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The Influence of Digital Grammar-Checking Tools on Writing Proficiency a Review of Recent Studies

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ABSTRACT

The integration of artificial intelligence (AI) into language education has significantly transformed the teaching and learning of English writing. Digital grammar-checking tools, such as Grammarly, Ginger, Microsoft Editor, ProWritingAid, and other Automated Writing Evaluation (AWE) systems, provide immediate feedback on grammar, spelling, punctuation, sentence structure, and style, enabling learners to revise and improve their writing independently. This narrative review synthesizes empirical and theoretical research published between 2016 and 2025 to examine the influence of digital grammar-checking tools on the writing proficiency of English language learners. Relevant studies were identified through peer-reviewed journals and scholarly databases and analysed using a thematic approach. The review examines the impact of these tools on grammatical accuracy, writing quality, learner autonomy, writing confidence, revision practices, and pedagogical integration. The findings indicate that digital grammar-checking tools enhance writing proficiency by improving linguistic accuracy, promoting self-regulated learning, encouraging iterative revision, and increasing learner confidence. However, challenges such as overreliance on automated feedback, contextual inaccuracies, limited support for higher-order writing skills, and concerns related to academic integrity continue to warrant attention. The review concludes that digital grammar-checking tools are most effective when integrated with teacher guidance and sound pedagogical practices. It also identifies important research gaps, particularly in school-level education, longitudinal studies, comparative evaluations of grammar-checking platforms, and the educational implications of emerging AI technologies. The study provides valuable insights for educators, researchers, and curriculum developers seeking to integrate digital writing technologies effectively into English language teaching and learning.

Keywords: Digital Grammar-Checking Tools, Writing Proficiency, Automated Writing Evaluation, English Language Learning, Artificial Intelligence, Learner Autonomy.

1. Introduction

Writing is a fundamental language skill that requires learners to integrate grammatical accuracy, vocabulary, coherence, organization, and critical thinking to communicate ideas effectively. For learners of English as a Second Language (ESL) and English as a Foreign Language (EFL), writing often presents significant challenges due to difficulties in mastering grammar, sentence structure, punctuation, and appropriate vocabulary use. These challenges frequently affect both the clarity and quality of written communication.

Traditionally, the development of writing skills has depended largely on teacher feedback and peer review. Although these approaches remain valuable, they are often constrained by large class sizes, limited instructional time, and the difficulty of providing timely, individualized feedback. Consequently, advances in educational technology have introduced innovative approaches that support writing instruction through immediate and personalized feedback.

Among these innovations, digital grammar-checking tools have gained considerable prominence. Applications such as Grammarly, Ginger, Microsoft Editor, ProWritingAid, and other Automated Writing Evaluation (AWE) systems employ artificial intelligence (AI), natural language processing (NLP), and machine-learning technologies to identify grammatical, lexical, mechanical, and stylistic errors. By providing instant feedback, these tools enable learners to revise multiple drafts, monitor their progress, and assume greater responsibility for improving their writing.

The increasing adoption of online learning, digital communication, and AI-assisted educational technologies has accelerated the use of grammar-checking tools across schools and higher education institutions. Research generally indicates that these applications improve grammatical accuracy, writing quality, learner autonomy, revision practices, and writing confidence. Nevertheless, scholars have also expressed concerns regarding learner dependence on automated feedback, contextual inaccuracies, ethical issues, and the limited ability of such tools to evaluate higher-order writing skills, including organization, argumentation, creativity, and critical thinking.

Although numerous empirical studies have examined individual grammar-checking applications, the existing evidence remains dispersed across different educational contexts and research designs. A comprehensive synthesis is therefore necessary to consolidate current knowledge, evaluate the effectiveness of these technologies, identify research gaps, and explore their pedagogical implications.

This review addresses that need by examining research published between **2016 and 2025** on digital grammar-checking tools and Automated Writing Evaluation systems. Drawing on theories of second language acquisition, corrective feedback, sociocultural learning, and technology-enhanced language instruction, the study critically analyses current evidence regarding the role of AI-assisted writing technologies in improving English writing proficiency. The findings aim to inform educators, researchers, and curriculum developers seeking to integrate digital grammar-checking tools into English language teaching in a pedagogically effective and responsible manner.

