A Systematic Review Exploring the Use of Artificial Intelligence in Developing Writing Skills

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Abstract

Artificial Intelligence (AI) as a phenomenon has grown to be a disruptive innovation across many fields and has engaged education in writing. Since the appearance of generative AI and due to the recent availability of ChatGPT in November 2022, AI has become seen as a helpful tool that can help educators and students improve their writing. This systematic review will identify over the past decade the AI capabilities to generate ideas, critique essays, tell stories, and give feedback to the writing and writing scholars. In order to help educators, researchers, and application developers better understand the possibilities of AI in writing, the present study aims to fill the existing gaps in the literature. The results suggest that AI is on the correct path in its application in the educational process, at the same time, it signals new directions for the application of AI in the development of a writing assistant.

Keywords: Artificial Intelligence, Writing, Technology in Education, Systematic Literature Review

1. Introduction

Artificial Intelligence (AI) is changing many sectors such as the health sector, the financial sector, the media and the educational sector (Marzuki, et al., 2023). This is especially significant in the field of education and more specifically in concerns to the enhancement of writing skills using the integration of AI. In the past, AI technologies have been employed in many fields, for example in predicting and data analysis (Fischer et al., 2020). However, their use in the education sector particularly in writing has only come to light recently. Generative tools like ChatGPT have ignited the discussions on the use of AI as an assistant and co-writer in the different academic works (Barocas & Selbst, 2016).

Thus, an appreciation of writing skills in the present century cannot be overemphasized (Gilmore, 2023). Daily discursive practice is critical as students advance their learning experiences; writing is necessary not only to succeed academically, but also professionally later in life. Some of the prior traditional writing instructions have presented some forms of challenges (Santangelo & Graham, 2016) such as; though this varies with the level of engagement by the students, lack of immediate feedback and individual attention. This is where AI brings new approaches to these problems by being able to immediately respond, creating content, and helping in the writing.

The primary objectives of this systematic review are to:

- Assess the current state of research on AI applications in writing over the past decade.
- Identify the benefits and challenges associated with AI writing tools in educational contexts.
- Highlight gaps in existing literature and suggest directions for future research.

This review aims to expand knowledge on AI's potential to enhance writing skills and offer insights for educational stakeholders on integrating AI in writing instruction.

In this way, this review also helps advance knowledge on how AI can improve the writing skills and provide insights to stakeholders in education on how AI can be utilised within writing.

2. Methodology

2.1. Search Strategy

An extensive literature review was then done to source various articles of interest with specific reference to the application of Artificial Intelligence in writing. An extensive literature review was conducted to source articles focused on the application of AI in writing. While conducting this search, different academic bases such as Google Scholar, ERIC, Scopus, and JSTOR were used because these databases provide a vast array of scholarly articles. To increase the pool of literature, the search involved combining multiple keywords associated with AI and writing. Some specific search terms were 'Artificial Intelligence writing', 'AI in education', 'generative AI', 'AI assisted writing' and 'writing enhancement.' Since the proposed approach involved using various search queries, different sources and perspectives were collected, reflecting the use of AI in the writing process in its entirety.

In light of this, the temporal setting of the search involved articles that were published within the years 2020-2023. This timeline was determined to encapsulate a decade to capture the recent developments of AI and especially in the learning environment. The decision to confine the investigation to this time was informed by advancements in AI capability that has made the technology more pertinent in modern learning environments. In this way, the emphasis on the recent research allows the review to give a timely snapshot of the present-day tendencies of using AI in writing instruction – an area that has developed rather recently and is still in the process of formation.

2.2. Inclusion and Exclusion Criteria

In order to define the prerequisite studies, the explicit inclusion and exclusion criteria were set. Regarding the articles selection, inclusion criteria were defined where the articles have to be peer reviewed, which ensured the level of scholarly approach and reliability. Moreover, great emphasis was placed on the publication that addresses AI solutions in learning environments, which concern all levels: primary, secondary, and tertiary. This focus on educational contexts coheres with the general study's focus of how AI can help augment writing teaching and achievement.

On the other hand, the exclusion criteria were not any less rigorous: Articles written in English but translated from other languages were also excluded, transference barriers could greatly hinder interpretation of the data. Moreover, the works which explored AI in writing outside the educational context, i.e. commercial or industrial use, were also omitted to conduct a narrow-centred analysis of educational effects. The next inclusion criteria removing the articles that did not offer empirical evidence; this eliminated opinion and non-report articles, including editorials. This method of filtering through inclusion and exclusion criteria was very effective in furthering the goal as it was not easy to pick only related and at the same time credible works, thereby making a meaningful contribution towards capturing the essence of AI in writing.

