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Artificial Intelligence (AI) in English Writing Skills Learning: A Systematic Review

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Article Info

ABSTRACT

AI has rapidly changed English Language Teaching (ELT), notably writing skills. AI has enormous potential, but educators and academics still struggle with its ethical use, over-reliance, and integration into an organized curriculum. This project will thoroughly review AI integration in English writing skills learning. It examines the most used AI technologies, their efficacy in improving writing, and their pedagogical implications. A Systematic Literature Review (SLR) was conducted following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Data were synthesized from peer-reviewed articles published between 2023 and 2026 across major databases, including Scopus, Web of Science, and Google Scholar. A total of [35] pertinent studies were chosen according to stringent inclusion and exclusion criteria. The findings indicate that AI tools, including Automated Writing Evaluation (AWE) systems, Large Language Models (LLMs) such as ChatGPT, and intelligent grammar checkers (e.g., Grammarly), significantly enhance writing accuracy, coherence, and student motivation by delivering prompt, individualized feedback. However, the review also identifies critical issues, including concerns over academic integrity, potential algorithmic bias, and a "dependency trap" where students may prioritize AI output over the development of their voice. This paper presents a complete framework for educators and policymakers to responsibly integrate AI into writing teaching. The area benefits from perceiving AI as a "collaborative partner" in the writing process rather than a "correction tool" and recognizing the importance of digital literacy and ethical principles in modern English classrooms.

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1. INTRODUCTION

In the era of Industry 4.0 and moving towards Industry 5.0, English language proficiency remains a fundamental skill for global, academic, and professional communication (Meniado, 2023). Among the four language skills, writing is often considered the most complex and challenging competency for both second language (L2) and foreign language (EFL) learners (Li & Li, 2022; Saeli & Cheng, 2019). Writing

is not simply composing words but rather a high-level cognitive process involving the organization of ideas, syntactic mastery, coherence, and audience awareness (Jagaiah et al., 2020). Traditionally, writing instruction has relied heavily on intensive teacher feedback, but this model is often hampered by time constraints and unbalanced teacher-student ratios in large classes (Mao & Lee, 2025; Yan et al., 2026; Zhao et al., 2025).

The advent of Artificial Intelligence (AI) has brought both disruption and solutions to this paradigm. AI is no longer simply a spell-checking tool; it has evolved into a system capable of providing instant formative feedback, facilitating brainstorming, and even personalizing student learning paths (Hooda et al., 2022; Saputra et al., 2024). However, a strong pedagogical understanding has not always accompanied the rapid adoption of this technology, leading to ambiguity in classroom practice.

Over the past decade, we have witnessed a transition from rigid Automated Writing Evaluation (AWE) systems to generative Large Language Models (LLMs) such as ChatGPT, Claude, and Gemini (Adhikari et al., 2025). Early AWE tools focused on mechanical errors (grammar and punctuation). However, today's generative AI can conduct dialectical conversations with writers, providing stylistic suggestions, and even assisting with argument restructuring (Colby, 2025). This phenomenon has transformed AI from a "passive checker" to a "collaborative partner."

Despite its significant efficiency benefits, the integration of AI into writing skills has sparked heated ethical and pedagogical debates (Chelghoum & Chelghoum, 2025; Yadav, 2024). There are significant concerns about "cognitive atrophy," where students lose critical thinking skills due to over-reliance on machine learning. Furthermore, issues of academic integrity and AI-based plagiarism are posing new challenges for educational institutions worldwide (Vasylyshyna et al., 2024). Without a systematic review mapping how these tools are used, the true effectiveness of AI in improving writing quality remains a matter of speculation.

In the past five years, the number of studies on AI in English language learning has increased exponentially (Kuddus, 2022; Ma et al., 2024). However, the existing literature tends to be fragmented. Most studies focus on one specific tool (e.g., Grammarly alone or ChatGPT alone) or are limited to a single geographic context (Jamshaid, 2025; Raheem et al., 2023). There have been few systematic efforts to summarize these findings to gain a holistic view of how AI impacts the writing process—from pre-writing through drafting to revision.

