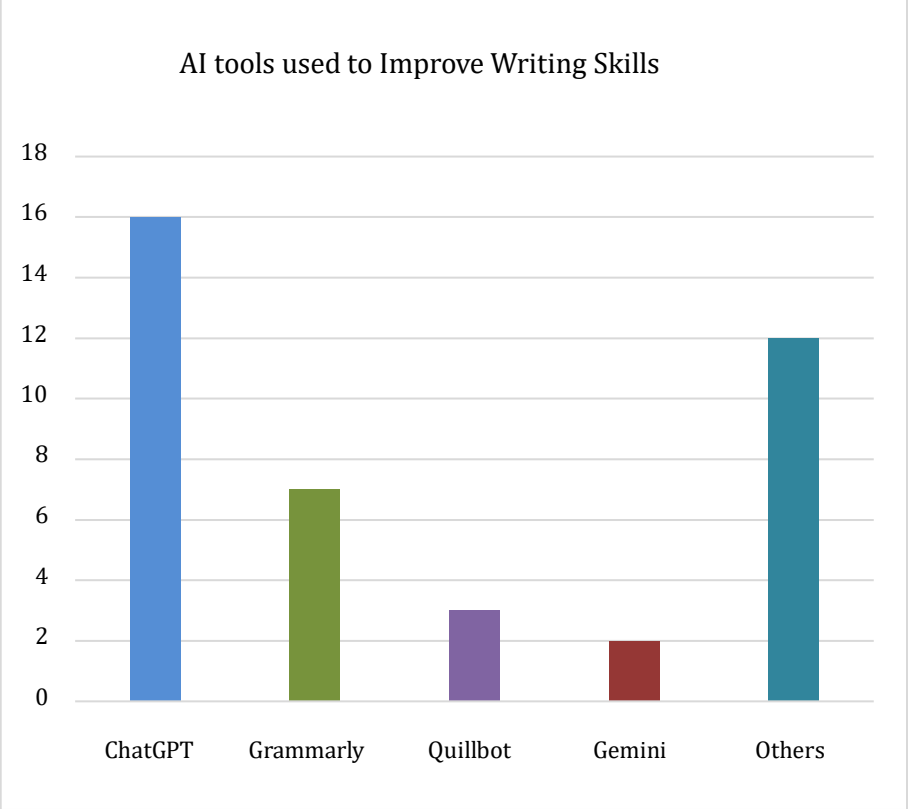
The review incorporated 31 studies published between 2021 and 2025. A methodological stratification reveals that the weight of evidence is primarily supported by Mixed-Methods (*n*=12) and Quasi-Experimental (*n*=10) designs, offering a relatively robust empirical foundation. However, the corpus also relies on smaller Case Studies (*n*=5) and Qualitative or general explorations (*n*=4), which provide pedagogical depth but limited generalizability. Notably, the evidence is heavily skewed toward Tertiary-level education (*n*=26), with minimal representation from primary or secondary contexts. Sample sizes range from small pilot cohorts (*N*=14) to largescale randomized controlled trials (*N*=918), necessitating a cautious interpretation of effectiveness when generalizing across diverse learner proficiencies.

AI Tools Used to Improve Writing Skills

This section presents the synthesised results from 31 selected articles, addressing the AI tools used to improve writing skills among ESL/EFL learners. A comprehensive list of the identified AI tools is presented in Figure 2.

Based on Figure 2, the analysis revealed that ChatGPT is the most frequently utilised tool teaching writing skills, as 16 out of 31 articles discussed the effectiveness of ChatGPT in enhancing writing skills. After that, it was followed by Grammarly, Quillbot and Gemini. Next, there are 12 articles which discuss a variety of less frequently cited AI writing tools and general references to AI tools. This category is referred to as "Others'.