2.3. Data Extraction

After identification of the most appropriate articles, data was systematically retrieved from each of the papers that were selected. This extraction process focused on several critical elements: the author, year of publication, research methods, and results and conclusion on the effects of artificial intelligence in writing. This was due to the grouping of the authors and the years of the publications to track the development of research over the period thus identifying areas of interest to the scholars.

The components of the research design and the methods section were documented meticulously giving special attention to whether it is qualitative, quantitative or a hybrid approach. It is important to be familiar with these methodologies as it helps to comprehend the results and assess the quality of the given research. Last of all, the identification of the key emergent findings revealed the most significant results regarding the impact of AI in writing and education. The systematic way in which the information was gathered allowed for a synthesis of the results in a manner that enabled clear distinctions to be made on the different studies and provided an overall view of the existing state of knowledge on the related topic.

2.4. Quality Assessment

The potential sources of bias were further minimised by individually critically appraising all the studies selected for inclusion using the PRISMA checklist. This already framed guideline defines core elements that are competent for performing high quality systematic reviews. The assessment criteria consisted of the nature of the research question posed, the methodology to be adopted in the research the methods to be used to gather and analyse data, and the conclusion that would be drawn from the research study. This was achieved by giving preference to the studies that passed the PRISMA criteria hence ensuring that only accurate work that has been conducted in a proper manner was used.

To sum, the literature search executed on the adoption of AI in writing incorporated the following principle: Extensive, American and reasonably current, and of high calibre. Through providing the inclusion-exclusion criteria to define the research and intervene in the literature, systematically retrieving data, and critically evaluating the studies' quality, the review pursues to advance considerably the existing knowledge on AI's revolutionary capabilities to enhance the writing education. Besides the methodology increases the reliability of the findings it also lays foundation for future research in this rapidly developing area of knowledge.

3. Results

3.1. Overview of Included Studies

In total, 24 of the studies were identified and included in to this systematic review meaning that the current research encompasses wide range of studies that focuses on the use of Artificial Intelligence (AI) in writing. These studies highlight AI tools as valuable resources for writing development. The work under consideration shows that AI tools are seen as important resources in the sphere of writing development, and many works stressed the benefits of AI tools for improving learning outcomes of students.

The map of studies' origin also reflected worldwide concern with the topic and identified research practices in the United States, Europe, Asia, and Australia. From this perspective, the importance and flexibility of the AI technologies are shown in different educational systems and cultural environments. For example, a study conducted in the United States focused on higher learning education analysing the use of AI in college writing system while a study done in Europe focused on primary and secondary learning system. The various settings in which these studies were carried out afford a strong background for figuring out how AI can be implemented to enhance writing schooling and worldwide writing abilities.

3.2. Applications of AI in Writing

Several uses of AI have been identified in the context of writing suggesting the value and potential enormous value of integrating AI WRITE in a way that can enhance writing performance of students. The primary applications identified in the literature include:

3.2.1. Idea Generation

ChatGPT and like generative models serve brainstorming by providing prompts and ideas for topics and creating formulation suggestions. Those tools are helpful for learners who have difficulty with writing because they help to initiate the writing process and foster creativity. For example, Ahmed, Siddique, and Tahir (2024) showed that students using materials created with the help of AI generated more qualitative essays than students who used only classical brainstorming techniques. This particular work proves the ability of AI to promote the generation of ideas and the development of the idea generation stage of writing.

3.2.2. Essay Evaluation

Automated scoring methods have become useful in that they offer snap feedback on the quality of the particular essays – helpful when teaching large classes. These systems assist learners with interaction on specific aspects of writing such as grammar, organization and flow as well as general essay organization. Gültekin (2023) showed that AI could evaluate a variety of facets of writing and students who used these programs saw their writing become steadily better. This use of AI not only helps in building up writing skills but also enhances the degree of participation in lectures as once the results are out, it is actionable feedback.

3.2.3. Storytelling Assistance

When it comes to creative writing, the prevailing results of using AI-based scenarios have been quite promising. For instance, Felix (2020) showed that AI can identifies narrative arcs, character arcs, and plot points that enhance creative writing learning for students. So far, this application of the AI is not only helpful for supplementing more conventional approaches to storytelling, but also for allowing students the opportunity to explore and discover new ideas and attitudes about writing that could help enliven the process.

3.2.4. Feedback Provision

AI systems can detect one's writing for grammar, style, coherence and this makes it possible for the system to provide feedback that meets the learner's requirement. The first advantage which may be seen is an option for the AI writing as it offers feedbacks in real time, which means that students can rewrite or improve their work based on the given suggestions (Oseni et al., 2021). This responsiveness is particularly helpful to students in that it elicits a growth mind-set while correcting the mistaken element of the writing process that is revision.

