

# Integrating Artificial Intelligence in Writing Pedagogy: Opportunities and Challenges

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## Abstract

*The integration of Artificial Intelligence has brought a notified improvement in writing pedagogy, creating both challenges and opportunities for educators and learners. This study examines the key role of AI in writing instruction. This study is based on a thematic analysis of the literature (2020-2026). The present study mentions that the integration of AI with writing instruction cannot be considered an individual cognitive activity. However, it can be viewed as an interactive, collaborative, and computational process. This article focuses on the main benefits of such collaboration, such as continuous feedback, personalized learning, and creative engagement. At the same time It also explores challenges such as over-reliance on technology, data privacy, algorithm bias, academic integrity, and decreasing creative thinking. The present study proposes a novel pedagogical framework for AI collaboration with writing integration to address these issues. It also emphasizes the leading role of educators in implementing AI efficient and ethical implementation of AI. The study concludes that writing instruction can be enhanced effectively if it is integrated with sound pedagogical practices, timely ethical guidelines, and empirical classroom-based research across different educational contexts.*

**Keywords: Writing Skills, Pedagogy, Personalized Learning, Scaffolding, Artificial Intelligence (AI).**

## Introduction

A noticeable change was observed in 2022 in the field of education due to the advent of ChatGPT. This has sparked worldwide discussions on the role of AI in teaching and learning. The role of ChatGPT can be seen in the form of interaction between learners and educators with advanced language models that have the potential to create coherent, context-sensitive, and human-like text in various academic capacities. Consequently, the swift development of AI has challenged conventional opinions on creativity, originality, authorship, and the nature of writing instruction.

Educational establishments have reacted differently to this technological shift. In the initial stage, some educational institutions regulated or prohibited the usage of AI-enabled tools due to issues such as plagiarism, assessment validity, and academic integrity. Simultaneously, few institutions have begun to explore their pedagogical efficiency for teaching, learning, research, and academic writing. Medina (2025) argues that educators should comprehend the instructional benefits and ethical and pedagogical limitations of AI for its successful integration with writing instruction.

Recent scholarly works have shown that Artificial Intelligence can assist writing instruction through personalized feedback, adaptive learning, language enhancement, and revision support. The researchers also noted that key issues, such as over-reliance on technology, data privacy, and algorithmic bias, have lowered learners' critical thinking and threatened academic integrity. These findings show that AI is not just a technological innovation but a pioneering vigor that is redefining writing instruction.

A significant research gap exists. Most existing research focuses on the technological potential of AI-assisted tools or challenges such as learners' perceptions, how to apply such tools in the classroom, or the academic integrity of such tools. Limited conceptual research has been conducted that integrates these varied viewpoints into an extensive pedagogical framework that integrates learning theories, instructional abilities, ethical concerns, and critical AI literacy. Few studies have also reconstructed writing as a collaborative process between human cognition and AI, while recommending practical guidelines for educators. It is the need of the hour to address these research gap to develop ethically responsible AI assisted writing instruction.

To address this research gap, the present study designs a theoretical framework rooted in acclaimed learning theories to investigate the mounting integration of AI in writing instruction. Embracing a conceptual research design, this study showcases novel dimensions for comprehending writing instruction in the age of generative AI and offers a framework for expressive and reliable AI integration in writing.

The following research questions are formulated based on the study:

- What pedagogical avenues does AI provide for writing instruction?
- What issues and risks must educators face when integrating AI tools into writing classrooms?
- How writing instruction be redefined to optimize the strengths of AI while minimizing its pedagogical and ethical risks?

## Review of Literature

The expedited advent of Artificial Intelligence

(AI), especially generative AI applications such as ChatGPT, has prominently impacted writing instruction by reinventing conventional approaches to writing instruction. Recent findings have revealed both the instructional benefits and ethical concerns associated with AI-enabled writing, demonstrating that AI has become an inherent element of conventional educational practices.

A review of ChatGPT in education, conducted by Crompton and Burk (2024), showed that AI strengthens personalized learning through instant feedback, adaptive instruction, and avenues for self-directed learning. However, they also diagnosed issues related to over-dependency on technology and data privacy and the need for educators to restructure assessment practices.