2. Theoretical Framework

The present review is grounded in established theories of second language acquisition, corrective feedback, and technology-enhanced language learning. These theoretical perspectives provide a foundation for understanding how digital grammar-checking tools support the development of writing proficiency among English language learners.

2.1 Krashen's Input Hypothesis

Krashen's Input Hypothesis (1982) posits that language acquisition occurs when learners are exposed to comprehensible input slightly beyond their current level of competence ($i + 1$). Digital grammar-checking tools facilitate this process by providing immediate, comprehensible feedback on grammatical and lexical errors. Such feedback enables learners to identify mistakes, understand correct language forms, and revise their writing, thereby supporting continuous language development. The instant nature of automated feedback also reduces the delay associated with traditional teacher correction, allowing learners to engage in timely revision and reinforcement.

2.2 Vygotsky's Sociocultural Theory

According to Vygotsky (1978), learning occurs through social interaction and guided support within the Zone of Proximal Development (ZPD). Although digital grammar-checking tools are technological rather than human resources, they function as scaffolding mechanisms by offering immediate guidance during the writing process. When combined with teacher feedback and collaborative learning, these tools encourage learners to become increasingly independent writers while gradually developing self-regulation and confidence.

2.3 Ferris's Theory of Corrective Feedback

Ferris (2002) argues that effective corrective feedback promotes long-term improvement in writing when learners actively engage with the corrections provided. Digital grammar-checking tools operationalize this principle by identifying grammatical, mechanical, and stylistic errors and suggesting possible revisions. Their educational value depends not merely on correcting errors but on encouraging learners to reflect on feedback and apply it during subsequent writing tasks.

2.4 Computer-Assisted Language Learning (CALL)

Computer-Assisted Language Learning (CALL) emphasizes the integration of technology to enhance language learning through interactive, learner-centred environments. Digital grammar-checking tools exemplify CALL by providing personalised, immediate, and continuous feedback that complements classroom instruction. These technologies support independent learning, increase opportunities for revision, and promote learner engagement beyond the classroom.

2.5 Automated Writing Evaluation (AWE)

Automated Writing Evaluation (AWE) systems employ artificial intelligence and natural language processing to analyse written texts and generate automated feedback on grammar, mechanics, vocabulary, and style. Contemporary AWE tools assist learners in identifying language errors, revising drafts, and improving overall writing quality. However, research suggests that these systems are more effective in addressing lower-order language concerns than higher-order aspects such as organisation, coherence, critical argumentation, and creativity. Consequently, AWE tools are most beneficial when used alongside teacher guidance rather than as substitutes for human feedback.

Collectively, these theoretical perspectives support the integration of digital grammar-checking tools into English language instruction by explaining how automated feedback, scaffolding, corrective input, and technology-assisted learning contribute to the development of writing proficiency.

3. Objectives of the Study

The study seeks to achieve the following objectives:

1. To examine the influence of digital grammar-checking tools on the writing proficiency of English language learners.
2. To review recent empirical evidence on the effectiveness of Automated Writing Evaluation (AWE) systems in improving writing performance.
3. To analyse the impact of digital grammar-checking tools on grammatical accuracy, writing quality, learner autonomy, revision practices, and writing confidence.
4. To identify the pedagogical implications and limitations of integrating AI-assisted writing technologies into English language teaching.
5. To highlight existing research gaps and propose directions for future research.

4. Research Questions

The review addresses the following research questions:

1. How do digital grammar-checking tools influence the writing proficiency of English language learners?
2. What effects do these tools have on grammatical accuracy, writing quality, learner autonomy, revision practices, and writing confidence?
3. What pedagogical benefits and challenges are associated with the use of digital grammar-checking tools in English language teaching?
4. What research gaps exist in the current literature, and what directions should future research pursue?

5. Methodology

5.1 Research Design

This study adopts a qualitative narrative review design to synthesise and critically examine existing research published between 2016 and 2025 on digital grammar-checking tools and their influence on English writing proficiency. A narrative review was selected because it enables the integration of findings from diverse empirical studies, facilitates critical interpretation of emerging evidence, and identifies trends, research gaps, and pedagogical implications within a rapidly evolving field.