3.3. Benefits of AI in Writing

The literature highlights several benefits associated with integrating AI tools into writing education, which can significantly enhance the learning experience for students:

3.3.1. Personalization

Perhaps one of the most significant benefits that AI offers in writing are custom learning needs and orientation abilities. AI can help students get the support they need, which in return can be personalized to fit their needs. According to the study done by Anand and Acharya (2024), use of AI technology that provides feedback according to the individual student needs increased student satisfaction and students' participation in the writing assignments. What makes the approach truly valuable is the increased relevance of what is being taught, as well as the culture of positivity and engagement that comes from writing instruction.

3.3.2. Efficiency

By applying AI tools for giving feedback and also in creating content makes work easier for the instructors as well as the learners. It has also made it easier for the teachers to concentrate on other high level aspects that are relevant to the writing process for instance critical thinking skills and analysis progression. According to research on response, over 90% of students who are given feedback on their writing are likely to come back to the composing process and write with mastery (Liao et al.,

2024). Possibilities of writing more effectively and correcting one's writing weaknesses in a short time with regard to AI can make writing practices more effective.

3.3.3. Engagement

Computer programs used as intelligent tools have been observed to have a positive effect on participation among students during the writing task to make writing fun. Kim et al. (2024) discovered that students who use AI for writing wrote more effectively having indicated high level of interest in the tasks compared to their counterparts in traditional groups. Consequently, writers might fine tune the amount of writing practice and they become more receptive to writing in varied writing styles and forms thereby enhancing their writing ability.

3.4. Challenges and Limitations

Despite the promising applications and benefits of AI in writing, several challenges and limitations have been identified in the literature, which merit consideration:

3.4.1. Reliability

However, one of the biggest objections to AI use in writing is the credibility of the content produced with the AI's help. Some of the concerns or literatures like Fleckenstein et al. (2023), highlighted matters concerning bias in AI systems that may lead to poor outcomes on feedback as well as writer's general input. For example, if the training dataset is used in developing the bias of an AI system, then what it advises its users, the outcome may not be in the best interest of the students. Hence, guaranteeing the dependability of the AI instruments is a prerequisite to preserving the credibility of writing instruction.

3.4.2. Ethical Considerations

The application of AI in writing is an issue that brings key questions of ethics regarding authorship, plagiarism, and academic integrity. AI write the content and offer help hence making it difficult for one to differentiate the student work and the work of the tool. This could erode the inerasable instructional objective of writing tasks and jeopardise different sorts of cheating (Putr, 2023). Therefore, there is ethical dilemmas that educators are to solve by providing definitions and rules for the use of AI in writing assignments.

3.4.3. Technological Barriers

A final and perhaps the biggest problem is a technical constraint to accessing AI tools. The usage of technology and other forms of AI resources may not be easily achievable for all educations settings due to lack of access to such. Dai et al (2024) insisted that such socio-economic factors could also threaten students' access to AI resources thus the gaps in writing aid. Such disparities could worsen existing disparities in learning achievement and echoes call for policies that will improve on access to technology in learning institutions.

4. Discussion

4.1. Implications for Educators and Students

Implications for direction and instruction with the incorporation of AI tools in writing instruction has various implications on the teachers and learners in the teaching learning process (Kim & Kim, 2022). From the perspective of educators, the use of AI in the classroom must be reimagined in terms of bringing about a shift within the classroom practices of the educators themselves. To be more effective, a number of authors have advocated for the integration of AI tools in learning instead of displacing conventional teaching models (Schiff, 2021). It helps to maintain that developing voice, style and critical thinking as core to the learning experience as much as the content. Teachers cannot sit back and fold their arms watchfully as AI progresses in their classroom, by making computers do all of the work, they have to be extremely careful and ensure that the general goal of teaching human being is not hugely derailed (Livingston & Risse, 2019).

In order to help educators, integrate the use of AI in their practices, the educators would require the AI training and professional development (Chounta et al., 2022). They should instead centre on how the teachers could effectively disseminate the contents of the AI tools in their courses. This involves being acquainted with technological features of AI applications and educational theories belonging to the use of these applications. In addition, teachers ought to receive engagement to help learners avoid or mitigate the controversial social issues of AI-generated content (Aad & Hardey, 2024). This entails the topics of authorship and of how AI works and might plagiarize, as well as critical sections of machine-written texts, so that students are not accepting the output of an AI system as actual work.

Teachers contribute a lot when it comes to ensuring that the students are in a position to regard AI as a partnership on the part of the writing process. This is where educators need to help students develop an attitude, where they explicitly ask questions, and where they are curious about what these tools are and how they can assist them on their writing paths and not take over the writers' jobs. This active tutorial approach fosters a deeper understanding of the writing strategies better than AI tools and sets the student responsible for their creations while at the same time using AI to motivate their creativity (Ng et al., 2022). Finally, imparting knowledge on student as to how to rely on AI yet analyse its outcomes with one's own mind will help them in the world where both teaching and business writing are already infused with AI.