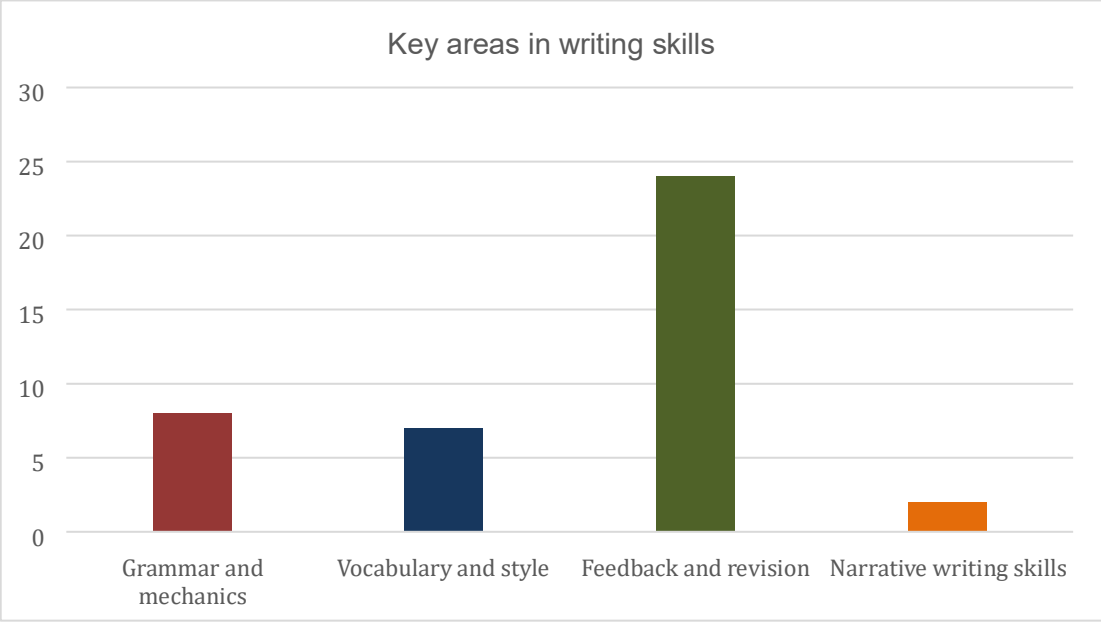
Figure 2. AI tools used to improve writing skills identified in the selected articles



The Effectiveness of AI Tools in Enhancing ESL/EFL Writing Skills

This section presents a synthesis of research evaluating the efficacy of AI tools in enhancing specific aspects of ESL/EFL writing skills. The analysis is structured around the following key areas in writing such as grammar and mechanics, vocabulary and style, feedback and revision processes and narrative writing skills. The results of this synthesis are presented in Figure 3. Based on Figure 3, it can be inferred that AI tools can enhance the learners' writing skills especially in terms of feedback and revision, followed by grammar mechanics, vocabulary and style and narrative writing skills.

Figure 3. The effectiveness of AI tools in key areas of writing skills



DISCUSSION

AI Tools Used to Improve Writing Skills

A synthesis of the 31 reviewed articles identifies a diverse ecosystem of AI tools utilized in ESL/EFL writing instruction. As illustrated in Figure 2, ChatGPT emerged as the most prevalent tool (*n*=16), valued for its versatility in offering immediate support for idea organization, essay structuring, and personalized feedback (Alshammari, 2024; Chan et al., 2024; Cheng, 2024; Ghafouri et al., 2024; Karataş et al., 2024; Long, 2024; Mahapatra, 2024; Moussa & Belhiah, 2024; Özdere, 2025; Polakova & Ivenz, 2024; Seo, 2024; Shen et al., 2023; Solovey, 2024; Song & Song, 2023; Yu-Ching & Lin, 2024; Zaiarna et al., 2024). Learners utilize its conversational interface to receive instant critiques in a supportive digital environment, effectively enhancing overall writing quality through iterative dialogue (Song & Song, 2023).