Medina (2025) investigated the policy and pedagogical significance of using generative AI in writing instruction. The research emphasizes that the association of AI with writing instruction should be like a collaborative tool and should not be treated as a threat to academic honesty. Medina also mentioned that institutional policies, ethical guidelines, and teacher competency should facilitate reliable AI integration in educational setups.

Muslimova and Yelubayeva (2025) employed Vygotsky's Zone of Proximal Development (ZPD) as a theoretical framework and examined the potential of AI-enabled language learning tools among Kazakh high school students. The findings show that AI-enabled language learning tools perform as a scaffolding mechanism that demands personalized guidance, advocates learner autonomy, and enhances writing proficiency. At the same time, the authors also warn against over-dependency on AI-assisted applications, which may lower learners' impartial learning abilities.

Writing as a collaborative process between human creativity and AI potential is well defined in the Human-AI Collaborative Writing (HACW) Model (2025). The model stresses the role of AI in idea generation, drafting, revision, and reflective feedback while retaining human control over critical thinking and decision-making.

Likewise, the concept of 'Writing is Coding' (2025) showcases the significance of prompt engineering and computational thinking in the era

of AI. The framework highlights the increasing significance of AI literacy in addition to traditional writing competencies.

Miah et al. (2025) offer an integrative perspective with the help of a SWOT analysis of ChatGPT in higher education and research. Their study indicates the potential for writing efficiency assistance and personalized learning opportunities, and highlights issues such as ethical concerns, data privacy, and decreasing critical thinking. It is suggested that AI-enabled applications should be considered as a complement rather than a replacement of human intellectual engagement.

A study by Ghimire, Neupane, and Dahal (2024) in the domain of English language teaching showed that AI-enabled writing applications enhance vocabulary acquisition, grammatical accuracy, and learner motivation. The authors also suggest that teachers' supervision is required during the usage of AI by the learners.

Payne (2026) demonstrated the concept of Critical AI Literacy. Payne stresses that prospective writing instruction should focus not only on writing skills but also on learners' potential to critically evaluate AI-generated content and use it ethically.

The current literature shows that AI has the potential to strengthen writing instruction through personalized learning, adaptive feedback, collaborative writing, and learner engagement. These studies also acknowledged issues related to over-dependency on technology, data privacy, algorithmic bias, and academic integrity. Few scholars have proposed an integrated pedagogical framework that examines the individual perspective of AI-enabled writing, addressing instructional opportunities, ethical considerations, and critical AI literacy. This study attempts to bridge this gap by developing a comprehensive conceptual framework for the impactful integration of AI into writing instruction.

### **Research Methodology**

This study employs a conceptual and theoretical research design to investigate the avenues and issues related to the integration of AI in writing instruction. This study collated existing scholarly literature to develop a pedagogically meaningful theoretical framework for AI-enabled writing instruction.

The review consists of peer-reviewed journal articles, conference proceedings, books, and institutional reports published between 2020 and 2026. Three criteria were adopted to select the literature: (a) relevance to Artificial Intelligence in educational set up, (b) focus on writing instruction, and (c) light on academic integrity, ethical concerns, and AI-assisted learning. The literature that did not address these themes or lacked academic credibility was eliminated.

An interactive process was employed to examine the selected literature using a thematic analysis. First, the existing literature was thoroughly read to become familiar with the content. Subsequently, the key concepts were coded and grouped under thematic categories. After comparing these studies, four main themes were formulated: pedagogical opportunities, instructional challenges and risks, ethical issues, and AI literacy.

To confirm the credibility and validity of the thematic analysis, the verified themes were modified through continuous comparison across many scholarly sources and investigated for consistency with established educational theories, including Process-Oriented Writing Pedagogy, Vygotsky's Zone of Proximal Development, and Human-AI Collaborative Writing models. Triangulating findings across different academic sources and theoretical perspectives strengthened the coherence of the proposed framework.

The collated themes were critically examined to develop a conceptual framework for Critical AI Literacy in Writing Pedagogy. As this study does not offer empirical validation, it provides a foundation that showcases curriculum design, instructional practices, and future classroom-based research on AI-enabled writing instruction.