In students' case the existence of AI products as writing tools is beneficial for the development of students' skills and creativity. AI can help stimulate ideas for the generation of content, critique on writing, and even be a functional participant in creating content (Dwivedi et al., 2023). But, for these to be advantageous to the student's social lives, academic learning, and career development, the students have to develop competencies necessary for the appraisal of the content created by AI systems.

They need to understand when they have a high efficiency writing and when they have low-quality writing and that AI helps in the writing process but does not contain the analytical and creative skills of the writer (Castellanos-Gomez, 2023).

In conclusion, AI-integrated writing instruction provide equal benefits to both students and teachers. For teachers AI tools offer an opportunity to enrich teaching methods while still focusing necessary educational values. For students, AI serves as a valuable support in creative process. Through careful integration, AI can complement traditional teaching, promoting an educational environment where technology enhances, rather than undermines, the human aspects of learning and writing.

4.2. Future Research Directions

Several limitations can be pointed out in the course of this systematic review pointing out areas in this line of research that may be worth exploring in the future. One of the essential questions to be studied pertains to the consequences of integrating AI in learning writing over the long run. The stabilization of AI tools in the learning process can be studied in the future as for their impact on students' writing skills enhancement during further classes and years. Such findings could help explain if the application of AI technology prepares students have better writing, performance and critical thinking skills when the programme is initiated early enough. By studying these longitudinal impacts, the educator must be knowledgeable on the impact of AI as for writing instruction and the kind of strategies best for using it.

Another area that seems most likely to expand through future research belongs to utilizing ethical perspectives of AI to work with academic writing. Since the advancement in the AI technologies is constant the issues of authorship, plagiarism and the consequence of relying on an AI system for creative purposes as essential as they get. Further, they can study the possibilities of how institutions as well as educators can adopt reporting measures to create parameters that will allow using advantages of AI tools and still avoid unethical utilization of these technologies. Further, research might explore the teacher and the students' beliefs on the ethical concerns related to AI in writing, thus giving a detailed understanding on how these issues are viewed in learning institution.

More importantly, there is an emerging necessity to explore the contextually sensitive AI writing environments from multicultural perspectives that accommodate different languages. As schools continue to embrace diversity in this establishments, it is important to determine how the use of AI can enhance teaching of writing to learners who have different languages. Continuing studies could examine how AI solutions can be developed to take into consideration the different linguistic and cultural tendencies which may exist so all learners get a level playing ground in their writing. This line of research may help develop AI writing assistants but also embrace and increase the variability of the languages and culture in modern classrooms.

However, understanding how and what methods better facilitate the use of AI in teaching writing also needs to be investigated. It could also be interesting for researchers to find out, how various teaching models and methods use AI tools to support student learning. For example, research can concentrate on introducing various projects within the curriculum which would allow students to, for instance, work on teamwork writing assignments alongside using AI to create more individual writing ideas. Such study may provide best practices for the design of writing curricula that incorporates AI in a conducive platform towards encouraging innovation.

Future research includes examining the social, emotional, and psychological effects of AI writing tools on students. Thus, it is important to identify how such tools affect students' perceptions of writing, motivation and self- efficacy as the amount of students' interactions with AI technologies grows. Studies could be made to find out the extent to which use of AI tools increases one's confidence on writing skills or rather diminish one's confidence by presenting human work side by side with that of the AI system. In this case, students' articulation of these emotional experiences will help to capture the different ways in which the students are engagement with AI-support in the context of writing.

5. Conclusion

Literature review on the use of Artificial Intelligence in writing shows the changes that AI brings in writing pedagogy and the students. Although the uses of AI in writing are varied and seem to have great potential, its disadvantages, as well as the risks and ethical issues that schools and academics should face when employing an AI writing assistant, so must be addressed. It means that stakeholders can develop the strategies that will help to integrate the effective AI tools with such traditional approaches to writing as writing pedagogy, and thus, provide the learners with the effective learning opportunities. Indeed, with the advancement of the AI technology research and implementation will remain key to realizing its full potential with an estimation of the detrimental implications.

In conclusion, it can be found that benefits as well as concerns of encouraging applying AI tools in writing classes are significant, for educators and students. With each passing day, AI finds its way into pedagogy, and thus, teachers should consider the place and function of the technology in the learning environment and whether it has a positive or negative impact on learning. In the case of students AI writing tools function as benefited assistants in enhancing writing and creative skills, but at the same time students must develop critical thinking skills to utilizing AI writing. Lastly, future studies should research into the following issues, which were discussed in this review but lacked sufficient attention; Effects of AI on student's writing skills in the long-run, Ethical concerns regarding the use of AI, Cultural sensitive writing assistants, AI and writing instruction, and Emotions evoked by AI. In this way, the educational community will be able to capitalise on all the potential that lies in

the use of AI to complement writing teachers and create the best environment for student learning that is inclusive, engaging and effective.

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