Complementing generative models, Grammarly was identified in seven studies as a prominent Automated Writing Evaluation (AWE) tool (Dizon & Gayed, 2021; ElEbyary et al., 2024; Lee et al., 2024; Nurul et al., 2022; Sanosi, 2022; Thangthong et al., 2024; Wei et al., 2023). By leveraging deep learning and natural language analysis, it provides real-time written corrective feedback (WCF) on grammar, clarity, and conciseness (Wei et al., 2023). Empirical evidence suggests that Grammarly significantly reduces grammatical errors while increasing lexical variety, though its impact is often characterized as focusing on surface-level accuracy (Dizon & Gayed, 2021; Thangthong et al., 2024).

Beyond these primary platforms, the literature highlights several specialized tools that address specific compositional needs. QuillBot (*n*=3), initially recognized as a paraphrasing tool, has been shown to improve writing performance and self-efficacy by assisting with rephrasing and vocabulary expansion (El-Garawany, 2023; Marzuki et al., 2023; Thangthong et al., 2024). Similarly, Gemini (*n*=2) is noted for its consistency in providing formative assessment feedback aligned with professional rubrics (Thi Thanh, 2025; Waziana et al., 2024). Other emerging tools like Cami and You.com integrate multiple AI technologies—including Whisper and Stable Diffusion—to facilitate higher-order tasks like brainstorming, collaborative writing, and automated grading of paragraph drafts (Muslimin et al., 2024; Özdere, 2025).

A smaller subset of the corpus (*n*=7) explored niche platforms such as Perplexity, Bing Chat, Ernie, and ProWritingAid, all of which were found to contribute positively to linguistic improvement (ElEbyary et al.,

2024; Lee et al., 2024; Marzuki et al., 2023; Pitukwong & Saraiwang, 2024; Shen et al., 2023; Thi Thanh, 2025; Waziana et al., 2024). Conversely, three articles discussed "AI-generated feedback" as a general construct without naming specific software, yet still reported positive outcomes for learner proficiency (Mohamed & Khalid, 2025; Moussa & Belhiah, 2024; Wang et al., 2022). Collectively, these findings indicate that while tools vary in technical functionality—ranging from generative conversationalists to targeted error-checkers—they consistently serve as effective scaffolds that improve the writing quality and engagement of ESL/EFL learners.

The Effectiveness of AI Tools in Enhancing ESL/EFL Writing Skills

Figure 3 illustrates that AI tools improve the accuracy of ESL/EFL learners' writing in terms of grammar and mechanics. Eight reviewed articles highlighted the ability of AI-powered grammar checkers and Automated Writing Evaluation (AWE) tools to identify and correct grammar, spelling, and punctuation errors (Dizon &

Gayed, 2021; Lee et al., 2024; Nurul et al., 2022; Sanosi, 2022; Thangthong et al., 2024; Wang et al., 2022; Waziana et al., 2024; Wei et al., 2023). The prevalent AWE tool discussed was Grammarly, which enables immediate feedback, allowing learners to recognize and rectify grammatical errors in real-time (Ofrita et al., 2023). Notably, studies revealed that Grammarly significantly reduced grammatical errors compared to writing without it, suggesting that surface-level writing improvements are effectively supported by such tools (Dizon & Gayed, 2021). Thus, consistent feedback helps learners develop a stronger grasp of grammatical rules and improve overall writing accuracy.

Next, AI tools contribute to expanding writing skills in relation to vocabulary and style. Seven articles indicate that tools like ChatGPT and Quillbot suggest alternative words and phrases, helping learners diversify their vocabulary and express ideas more effectively (El-Garawany, 2024; Lee et al., 2024; Marzuki et al., 2023; Moussa & Belhiah, 2024; Song & Song, 2023; Thangthong et al., 2024; Waziana et al., 2024). According to ElGarawany (2024), QuillBot broadened learners' vocabulary by suggesting sophisticated synonyms and phrases. Similarly, ChatGPT provided an interactive experience by offering personalized suggestions and vocabulary expansion to enhance expressiveness and fluency (Song & Song, 2023). This exposure to a variety of word choices encourages students to practice with a wider vocabulary.