5.2 Data Analysis

The selected studies were analysed using a thematic analysis approach. Recurring themes and patterns were identified across the literature, including grammatical accuracy, writing quality, learner autonomy, writing confidence, revision practices, technological limitations, and pedagogical implications. The findings were interpreted through the theoretical perspectives discussed earlier, providing a comprehensive understanding of both the benefits and limitations of digital grammar-checking tools in English language education.

Table 1. Summary of Reviewed Studies

Author(s)	Year	Tool/System	Research Design	Key Findings
Ghufron & Rosyida	2018	Grammarly	Experimental	Improved grammatical accuracy and writing quality.
O'Neill & Russell	2019	Grammarly	Survey	Enhanced learner confidence and perceived writing competence.
Koltovskaia	2020	Grammarly	Qualitative	Encouraged revision but revealed overreliance on automated feedback.
Ranalli	2021	AWE	Qualitative	Promoted learner engagement with corrective feedback.
Barrot	2022	Technology-assisted writing	Empirical	Improved grammar, vocabulary, and overall writing performance.
Zhai & Ma	2023	AWE	Meta-analysis	Reported significant positive effects on writing quality.

Author(s)	Year	Tool/System	Research Design	Key Findings
Ding & Zou	2024	AWE	Systematic Review	Highlighted the effectiveness of AI-assisted writing tools.
Dizon & Gayed	2024	Grammarly	Systematic Review	Strengthened learner autonomy and revision practices.

6. Review of Literature

Digital grammar-checking tools have emerged as significant innovations in technology-enhanced language learning, offering learners immediate and individualized feedback on grammar, spelling, punctuation, vocabulary, and writing style. Advances in artificial intelligence (AI) and Automated Writing Evaluation (AWE) have expanded the capabilities of these tools, making them valuable resources for supporting writing instruction in English as a Second Language (ESL) and English as a Foreign Language (EFL) contexts. Recent research demonstrates that these technologies contribute to writing development by enhancing linguistic accuracy, encouraging self-regulated learning, and promoting learner engagement. However, concerns remain regarding their limitations in addressing higher-order writing skills and the risk of learner dependence on automated feedback.

6.1 Digital Grammar-Checking Tools and Grammatical Accuracy

One of the most consistently reported benefits of digital grammar-checking tools is their ability to improve grammatical accuracy. By providing immediate corrective feedback, these applications enable learners to identify and correct grammatical, spelling, punctuation, and sentence-level errors during the writing process.

Ghufron and Rosyida (2018) found that students who used Grammarly demonstrated significant improvements in grammatical accuracy and overall writing quality compared with those receiving conventional instruction. Similarly, Barrot (2022) reported that technology-assisted writing tools enhanced learners' command of grammar, mechanics, and vocabulary while reducing common language errors.

A broader perspective is provided by Zhai and Ma (2023), whose meta-analysis concluded that Automated Writing Evaluation systems produce a significant positive effect on learners' writing performance across diverse educational contexts. Their findings suggest that automated feedback is particularly effective in improving lower-order writing skills, including grammar and language mechanics.

Collectively, these studies indicate that digital grammar-checking tools effectively support grammatical development by providing timely, individualized feedback. Nevertheless, their greatest strength lies in improving language accuracy rather than evaluating the quality of ideas or argumentation.

6.2 Learner Autonomy and Writing Confidence

Digital grammar-checking tools also contribute to learner autonomy by encouraging students to revise their work independently before seeking teacher evaluation. Immediate feedback allows learners to monitor their own progress, identify recurring errors, and develop greater responsibility for improving their writing.

O'Neill and Russell (2019) observed that learners perceived Grammarly as a valuable learning companion that increased confidence during writing tasks. Students reported feeling more willing to revise their work because they received prompt explanations and suggestions for improvement.

Similarly, Cavaleri and Dianati (2016) found that Automated Writing Evaluation systems encouraged self-directed learning by allowing students to identify and correct mistakes independently. Dizon and Gayed (2024) further concluded that AI-assisted grammar-checking tools strengthen learner autonomy, increase writing confidence, and promote positive attitudes toward revision.