Since this study employs a conceptual research design, its findings are derived from the critical integration of existing literature rather than from primary empirical data. The proposed framework has not been empirically examined in classroom settings. The present study aims to offer a theoretically grounded foundation for comprehending AI-integrated writing instruction, which can be examined through future empirical research. Future studies may validate the proposed framework by employing

qualitative, quantitative, or mixed-method research designs across various educational setups.

## **Theoretical Foundations**

### **Process-Oriented Writing Pedagogy**

Cognitive process theory, developed by Flower and Hayes (1981), has influenced contemporary writing instruction. It has conceptualized writing as a dynamic process that includes planning, translating, and reviewing. This framework has shifted product-centered activity to an evolving cognitive process in which writers seamlessly create, organize, and revise ideas.

However, this new process-oriented approach is challenged by emerging generative artificial intelligence. Payne (2026) points out that cognitive engagement during the process is complicated by AI-assisted writing tools. The active engagement of learners in the cognitive process of writing development is questioned when AI tools are used for drafting, revising, and editing textual content. This shift demands a critical reassessment of how writing processes are structured, documented, and assessed within AI-assisted learning environments.

### **Vygotsky's Zone of Proximal Development**

Lev Vygotsky's concept of Zone of Proximal Development (ZPD), the socio cultural learning theory, provides a significant theoretical context for comprehending the key role of artificial intelligence. This concept refers to the specified space between what learners learn without any assistance and what they learn with guidance and support. In this framework, scaffolding helps learners to exhibit tasks that would otherwise remain beyond their present level of competency.

In this context, the artificial intelligence AI-enabled applications have the strength to work as dynamic scaffolding within a learner's zone of proximal development. According to an empirical study conducted among high school students in Kazakhstan by Muslimova and Yelubayeva (2025), the pedagogical integration of AI applications within a ZPD-based instructional framework plays an important role in language development and promotes autonomous learning. This framework also discusses significant pedagogical concerns, such as

over-reliance on AI applications.

## **Human-AI Collaborative Writing Models**

Emerging learning concentrates on collaborative processes that involve both human and artificial applications. The Human-AI Collaborative Writing (HACW) model considers writing as a bridge that connects human creativity and the computational capabilities of artificial intelligence. This model comprises three interlinked phases of collaboration: collaborative ideation, distributed composition, and reflective revision. The distributed composition enables both humans and AI to strengthen textual content. The reflective revision consists of a feedback model that assists in continuous textual improvement.

This framework is also described as Writing in Coding, which considers natural language as a computational interface. At this stage, prompt engineering works where the learners need to develop algorithmic thinking along with traditional compositional skills.

In this way, these models express a general notion, which means that AI should be considered not just as a technical tool but as a key player in the writing process. Payne (2026) names such emerging educational orientation as 'Critical AI Literacy.'

## **Pedagogical Opportunities**

### **Personalized Scaffolding and Differentiated Instruction**

The integration of artificial intelligence offers pedagogical opportunities such as personalized learning and on-demand scaffolding for diversified learners at different levels of writing proficiency. In traditional writing instruction classes, it is difficult for instructors to provide individualized attention to each learner. Challenges such as lack of time, limited opportunities for detailed feedback, and the varied academic needs of learners make personalized instruction more challenging. AI-assisted writing applications can address these limitations by offering immediate, adaptive, and customized feedback based on learner needs.

Many studies have highlighted the potential of AI-enabled personalized learning. Crompton and Bruke (2024) observed that AI traits, such as self-

assessment mechanisms, personalized feedback, and interactive learning systems, enable learners to comprehend the difficulty of writing concepts and develop more independence in writing.

Many classroom-based research results showcase the potential of AI-assisted writing instruction. For instance, UNESCO has stressed the intelligible usage of generative AI in educational setups by identifying its strength to assist personalized learning and also focuses on the ethical aspects of its usage. ChatGPT also exhibited improvements in brainstorming, vocabulary development, and revision practices among second-language learners. Such empirical research shows that if AI applications are intelligibly integrated with pedagogical frameworks, they can perform as effective scaffolds that assist both learner autonomy and writing development.