Most importantly, AI tools play a crucial role in facilitating the feedback and revision process. The majority of included articles (24 out of 31) agree that AI tools help learners improve their work through feedback and subsequent revision (Alshammari, 2024; Chan et al., 2024; Cheng, 2024; ElEbyary et al., 2024; Ghafouri et al., 2024; Karataş et al., 2024; Lee et al., 2024; Long, 2024; Mahapatra, 2024; Marzuki et al., 2023; Mohammed & Khalid, 2025; Moussa & Belhiah, 2024; Muslimin et al., 2024; Özdere, 2025; Pitukwong & Saraiwang, 2024; Polakova & Ivenz, 2024; Sanosi, 2022; Seo, 2024; Shen et al., 2023; Solovey, 2024; Thangthong et al., 2024;

Thi Thanh, 2025; Yu-Ching & Lin, 2024; Zaiarna et al., 2024). A significant form of this is AI-operated Written Corrective Feedback (WCF). Researchers support that AI-powered tools promote instant feedback and selfpaced learning (Muslimin et al., 2024; Thangthong et al., 2024), which fosters learner autonomy. This is apparent in Chan et al. (2024), where a randomized controlled trial found that AI-generated feedback led to significant improvements in essay quality, participation, and motivation. Similarly, Sanosi (2022) found that after 14 weeks of use, students showed significantly improved written accuracy compared to a control group. This immediate and consistent feedback enables learners to notice and understand errors, leading to overall improvement.

Shifting focus, two articles stated that AI tools show potential in developing narrative writing skills (Moussa & Belhiah, 2024; Seo, 2024). Findings suggest that AI assistance significantly boosted creativity in narrative styles, leading students to adopt expressive approaches such as formal tones, storytelling elements, and metaphorical language (Moussa & Belhiah, 2024). This support helps students overcome writer's block and explore different narrative paths. Nevertheless, while AI tools offer significant potential, certain considerations remain. Firstly, AI should supplement rather than replace teacher instruction. There is a potential risk that students might become too dependent on AI, hindering independent writing development (Cheng, 2024). Secondly, the teacher's role in providing guidance remains essential as their expertise provides valuable context for feedback (Solovey, 2024). Finally, ethical implications regarding responsible usage must be addressed. Authors should recognize the benefits of technology while maintaining their unique voice and using AI tools with careful consideration (YuChing & Lin, 2024).

CONCLUSION

This systematic literature review of 31 studies confirms that AI-powered tools serve as effective scaffolds in ESL/EFL writing instruction. The evidence consistently demonstrates that platforms ranging from Generative AI to Automated Writing Evaluation tools improve the written tasks by providing immediate feedback, reducing grammatical errors, and expanding lexical variety. However, a critical tension remains. While AI enhances the final essay, the evidence for long-term improvement in the learner’s internal writing process is still limited. To move the field forward, research must shift from general observations of effectiveness toward addressing specific boundary conditions and developmental gaps. Future studies should prioritise three distinct areas. The first area is a methodological priority for longitudinal research to track the retention of writing skills after the AI scaffold is removed, determining whether gains lead to permanent cognitive development or tool dependency. The second area is in terms of theoretical priority, which aims to investigate prompt literacy and the human-in-the-loop dynamic, exploring how collaborative authorship affects learners’ learning. Finally, a contextual priority is needed to address the current tertiary-level bias by conducting more empirical studies in the primary and secondary school settings. By focusing on these specific gaps, educators can ensure that AI empowers the developing ESL writers rather than just simply automating the task.