Although these findings demonstrate clear educational benefits, researchers caution that learner autonomy develops most effectively when automated feedback is accompanied by teacher guidance that helps students understand the linguistic principles underlying the suggested corrections.

6.3 Revision Practices and Writing Quality

Revision is widely recognised as a critical component of effective writing. Digital grammar-checking tools support this process by enabling learners to revise multiple drafts before submitting their work.

Ranalli (2021) reported that automated corrective feedback encouraged learners to engage more actively with revision, leading to noticeable improvements in subsequent drafts. Similarly, Ding and Zou (2024) observed that AI-powered writing tools facilitated iterative revision by helping learners identify language errors efficiently and refine their written expression.

Research also indicates that repeated revision supported by digital feedback improves not only grammatical accuracy but also overall writing quality. Learners become increasingly aware of common mistakes and gradually transfer this knowledge to future writing tasks.

Taken together, these studies suggest that the educational value of grammar-checking tools extends beyond error correction. They encourage reflective revision practices that contribute to sustained improvement in writing proficiency.

6.4 Pedagogical Benefits of Digital Grammar-Checking Tools

The integration of digital grammar-checking tools into English language teaching offers several pedagogical advantages. These technologies provide immediate, individualized feedback that complements classroom instruction and enables teachers to devote greater attention to higher-order writing skills such as organisation, coherence, and critical thinking.

Within the framework of Computer-Assisted Language Learning (CALL), grammar-checking tools promote learner-centred instruction by supporting independent practice beyond the classroom. They also reduce the burden of repetitive error correction, allowing teachers to focus on facilitating meaningful writing development.

Several studies further indicate that AI-assisted writing tools increase learner motivation by creating interactive learning environments that encourage experimentation and multiple revisions. Consequently, these technologies can enhance both classroom instruction and independent learning when integrated thoughtfully into the writing curriculum.

Overall, current evidence supports the use of digital grammar-checking tools as complementary instructional resources rather than replacements for teacher feedback.

6.5 Challenges and Limitations

Despite their educational value, digital grammar-checking tools have several limitations. One frequently cited concern is learner overreliance on automated suggestions without understanding the underlying grammatical principles.

Koltovskaia (2020) observed that many students accepted corrections automatically without critically evaluating their appropriateness. Such dependence may limit opportunities for deeper language learning and reduce learners' ability to edit independently in contexts where technological assistance is unavailable.

Researchers have also highlighted the limitations of AI systems in evaluating higher-order writing skills. Although these applications effectively identify grammatical and mechanical errors, they are less successful in assessing coherence, logical organisation, creativity, audience awareness, and the strength of academic arguments.

Ethical concerns have likewise emerged regarding academic integrity, particularly as AI-assisted writing technologies become increasingly sophisticated. Excessive reliance on automated feedback may diminish opportunities for independent writing practice and critical reflection if not balanced with teacher guidance. These limitations suggest that digital grammar-checking tools should be viewed as supportive learning resources rather than comprehensive writing instructors.

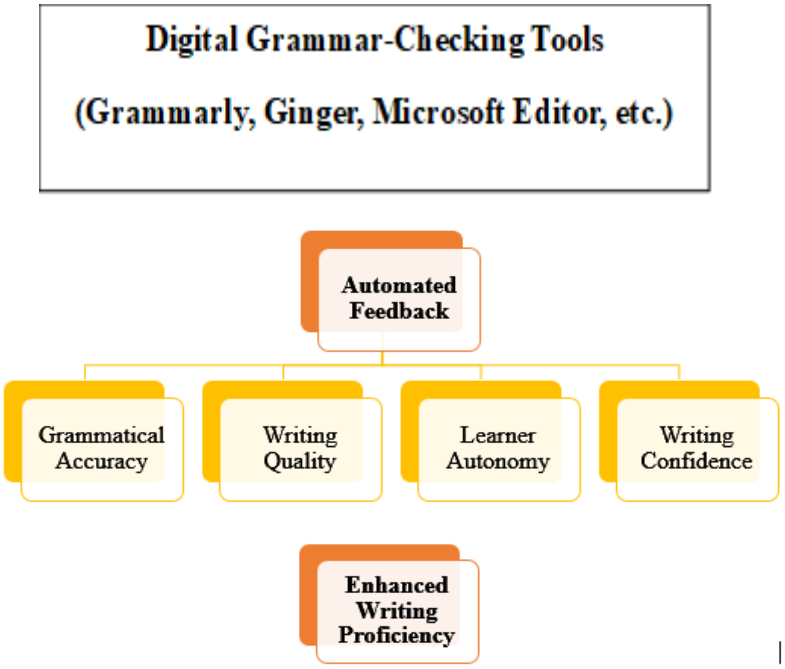
6.6 Synthesis of the Reviewed Literature