### **Enhanced Feedback and Revision Processes**

The revision stage in writing development has always been considered a critical component. Sometimes, revision receives limited attention due to the detailed, constructive, and individualized feedback, as it is time-consuming.

AI enables constructive feedback and the revision process in many meaningful ways. First, AI-enabled writing applications offer immediate feedback on lower-order writing concerns, such as grammar, spelling, sentence structure, and punctuation. At the same time, these tools also train instructors to pay more attention to higher-order rhetorical concerns, such as organization, evidence integration, coherence, and argument development. Second, AI applications generate many perspectives on a given writing content, such as stylistic variations, alternate phrases, and various rhetorical approaches. Third, AI applications also demonstrate how a particular passage can be improved by expansion, restructuring, or refinement.

### **Lowering Barriers and Democratizing Access**

Writing is an academic skill that requires continuous practice, guidance, and engagement for development. All learners may not have equal access to educational resources such as mentoring, individualized tutoring, and supportive literacy environments at home. In this scenario, students

from under-resourced backgrounds face issues in developing proficiency in writing. Here, AI-enabled applications are accessible to develop writing proficiency, and some of the tools are accessible at low or no cost.

In the process of writing development through AI-enabled applications, learners can easily interact with AI-generated content as an initial framework, which can be evaluated, revised, and personalized. This enables a switch from being a substitute for student writing to an enabling scaffold that assists in the continuous growth of confidence, independence, and writing competence.

### **Challenges and Risks**

#### **Academic Integrity and the Problem of Detection**

The use of AI-enabled tools also raises significant concerns regarding academic integrity. The continuous use of AI has challenged the old approaches to authorship verification and originality assessment. Outdated plagiarism detection software is ineffective in identifying AI-generated content. To resolve such challenges, many educational organizations have introduced proctor-enabled writing assessments, process-based assignments, and, in a few cases, keystroke logging technologies to document writing patterns. It assists in resolving issues such as unauthorized AI usage.

Rahman (2024) argues, too much dependency on surveillance and investigation can develop adversarial relationship between learners and instructors. It weakens the trust, openness, and mutual respect needed for an effective learning environment.

#### **Over-Reliance and the Erosion of Critical Thinking**

One of the most significant pedagogical concerns connected with AI-enabled applications in developing writing proficiency is learners' over-dependency on AI tools. This impacts the cognitive efforts of learners. Such over-reliance on AI tools also reduces the opportunities for learners to engage in critical thinking, problem-solving, and decision-making, which demand effective writing skills.

Empirical studies have demonstrated this immediate concern. Crompton and Bruke (2024)

identified over-dependency on AI-enabled writing tools as an instructional challenge and observed that learners who solely depend on AI and their writing content may be technically competent, yet it lacks originality, critical insight, and personal voice. Rahman (2025) also mentions that too much dependency on AI applications may reduce learners' willingness to engage with intellectually demanding writing tasks, and as a result, it reduces their resilience and independent academic confidence.

The solution to such issues is quite simple: educators should guide learners to engage with AI in a very responsible and reflective way, and learners should critically evaluate, selectively adapt, and creatively transform the AI-generated possibilities in such a way that AI-enabled learning tools assist genuine learning and intellectual growth.

### **Algorithmic Bias and Homogenization**

Generative AI models are developed based on large-scale databases that are extracted from digital and online sources, and many of them have some biases with reference to race, gender, class, language, and culture. Consequently, the results produced by AI applications will bring dominant cultural assumptions that will marginalize diverse perspectives and voices.

These issues can be observed in two different ways. First, the feedback provided by AI-enabled applications will exhibit cultural assumptions that will not help learners from marginalized backgrounds. Such reservations may affect how learners consider correctness, appropriateness, or academic quality in writing. Second, excessive reliance on AI-generated suggestions may contribute to the normalization of learners writing. However, diverse voices, cultural expressions, and individual perspectives are slowly being replaced by standard patterns of language and expression. This limits the plurality of perspectives that enhance classroom learning and academic discourse.

Payne (2026) describes Critical AI Literacy as a way of examining AI-generated outputs for bias and systematic limitations. Payne argues that such ability to examine should be integrated with pedagogical practices rather an optional or supplementary skill. Such learners are required to possess explicit

instruction to identify AI-generated responses that reflect bias and the ability to identify the gaps or limitations observed in the AI-generated knowledge.