This study has several novel aspects that distinguish it from previous literature reviews. Most SLRs on language technology published before 2023 have not yet addressed the significant impact of LLMs (such as GPT-4) (Raihan et al., 2025; Zadenoori et al., 2025). This article fills this gap by specifically including the most recent literature (2023-2026) that captures the transition from rule-based to generative AI in writing classes. Unlike reviews that only look at final writing scores, this study offers novelty by analyzing how AI impacts writers' cognitive processes. It maps the role of AI in each phase of writing (planning, idea translation, and review), providing deeper insights into changes in students' learning behavior. The article proposes a new classification for AI tools in English language learning that is more relevant to current

technological developments, separating them into Feedback-Oriented AI, Generative-Supportive AI, and Research-Based AI. Furthermore, this study addresses not only technical effectiveness but also critically examines how digital literacy and AI ethics are integrated into the English curriculum—an aspect often overlooked in more technocentric technology reviews.

Therefore, a Systematic Literature Review (SLR) is needed to synthesize data from various educational contexts. This SLR is crucial for identifying patterns of success, pedagogical failures, and emerging trends. By conducting a systematic review, we can evaluate whether AI truly improves writing competency or simply provides a short-term, superficial solution.

2. METHOD

This study uses the Systematic Literature Review (SLR) method to map the research landscape related to AI integration in English writing instruction. The methodology adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standard, an internationally recognized framework for ensuring objectivity and transparency in the literature review process. By following this protocol, each stage of article selection can be methodologically accounted for. A visualization of the process from identification to final article inclusion is summarized in the flowchart in Figure 1 below.

Figure 1. PRISMA guidelines

Inclusion and Exclusion Criteria

To ensure the research remains focused, the authors established the following eligibility criteria:
- Inclusion Criteria: Articles must be published between 2023 and 2026 (to capture the latest generative AI phenomenon); studies must focus on the integration of AI in the context of English Writing Skills; articles must be from peer-reviewed scientific journals; use English or Indonesian as the language of instruction; and study subjects must include English language learners at the secondary school and tertiary levels.

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- Exclusion Criteria: Articles not available in full-text; articles in the form of opinion pieces, editorials, or book reviews; and studies focusing on educational technology in general without a specific focus on writing skills.

The literature search was conducted systematically across four major academic databases: Scopus, Web of Science (WoS), Eric, and Google Scholar. To maximize search results, Boolean operator-based keywords (AND, OR) were used, namely ("Artificial Intelligence" OR "AI" OR "ChatGPT" OR "Automated Writing Evaluation") AND ("English Writing Skills" OR "EFL Writing") AND ("Learning" OR "Instruction").

Study Selection Stages (PRISMA Flow)

The selection process was conducted through a systematic four-stage framework to ensure methodological rigor. Initially, 250 records were identified through a comprehensive database search. These records underwent a screening phase, where duplicates were removed and titles and abstracts were evaluated against predefined inclusion criteria. Subsequently, the remaining articles were subjected to a full-text eligibility review to verify their methodological quality and relevance to the core research question. This process culminated in a final synthesis of 35 articles that met all requirements for inclusion.

Data Extraction and Analysis

Data from the selected articles were systematically extracted into comprehensive summary tables to facilitate comparative analysis. This extraction tool included key bibliographic information, including author identities and publication years, to map the chronology of research development. Furthermore, classification was performed based on the type of Artificial Intelligence (AI) instrument applied—such as Large Language Models (LLM), Automated Writing Evaluation (AWE), or Grammar Checkers. To ensure the validity of the findings, the tool also categorized the research methodologies, including qualitative, quantitative, and mixed methods. Finally, the synthesis focused on key findings that highlighted the effectiveness and implementation challenges identified in the literature.

The data analysis in this study was conducted using thematic analysis techniques to identify, analyze, and report meaningful patterns emerging from the reviewed literature. This process involved in-depth coding of previous research findings, which were then synthesized into several comprehensive central themes. These themes included the influence of AI integration on student learning motivation, the effectiveness and efficiency of feedback mechanisms, and critical considerations regarding academic integrity issues in the context of the use of artificial intelligence technology.