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Appendix 1 Summary of the findings for each study

No	Authors	Research design	Participants	AI Tools Used	Findings
1	Mahapatra, 2024	MM	134 university students	ChatGPT	Findings revealed a marked improvement in ESL students' writing skills following the integration of ChatGPT as a feedback tool. The experimental group, which employed ChatGPT, achieved significantly higher writing scores than the control group, and maintained a trajectory of improvement over time.
2	Polakova & Ivenz, 2024	QE	110 university students	ChatGPT	ChatGPT feedback resulted in marked improvements in students' writing across conciseness, grammar, content, and passive voice.
3	Mohamed & Khalid, 2025	MM	322 EFL Learners who studied in Nawroz University, Iraq		The perceived specificity of feedback, specifically targeting grammar, vocabulary, and coherence, was identified by learners as a crucial mechanism for stimulating active engagement in the refinement of their writing skills.
4	Marzuki et al., 2023	QL	4 EFL teachers	Quillbot, WordTune, Jenni, ChatGPT, Paperpal, Copy.ai, and Essay Writer.	Findings suggest that incorporating AI writing tools positively impacts EFL students' quality of written work, leading to improvements in content and organizational structure.
5	Yu-Ching & Lin, 2024	QL	15 Taiwanese university students	GPT-3.5	The findings indicate that GPT-3.5 effectively addresses key challenges in academic writing courses by enhancing efficiency through immediate feedback

					and content generation, ensuring cohesive organization, and providing objective, critical review comparable to traditional peer review.
6	Sanosi, 2022	EX	64 university students	Grammarly	The main finding of this research indicates that the implementation of Grammarly for 14 weeks has resulted in a significant improvement in the written accuracy of the experimental group participants when contrasted with the control group.
7	ElEbyary et al., 2024	QE	75 ESL undergraduates	Grammarly and E-rater	Automated feedback, particularly when provided during writing, significantly improved L2 students' writing scores, demonstrating a notable gain and large effect size compared to no feedback.
8	El-Garawany, 2024	MM	18 university students	QuillBot	The use of QuillBot as an intervention resulted in statistically significant improvements in students' writing performance, reduced writing apprehension, and enhanced writing self-efficacy.
9	Solovey, 2024	QL	30 EFL university students	ChatGPT	Participants generally perceived ChatGPT, teacher, and peer feedback as effective, with a preference for teacher feedback or a combination of teacher and ChatGPT feedback in academic writing.
10	Thangthong et al., 2024	CS	10 EFL university students	Grammarly and Quillbot	EFL students perceived AI writing assistance tools as beneficial for improving writing quality through grammar and spelling checks, vocabulary suggestions, and enhanced organization, ultimately boosting their confidence in written expression.
11	Chan et al., 2024	MM	918 students of Hong Kong University	GPT-3.5-turbo LLM	The study found that while feedback had a weak correlation with positive emotions and engagement, it strongly correlated with motivation, which in turn significantly improved revised test scores, suggesting that feedback indirectly enhances writing skills through increased motivation.
12	Seo, 2024	QL	44 students from South Korea University	ChatGPT	ChatGPT can be effective for surface-level writing revisions, but students need to develop prompt literacy to maximize its potential and understand its limitations in detecting all error types.