### **Data Privacy and Environmental Concerns**

Apart from pedagogical aspects, AI's integration with education draws attention to ethical concerns such as data privacy and environmental sustainability. User-generated data, integration histories, and sometimes learners' personal or academic data are stored in AI-enabled applications. Data privacy policies are not clearly communicated to users, which creates legitimate concerns regarding transparency, consent, and digital privacy.

Another issue, apart from data privacy, is the extensive infrastructure, large-scale data, and energy consumption. This has prompted educators and institutions to investigate AI sustainability in the context of education. Moreover, bringing AI into writing instruction draws our attention to ethical considerations and the alignment of AI-enabled tools with pedagogical goals.

### **A Framework for Critical AI Literacy in Writing Pedagogy**

This study proposes a Critical AI Literacy Framework for writing instructions. It is designed to assist learners in understanding AI-enabled writing applications in an ethical, thoughtful, and pedagogical way. The Critical AI Literacy Framework is based on four interrelated competencies.

#### **Competency 1: Strategic Prompting**

The integration of AI applications begins with the capacity to structure prompts that can generate relevant, powerful, and contextual outputs. Strategic prompting expresses an intense rhetorical awareness of how language functions as a type of instruction that shapes AI-generated outcomes.

#### **Competency 2: Critical Evaluation**

Another significant fundamental component of Critical AI Literacy is Critical Evaluation. Here, learners will have the ability to recognize information gaps, inaccuracies, and built-in biases, which will assist them in verifying references, factual claims, and citations. Through such critical assessment,

learners will be enabled to become active interpreters of AI-enabled content rather than passive receivers of automated content.

### **Competency 3: Ethical Integration**

Ethical integration is a significant component of Critical AI Literacy, which enables learners to make decisions regarding the intelligible usage of AI in academic writing contexts. Policies regarding the ethical usage of AI tools in writing instruction should be well informed to learners so that they can distinguish between appropriate and inappropriate usage of AI-enabled applications. Such competency encourages learners to critically reflect on how the implications of AI tools in writing contexts impact their learning process, intellectual dependence, and academic development. Moreover, ethical integration includes awareness of data privacy and digital responsibility associated with AI-enabled technologies.

### **Competency 4: Creative Transformation**

The main objective of the collaboration of artificial intelligence-enabled applications with writing instructions is not the creation of AI-generated text only, but the productive usage of AI tools as an agent for human creativity, originality, and intellectual exploration. Creative transformation includes an engagement with AI-generated results critically and imaginatively by adapting, revising, or sometimes challenging them to bring up a novel and contextually meaningful form of expression. Such competency assures that AI-enabled writing instruction tools continue to assist human intention, creativity, and critical inquiry rather than becoming a substitute for independent expression or authentic intellectual engagement.

## **Implications and Recommendations**

### **For Curriculum Design**

Curriculum design with reference to writing instructions needs to incorporate AI literacy and should be considered a significant component of contemporary writing education. Instead of being introduced as an isolated or optional topic, AI literacy should be included in all courses and integrated into writing instruction at various levels of academic

development.

To support meaningful classroom implementation, the following pedagogical strategies may be considered:

- Introducing AI-assisted brainstorming activities during the pre-writing stage to support idea generation and concept development.
- Designing assignments that encourage students to compare AI-generated drafts with their own independently written texts in order to examine differences in voice, structure, and originality.
- Requiring reflective journals or process logs that document how AI tools were used throughout different stages of writing.
- Incorporating classroom discussions on algorithmic bias, ethical AI use, authorship, and the broader social implications of AI-assisted writing.

### **For Assessment**

Assessment criteria employed in AI-integrated classrooms need not be limited to content evaluation but should also stress the learning process. This process-oriented approach enables educators to comprehend how learners engage with writing, revision, and AI-enabled learning throughout various levels of composition.

To strengthen assessment practices in such learning environments, the following strategies may be adopted.