The reviewed literature consistently demonstrates that digital grammar-checking tools positively influence English writing proficiency by improving grammatical accuracy, facilitating revision, promoting learner autonomy, and increasing writing confidence. These findings align with theories of second language acquisition, corrective feedback, and technology-enhanced language learning, which emphasise the importance of timely feedback and learner engagement.

However, the evidence also indicates that the effectiveness of these tools depends on their pedagogical integration. While they provide valuable support for lower-order writing skills, they cannot adequately replace teacher feedback in developing higher-order competencies such as critical thinking, organisation, and argumentative writing. Accordingly, the most effective instructional approach combines AI-assisted feedback with explicit teacher guidance and reflective writing practices.

Conceptual Framework

Based on the reviewed literature and theoretical perspectives, the following conceptual framework illustrates how digital grammar-checking tools contribute to the development of writing proficiency among English language learners.



7. Discussion

The findings of this review demonstrate that digital grammar-checking tools have become valuable resources for enhancing English writing proficiency. Across the reviewed studies, these technologies consistently improved grammatical accuracy, writing quality, learner autonomy, and revision practices by providing immediate, individualized feedback. Their effectiveness can be understood through established theories of second language acquisition, which emphasize the role of timely feedback, guided learning, and meaningful learner engagement.

The review indicates that digital grammar-checking tools are particularly effective in addressing lower-order writing concerns, including grammar, spelling, punctuation, vocabulary, and sentence structure. Immediate corrective feedback enables learners to recognize recurring errors, revise multiple drafts, and gradually develop greater linguistic accuracy. These findings support Krashen's Input Hypothesis, which suggests that learners acquire language more effectively when they receive comprehensible input and opportunities to refine their language use through continuous practice.

The reviewed literature also highlights the contribution of these tools to learner autonomy. By encouraging students to identify and correct their own errors before submitting written work, grammar-checking applications foster self-regulated learning and increase learners' confidence. This aligns with Vygotsky's Sociocultural Theory, which emphasizes the importance of scaffolding in enabling learners to progress from supported to independent performance. Nevertheless, the effectiveness of technological scaffolding depends on learners' active engagement with feedback rather than the passive acceptance of automated corrections.

Despite these benefits, the review identifies important limitations. Most grammar-checking tools focus primarily on linguistic accuracy and provide limited support for higher-order aspects of writing, such as coherence, organization, critical analysis, creativity, and audience awareness. Consequently, they cannot replace the pedagogical expertise of teachers in developing comprehensive writing competence.

Another concern is the increasing dependence on automated feedback. Several studies suggest that learners may accept suggested corrections without understanding the underlying grammatical principles. Such dependence may hinder the development of independent editing skills and reduce opportunities for meaningful language learning. Therefore, grammar-checking tools should be integrated into writing instruction as complementary learning resources rather than substitutes for teacher feedback.

Overall, the evidence suggests that the greatest educational benefits are achieved when AI-assisted grammar-checking tools are combined with explicit instruction, teacher guidance, peer collaboration, and reflective revision practices. This balanced approach allows technology to enhance writing instruction while preserving the critical role of teachers in fostering higher-order thinking and effective communication.

8. Research Gap and Future Directions

Although research on digital grammar-checking tools has expanded considerably in recent years, several important gaps remain.

First, most empirical studies have been conducted in higher education settings, while comparatively little research has examined the effectiveness of these tools among school-level learners. Understanding how younger learners interact with AI-assisted writing technologies would provide valuable insights for English language education.