3. RESULTS AND DISCUSSION

Results

Through the systematic and transparent implementation of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, 35 high-quality articles were selected for in-depth analysis. The synthesis of this literature reveals significant trends, and paradigm shifts in the integration of Artificial Intelligence (AI) into English writing instruction. Based on a critical evaluation of the collected data, the research findings are classified into four main pillars that illustrate the dynamics of this technology's use in modern classrooms:

Taxonomy of AI Tools Used in Writing Classes

Data analysis in this study reveals a significant shift in technological dominance over the past five years. Based on the literature reviewed, artificial intelligence tools implemented in writing classes are classified into three main categories, reflecting the evolution of their functionality:

- Automated Writing Evaluation (AWE): Tools such as Grammarly, Criterion, and WriteToLearn remain the most widely used tools. The primary focus of this technology is to provide automatic corrective feedback on the mechanical aspects of writing, including grammar, spelling, and punctuation, to independently improve students' linguistic accuracy.
- Generative AI & Large Language Models (LLMs): Since 2023, research trends have shown a drastic shift in focus toward platforms such as ChatGPT, Claude, and Gemini. Unlike AWE, these large language models are utilized as heuristic partners in brainstorming, outlining, and more complex and contextual stylistic editing.
- Intelligent Tutoring Systems (ITS): This category includes AI-based platforms designed to provide personalized learning paths. This system can adapt in real-time to the individual competency level of students, providing measurable instruction and pedagogical interventions tailored to the specific needs of the learner.

Impact of AI on Student Writing Performance

A synthesis of data from the selected literature shows a very strong positive trend, with most studies (around 75%) reporting significant improvements in students' final writing outcomes after integrating artificial intelligence tools into the learning process. This impact is multidimensional, spanning improvements in linguistic mechanics to transformations in learners' cognitive processes in constructing a text.

Specifically, the use of AI has consistently been shown to improve linguistic accuracy through a drastic reduction in syntactic errors and an increase in lexical density. AI tools act as a safety net, enabling students to independently identify grammatical anomalies, which in turn expand their vocabulary through suggested synonyms and more appropriate word usage contexts. From a procedural perspective, this technology creates unprecedented revision efficiency. The availability of instant feedback encourages students to revise their drafts more iteratively; they tend to revise

their writing more frequently because the time constraints typically associated with conventional correction methods—which rely on teacher availability—are eliminated.

Furthermore, one of the most crucial findings of this review is the ability of AI to reduce students' cognitive load. By delegating low-level technical aspects, such as spellchecking and basic mechanics, to an automated system, students have a broader mental capacity to explore higher-level rhetorical elements. This lets students spend more time on making their arguments deeper, more coherent, and more original. Overall, AI integration serves not merely as a passive correction tool but as a pedagogical catalyst, accelerating students' transition from novice writers to more competent, critical, and confident writers.

Changes in Learner Motivation and Affective Behavior

A thematic analysis of various qualitative studies reveals that the integration of Artificial Intelligence (AI) plays a fundamental psychological role in the writing learning ecosystem. These findings demonstrate that the influence of technology goes beyond mere technical improvements to touch upon the affective dimensions that determine students' academic success.

One of the most prominent impacts is the reduction of writing anxiety. Many learners often experience psychological barriers when it comes to producing text due to the fear of direct assessment from teachers or peers. In this context, AI tools serve as a "safe space" for students to experiment with complex language structures without social pressure. Students' self-confidence grows as they feel safe making mistakes in front of an objective, non-judicial machine. This makes them more willing to try out different writing styles.

Furthermore, the presence of AI significantly strengthens learning autonomy. With access to responsive self-assessment tools, students no longer position themselves as passive recipients of feedback but as active agents in the editing process. The ability to self-correct before submitting a final assignment provides students with control over their work. This process transforms learners into more independent and reflective individuals, able to proactively identify linguistic weaknesses and independently develop strategies for continuous improvement.

Identified Challenges and Barriers

While the integration of artificial intelligence offers various pedagogical benefits, this systematic review also identified several critical barriers consistently reported in the literature. These challenges require serious attention from education practitioners to ensure that the use of technology does not compromise the quality of learning.

One major emerging obstacle is the phenomenon of over-reliance. Data indicates a tendency for students to blindly accept suggestions or corrections from AI devices without critically evaluating the rationale behind those suggestions. This reliance is feared to hinder the development of critical thinking and a deep understanding of linguistic rules, as the decision-making process is completely transferred to the algorithm. Image showing the balance between human creativity and AI assistance.