- Developing process portfolios that document multiple drafts, revisions, and stages of textual development.
- Conducting oral defenses or viva-based discussions that allow students to explain their writing choices, arguments, and the ways in which AI tools were used.
- Incorporating in-class timed writing activities to assess independent writing ability within authentic academic contexts.
- Requiring mandatory AI usage disclosure statements that clearly document when, how, and for what purposes AI tools were employed during the writing process.

### **For Instructor Development**

The collaboration of AI-enabled applications

with writing instructions depends not only on learners readiness but also on the professional training of instructors. Therefore, educational institutions need to invest in continuous professional development, which enables educators to comprehend both the strengths and weaknesses of AI tools, develop resourceful and meaningful AI-integrated assignments, and have concerns about AI-assisted learning environments and academic integrity.

To support this transition, instructor training programs should focus on the following:

- Developing prompt engineering skills for academic and instructional contexts.
- Recognizing and critically evaluating instances of algorithmic bias in AI-generated outputs.
- Understanding ethical considerations related to classroom integration, transparency, and responsible AI use.
- Designing human-centered learning activities that use AI to support creativity, critical thinking, and meaningful engagement.

### **Future Research Directions**

Given the steady growth of AI, writing instruction requires scholarly investigation to comprehend its long-term educational implications. An empirical investigation is needed to validate the proposed Critical AI Literacy Framework across various educational setups. As the present paper is conceptual in nature, the future study should focus on empirically

First, classroom-based intervention studies are required to determine whether AI-assisted writing tools improve learners writing skills, critical thinking, and autonomy. Experimental and quasi-experimental research designs may be employed to achieve this.

Second, longitudinal research is needed to determine the long-term impact of such tools on learners writing development, academic integrity, and independent writing abilities.

Third, comparative research across various educational levels and cultural contexts is needed. This study examined whether AI-enabled writing instruction can be generalized across various learning environments.

Fourth, studies related to educators' perspectives, AI readiness, and institutional policies regarding the

ethical integration of AI into writing classrooms are required.

Finally, intensive research is needed to examine emerging challenges such as over-reliance on technology, data privacy, and environmental sustainability of generative AI technologies.

Overall, these research directions will offer empirical findings to restructure the proposed conceptual framework and assist in the development of pedagogically strong, ethically responsible, and learner-centric AI-integrated writing instruction.

### **Conclusion**

AI and writing pedagogy integration displays a basic change in the way writing is taught, learned, and assessed. This study argues that Artificial Intelligence should be considered a collaborative educational tool rather than a threat to academic integrity or a replacement for humans. It has the potential to strengthen writing instruction if implemented within strong pedagogical and ethical frameworks.

The present study makes three important contributions to emerging AI-assisted writing instruction. First, it collates contemporary literature (2020-2026) to offer a comprehensive theoretical understanding of the opportunities and issues related to AI integration in writing instruction. Second, the study restructures writing as collaborative, interactive, and computational by integrating Process-Oriented Writing Pedagogy, Vygotsky's Zone of Proximal Development, and Human-AI Collaborative Writing models. Third, it offers a Critical AI Literacy Framework that integrates strategic prompting, critical evaluation, ethical integration, and creative transformation as required competencies for insightful AI-enabled writing instruction.

The findings demonstrate the potential of AI to enhance writing instruction through personalized scaffolding, differentiated instruction, continuous feedback, and enhanced learner engagement. This integration demands that educators and institutions address issues such as data privacy, algorithmic bias, academic integrity, and originality. The success of AI integration with writing instructions relies on thoughtful curriculum design, process-oriented assessment, and intensive training of educators.

As the present study is conceptual in nature, there is a growing need to examine the effectiveness of AI integration with writing instruction through classroom-based interventions, longitudinal studies, and cross-cultural comparative research involving educators and learners from various educational setups. Such empirical research will assist in restructuring the framework and establishing evidence-based practices for AI-integrated writing instruction.

In conclusion, the future of writing pedagogy depends on a meaningful partnership between Artificial Intelligence and writing instruction. It is necessary to foster Critical AI Literacy in addition to conventional writing competencies. Educators are required to prepare learners to engage responsibly, creatively, and critically with AI technologies. At the same time, the human communication, originality and intellectual enquiry can not be ignored. Such a balanced approach has the aptitude to create a sustainable and learner-centric future for writing education in the era of Artificial Intelligence.

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