Second, existing research has focused predominantly on Grammarly, with relatively limited attention given to other widely used applications such as Microsoft Editor, ProWritingAid, Ginger, and emerging AI-powered writing assistants. Comparative studies evaluating the effectiveness of different grammar-checking tools across diverse educational contexts remain limited.

Third, most studies employ short-term experimental or survey designs. Longitudinal research is needed to determine whether improvements in grammatical accuracy translate into sustained writing proficiency and independent language development over time.

Finally, the rapid advancement of generative artificial intelligence has transformed digital writing support. Future research should investigate the pedagogical, ethical, and assessment implications of integrating AI-powered writing assistants into English language teaching, with particular attention to academic integrity, responsible AI use, and the evolving role of teachers in technology-enhanced classrooms.

Addressing these research gaps will contribute to a more comprehensive understanding of how digital grammar-checking technologies can be effectively integrated into language education while maintaining educational quality and academic integrity.

9. Pedagogical Implications

The findings of this review have important implications for English language teaching and curriculum development.

Teachers should incorporate digital grammar-checking tools as supplementary instructional resources that support the writing process rather than replace traditional feedback practices. Automated feedback can assist learners in identifying grammatical and mechanical errors independently, allowing classroom time to focus on higher-order writing skills such as idea development, organization, coherence, argumentation, and critical thinking.

Teacher education programmes should also prepare educators to integrate AI-assisted writing technologies effectively into classroom practice. Professional development initiatives can help teachers understand both the strengths and limitations of digital grammar-checking tools, enabling them to guide students in interpreting automated feedback critically and using it responsibly.

Curriculum developers should encourage balanced instructional approaches that combine technological innovation with established pedagogical principles. Writing activities should promote reflection, revision, collaboration, and independent thinking while ensuring that learners do not become overly dependent on automated correction.

Finally, educational institutions should establish clear guidelines regarding the ethical use of AI-assisted writing technologies. Policies promoting transparency, academic honesty, and responsible digital literacy will help students use these tools as learning aids while maintaining the integrity of academic writing.

10. Conclusion

Digital grammar-checking tools have become valuable components of contemporary English language instruction by providing learners with immediate, personalized, and accessible feedback on their writing. The reviewed literature indicates that these technologies contribute positively to writing proficiency by improving grammatical accuracy, enhancing writing quality, promoting learner autonomy, encouraging iterative revision, and increasing writing confidence. Their effectiveness is particularly evident in supporting lower-order writing skills and facilitating self-regulated learning.

The review also demonstrates that the educational value of digital grammar-checking tools extends beyond error correction. When integrated thoughtfully into teaching practices, they complement classroom instruction by enabling learners to engage more actively with the writing process and develop greater awareness of their linguistic strengths and weaknesses. These findings are consistent with established theories of second language acquisition, corrective feedback, sociocultural learning, and technology-enhanced language instruction, which emphasize the importance of timely feedback, guided learning, and active learner participation.

However, digital grammar-checking tools are not without limitations. They provide limited support for higher-order writing skills such as organization, coherence, argumentation, creativity, and critical thinking. Furthermore, excessive dependence on automated feedback may reduce opportunities for learners to develop independent editing skills and deeper grammatical understanding. These limitations reinforce the importance of combining AI-assisted feedback with teacher guidance, peer collaboration, and reflective writing practices.

The rapid advancement of artificial intelligence presents new opportunities and challenges for English language education. As AI-powered writing technologies continue to evolve, educators must adopt balanced instructional approaches that maximize the benefits of digital tools while preserving academic integrity, critical thinking, and authentic language learning. Rather than replacing teachers, digital grammar-checking tools should be viewed as complementary resources that enrich writing instruction and support learners in becoming more confident, accurate, and independent writers.

In conclusion, this review highlights the growing significance of digital grammar-checking tools in enhancing writing proficiency and underscores the need for their pedagogically informed integration into English language teaching. Future research should continue to explore their long-term impact across diverse educational contexts and examine how emerging AI technologies can be used responsibly to support effective writing instruction.

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