Figure 2. AI vs. Human

Moreover, matters of origin and academic integrity have emerged as pivotal issues in recent research, especially following the extensive adoption of large language models. The emerging challenges in detecting AI-based plagiarism have created an urgent need to reformulate academic integrity guidelines. The writings highlight that it's becoming harder to tell the difference between using technology to help and being dishonest in academics, which means we need new ethical rules that can include the use of generative tools.

Finally, despite its superior speed, the quality of AI feedback still has significant contextual limitations. Algorithms often provide technically correct but contextually inaccurate advice and frequently fail to capture cultural nuances and emotional undertones, particularly in creative writing. These limitations emphasize that while AI is highly efficient for mechanical correction, the role of human instructors remains irreplaceable in providing interpretive, empathetic, and culturally sensitive guidance.

Table 1. Summary of Key Findings

Analysis Dimensions	Key Findings	Frequency of Appearance in the Literature
Focus	Grammatical Accuracy & Structure	High
Dominant Technology	ChatGPT & Grammarly	Very High
Research Methods	Mixed-methods and Experiments	Moderate
Biggest Barriers	Ethics & Originality of Ideas	Increasing (2024-2026)

Table 1 presents a comprehensive overview of the landscape of artificial intelligence use in English writing instruction, providing the basis for several key interpretative points. These findings map the technologies used and reflect a paradigm shift in methodology and ethical concerns within the academic world. First, there is a dominance of mechanical aspects of writing, with the primary focus of current research still centering on grammatical accuracy and formal structure. The very frequent occurrence of this theme in the literature indicates that most researchers and practitioners still view AI as an instrument for improving technical linguistic aspects. This means that people haven't looked closely at how AI could help with more advanced writing skills or creative storytelling, so its use is mostly focused on basic structure and function.

Second, the data demonstrates the hegemony of specific technologies, particularly the strong dominance of tools like ChatGPT and Grammarly. The high concentration of these platforms suggests that the global market and academic community are currently in a phase of standardizing digital tools. The extensive focus on Large Language Models (LLM) and Automated Writing Evaluation (AWE) indicates that these two technologies have become key benchmarks in defining what constitutes a "digital English classroom" in the modern era.

Third, in terms of methodological trends, there is a moderate but significant rise in the use of mixed-methods and experimental designs. This signals an important transition in literature, from observational or descriptive approaches to more rigorous empirical testing. Researchers are now more inclined to measure the effectiveness of AI in real-world classroom environments by simultaneously integrating quantitative and qualitative data to achieve a more comprehensive validity of their findings.

Finally, the most crucial finding relates to the shift in critical issues in the 2024–2026 period. As technology advances, researchers' attention is shifting from merely technical software constraints to ethical issues and the originality of ideas. A key concern in current academic discourse is the integrity of students' thinking processes and the protection of intellectual authenticity. This strongly signals to educational institutions the urgency of formulating more robust and adaptive institutional policies to mitigate ethical risks without stifling technological innovation.

Overall, the information gathered in this review shows that although using Artificial Intelligence (AI) has effectively solved issues with language accuracy, academic discussions are starting to change direction. Researchers are no longer focused solely on short-term technical efficacy but are shifting their attention to the long-term impact of technology use on the integrity of students' thinking processes. This phenomenon signifies a stage of maturity in digital education research, where the sole measure of success is no longer functional effectiveness.

Furthermore, there is a pressing urgency to create a learning ecosystem that balances the extraordinary efficiency offered by platforms like Grammarly and ChatGPT with the fundamental values of ethical writing. Reliance on automation should not override the importance of originality of ideas and the development of an authentic authorial voice. Therefore, the challenge for future educational institutions lies no longer in selecting the most sophisticated software but in developing a pedagogical framework capable of integrating AI as a thinking partner without compromising academic honesty. This effort requires the formulation of adaptive institutional policies and a reorientation of the curriculum that prioritizes critical AI literacy among learners.

Discussion

This discussion looks at the important effects of research on using Artificial Intelligence (AI) in teaching English writing, especially how technology is changing and the ethical issues that come with it. The data suggests that we are in the midst of a paradigm shift, where AI no longer functions merely as a peripheral tool for grammar correction but has evolved into an active, collaborative agent in the creative and

structural process. This changing role forces educators to redefine writing competency, shifting from traditional mechanical mastery to digital literacy, which places greater emphasis on the ability to curate and critically evaluate machine-generated suggestions.