13	Nurul et al., 2022	MM	100 undergraduate students from Malaysian public universities	Grammarly	University students utilize Grammarly as a comprehensive web tool for effective punctuation, spelling, sentence structure, and syntax correction
14	Wei et al., 2023	Randomized controlled trial (RCT) with repeated measures	190 Chinese intermediate EFL students	Grammarly	AI-powered writing programs like AWE are effective in improving second language writing skills, particularly for less proficient learners.
15	Thi Thanh, 2025	QE	14 Vietnamese university students	Gemini	The study demonstrates that combining AI-generated and teacher-generated feedback, with AI feedback preceding teacher feedback, effectively enhances EFL writing revisions and improves essay quality.
16	Moussa & Belhiah, 2024	QE	62 university students	ChatGPT	The study showed that AI assistance positively impacted language skills, creativity, organizational skills, and the use of vocabulary, which proves that AI has a transformative impact on writing.
17	Karataş et al. 2024	CS	13 students enrolled in a foundation course	ChatGPT	Findings show that ChatGPT's versatility and accessibility in learning activities significantly enhance students' motivation and engagement, positively impacting their writing, grammar, and vocabulary acquisition process.
18	Özdere, 2025	MM	16 university students	ChatGPT and You.com	The study emphasises the value of AI feedback as an educational tool that provides tailored and immediate assistance to enhance writing skills.
19	Long, 2024	QL	5 Form Four secondary school students	ChatGPT	The findings indicate that the use of ChatGPT as a feedback tool enables learners to notice and correct their grammar errors. However, some learners could not apply the feedback because they did not understand the feedback given.
20	Lee et al., 2024	MM	80 Korean undergraduates	Google Translate, Naver Papago, and Grammarly	The findings demonstrate that AI writing tools can enhance the writing abilities of English language learners.

21	Ghafouri et al., 2024	QE	12 English teachers from Iran and 48 EFL learners	ChatGPT	The ChatGPT-integrated writing instruction protocol (CGWIP) significantly improved learners' writing skills compared to the control group and these improvements persisted over time.
22	Wang et al., 2022	QE	76 university students	SVVR-AWE approach	The findings show that students who utilized the SVVR-AWE approach demonstrated statistically significant improvements in EFL writing performance compared to those who used the C-AWE approach.
23	Shen et al., 2023	QE	42 EFL learners	Pigai	The study found that automated feedback primarily drives students to correct errors in their writing, with advanced students focusing more on improving their language overall, while less proficient students benefit more in terms of writing accuracy.
24	Alshammari, 2024	CS	6 undergraduates from University of Hail, Saudi	ChatGPT	The study found that ChatGPT significantly aided EFL learners in improving their writing skills by providing opportunities for practice, enabling error correction, enhancing writing style, and offering feedback through critique and suggestions. Students used ChatGPT as a personalized tutor to refine their writing.
25	Zaiarna, et al., 2024	MM	36 ESL/ESP university professors	ChatGPT	The study reveals that ESL instructors are using ChatGPT to assess various language skills, with writing being a significant focus (11 out of 17 responses, or 64.7%). This indicates that ChatGPT can be used to evaluate and potentially improve students' writing abilities.
26	Pitukwong & Saraiwang, 2024	MM	53 Thai EFL university students	ProWritingAid	Thai EFL university students showed significant improvement in their writing abilities after using digital writing tools because of the supportive guidance and instant feedback given.
27	Cheng, 2024	EX	4 teachers and 10 students	ChatGPT	Students found AI writing assistants helpful for improving their writing through immediate feedback, suggestions for edits and reducing anxiety about writing.
28	Waziana et al., 2024	MM	100 EFL university students	ChatGPT, Gemini, Perplexity, Bing Chat, Ernie,	Students reported that AI chatbots significantly improved their vocabulary, grammar, and overall writing quality and language proficiency.

				Character AI, Discord Bot, Wren, and Ginger	
29	Muslimin et al., 2024	MM	100 undergraduates across five universities in Indonesia	Cami	Cami AI-SAMR was reported to positively impact EFL writing skills by facilitating brainstorming, providing feedback on generated content, and fostering collaborative writing activities.
30	Song & Song, 2023	MM	50 EFL students from China	ChatGPT	The findings indicate that the assisted instruction provided by AI led to statistically significant improvements in students' writing skills such as organization, coherence, grammar, vocabulary and motivation as compared to the traditional instruction.
31	Dizon & Gayed, 2021	QE	31 Japanese EFL undergraduates	Grammarly	Grammarly significantly improved grammatical accuracy and lexical variation in Japanese L2 English students' writing compared to unassisted writing.