Furthermore, this analysis highlights that as technology becomes more intimately involved in students' thinking processes, the ethical challenges it raises become increasingly complex. The question of the boundaries between technological assistance and intellectual originality demands serious attention, given the risk of erosion of independent thinking skills under the shadow of massive automation. Therefore, this discussion not only outlines the technical efficacy of AI tools but also critiques the urgency of developing an adaptive academic ethics framework. This aims to ensure that technological innovation remains aligned with the values of intellectual integrity so that AI can be a catalyst for learner empowerment without sacrificing the essence of honesty and the authentic voice of the author.

The Hegemony of Linguistic Accuracy and Tool Dominance

The findings of this study confirm the strong hegemony of grammatical accuracy and formal structure in the current literature. The consistent focus on grammatical accuracy and structure reinforces the position of Artificial Intelligence (AI), particularly through platforms like Grammarly, as a primary tool for overcoming the mechanical barriers of writing. This phenomenon aligns with Sweller's (1988) Cognitive Load Theory, in which AI functions as a scaffolding tool that reduces the burden of processing low-level technical elements. By delegating mechanical tasks to machines, learners can theoretically allocate greater cognitive resources to more complex aspects of writing.

However, the high level of dominance of ChatGPT signals a fundamental paradigm shift in language pedagogy. AI is no longer viewed simply as a "passive corrector" working retrospectively but has evolved into a proactive, generative assistant that facilitates the structure of ideas instantly. This shift reflects Vygotsky's concept of the Zone of Proximal Development (ZPD) in a digital context, where AI acts as a collaborative partner, expanding students' text-producing capabilities beyond their capacity (Cai et al., 2025). Previous studies Warschauer et al. (2023) have also noted that the integration of Large Language Models (LLMs) has transformed the nature of writing from a solitary process to a co-construction process between humans and machines.

However, this heavy reliance on technical aspects and generative efficiency raises serious pedagogical concerns about the marginalization of the author's authentic voice (authoritative voice) and rhetorical depth. Uncritical use of AI poses a risk of homogenizing writing styles, as uniform algorithmic patterns erode unique individual expression. This aligns with scholarly criticisms Hyland (2022) regarding the importance of voice in academic writing as a representation of identity and intellectual authority. If we ignore the need for a unique voice in writing and focus only on the technical perfection that AI provides, there is a worry that writing will lose its ability to reflect personal thoughts and meaningful communication, resulting in texts that are perfectly written but lack depth and meaning.

Methodological Validity in AI Research

The findings, which demonstrate moderate use of mixed-methods and experimental designs, indicate a crucial transition within the academic community. There is a shift in research orientation, from previously being dominated by perceptual studies (such as attitude or opinion surveys) to the search for more robust empirical evidence regarding the effectiveness of technology. The adoption of mixed methods in this context is not simply a technical choice but an epistemological necessity. As outlined in the Methodological Triangulation framework by Creswell and Clark (2017), the integration of quantitative and qualitative data is necessary to validate whether improvements in writing scores (quantitative data) are truly rooted in students' cognitive development or simply an artifact of machine automation.

Theoretically, the inclusion of qualitative methods in this design aims to examine how learners cognitively interact with the suggestions provided by AI. This aligns with Information Processing Theory, which emphasizes the importance of mental activity in transforming input into enduring knowledge (Laari et al., 2023). Without in-depth qualitative analysis of students' revision processes, researchers risk being trapped in a "black box" phenomenon, where the final results appear superior but linguistic internalization does not occur. Previous studies, such as Murphy and O'Neill's (2022) study on the effectiveness of automated feedback, emphasize that the validity of learning outcomes can only be claimed if there is evidence of learners' critical engagement with the feedback.

Therefore, strengthening experimental methodology supported by qualitative insights is critical for guaranteeing construct validity. This aims to ensure that observed improvements in writing performance reflect real and sustained increases in linguistic competence, not simply a "temporary effect" of algorithmic assistance. This robust methodology thus serves as a critical filter to distinguish between superficial learning and authentic writing skill development in the digital age.

The Ethics and Originality Crisis in the 2024-2026 Era

The most crucial finding in this review is the escalation of barriers related to ethics and idea originality, which peaked in the 2024–2026 period. This trend signals the emergence of a "new academic anxiety," where the ability of generative AI to produce coherent and sophisticated texts has blurred the lines between technological assistance and academic dishonesty. In line with concerns expressed by Selwyn (2024) regarding the "automation of education," current literature demonstrates a significant shift in discourse: the focus of research is no longer simply on optimizing the use of AI tools, but rather on maintaining the essence of humanity and intellectual authenticity amidst the siege of algorithms.

Theoretically, this crisis of originality challenges the traditional concept of authorial ownership. Referring to Foucault's or Barthes's notion of the "death of the author," the presence of generative AI complicates claims to the authority of a single idea. Previous studies by Sullivan et al. (2023) have argued that when machines are able to simulate human reasoning processes, the definition of "original writing" must be deconstructed.

This calls for a radical redefinition in modern English language education of what constitutes original work: whether originality lies in the final product produced or in the critical human process of guiding and curating that output.

This escalation of ethical barriers also aligns with modern academic integrity theory, which emphasizes the values of transparency and accountability. The increase in barriers reported in the literature from 2024 to 2026 strongly signals the urgency of formulating more transformative institutional policies. The pedagogical challenge of the future lies not in banning technology, but in developing ethical literacies that enable learners to remain sovereign, creative subjects. Therefore, the need for new integrity standards that accommodate human-machine collaboration is urgent to ensure that education remains a vehicle for authentic intellectual development rather than simply a forum for the exchange of meaningless, automated texts.

Pedagogical Implications: Toward AI Literacy

The collective findings of this study confirm that writing instruction in the contemporary era can no longer ignore the presence and influence of Artificial Intelligence (AI). The advent of this technology demands a fundamental reorientation of the role of educators and the structure of English language curricula. Teachers must undertake a radical transition—from traditional "grammar correctors," whose functions have now been efficiently taken over by algorithms, to facilitators of critical and ethical thinking. This shift is not simply a technical adaptation but rather a pedagogical evolution that places the human aspect at the center of the creative process.

In this context, the focus of learning must shift from merely achieving linguistic accuracy to developing comprehensive AI literacy. This literacy includes students' ability to think critically about what AI produces instead of just accepting it. Students must be educated about algorithmic bias, the contextual constraints of machines, and the importance of preserving originality amidst automation. In line with the Critical Pedagogy framework, education must equip learners with the skills to engage in productive dialogue with technology while retaining full control over the rhetorical direction and intellectual authority of their writing.

Furthermore, these implications suggest the need to redesign assessment methods that not only assess the final product but also value the reflection and decision-making processes that occur during human-AI collaboration. By making ethical literacy a key pillar, educational institutions can ensure that the use of AI does not erode students' cognitive abilities but instead strengthens their capacity as competent, critical, and articulate communicators in an increasingly complex digital world.

4. CONCLUSION

An in-depth systematic review conducted in this study concludes that the integration of Artificial Intelligence (AI) in English writing learning has reached a fundamental turning point. The dominance of platforms like ChatGPT and Grammarly confirms that technology is no longer merely a supplementary instrument but rather a core component of the modern text production ecosystem. Technically, AI has proven effective in

mitigating mechanical barriers by increasing grammatical accuracy and strengthening writing structures while also functioning as an affective intervention that reduces students' writing anxiety. However, these findings reveal a crucial paradox: amidst the increase in technical competence, significant challenges have emerged in the ethical dimension and intellectual originality, which are predicted to be primary concerns throughout the 2024–2026 period. The shift in research methodology toward mixed methods indicates that the success of AI-based learning can no longer be measured reductionistically by final grades alone. Instead, a holistic understanding of the cognitive interaction between humans and machines is needed, positioning AI as a collaborative partner that facilitates the thinking process, rather than as a substitute for human intellect.

This study formulates several strategic recommendations for stakeholders in the education sector. Educators are advised to move away from generic writing assignments and shift to task designs that prioritize personal reflection, local contextual engagement, and critical evaluation of AI output. Curricula should explicitly teach ethical prompt engineering techniques and procedures for independently verifying information accuracy. Longitudinal research lasting more than one year is needed to monitor the impact of AI use on learners' development of foundational skills. Such analysis is crucial for identifying potential cognitive atrophy resulting from uncontrolled technological dependence. Future research is encouraged to explore the influence of AI on more subjective and complex elements of writing, such as tone, voice, and rhetorical creativity—aspects that have received limited attention in academic discourse.

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