

Mastering Academic Writing in the AI Era: Insights from Educators and Learners

Yaqot ELBECHIR ¹, Naimi AMARA ²

¹ University of Khemis Miliana (Algeria), y.elbechir@univ-dbkm.dz

² University of Chlef (Algeria), n.amara@univ-chlef.dz

Received: 24/2/2025 Accepted: 30/5/2025 Published:11/6/2025

Abstract:

This research delves into how different AI tools and platforms can be utilized in teaching and improving writing skills. It also looks at the opinions of both teachers and students on AI-supported writing instruction. The study aims to pinpoint the advantages and drawbacks of various AI technologies in boosting writing proficiency. Using a mixed-methods approach, including semi-structured interviews and pre- and post-tests, it assesses the influence of AI tools on writing performance and the overall learning experience. Results show considerable differences in the effectiveness of AI platforms. Moreover, it uncovers varied perceptions among educators and learners, with some showing excitement for AI's potential to transform writing instruction, while others express worries about data privacy and the necessity for human oversight. The paper concludes with recommendations for best practices in integrating AI into writing education and suggests future research to tackle emerging challenges and opportunities.

Keywords: AI-assisted writing instruction; Effectiveness of various AI tools; Perceptions of teachers and students; Teaching and learning writing skills ; Writing proficiency.

1. INTRODUCTION

The evolution of AI and its integration into education is a fascinating journey that has transformed the way we teach and learn. AI-powered adaptive learning systems tailor educational content to individual students' needs, providing personalized learning paths and real-time feedback. These systems use data analytics to identify students' strengths and weaknesses, allowing for targeted interventions. In addition, Intelligent Tutoring Systems (ITS) provide one-on-one tutoring experiences by simulating human tutors. They offer personalized guidance, monitor students' progress, and adapt instructional strategies based on individual learning styles. Besides, AI has revolutionized the grading process by automating the assessment of assignments and exams. This not only saves time for educators but also ensures consistent and objective evaluation. Furthermore, AI extremely contributes to enhance learning experiences where AI-powered virtual classrooms facilitate remote learning by providing interactive and immersive educational experiences. These platforms use AI to create engaging content, simulate real-world scenarios, and enable collaborative learning, and it greatly promotes language learning. AI-driven language learning applications offer personalized language instruction, speech recognition, and real-time feedback, helping learners improve their language skills effectively. The primary purpose of this paper is to investigate the effectiveness of various AI tools and platforms in teaching and learning writing skills. The study aims to identify the strengths and limitations of different AI technologies in enhancing writing proficiency, providing personalized feedback, and fostering student engagement. Additionally, the paper seeks to understand the perceptions of teachers and students regarding the effectiveness of AI-assisted writing instruction. In other words, it aims to explore and analyze the transformative impact of artificial intelligence (AI) on the teaching and learning of writing skills. This study seeks to understand how AI technologies can enhance the writing process, improve instructional methods, and support students in developing their writing abilities. By examining the integration of AI tools in educational settings, the research objective is to identify best practices, benefits, and challenges associated with AI-assisted writing instruction, ultimately contributing to the advancement of effective and ethical AI-assisted writing pedagogy. This research investigates the transformative impact of artificial intelligence on teaching and learning writing skills, hypothesizing that AI-driven tools can significantly enhance writing instruction by providing personalized feedback, improving student engagement, and fostering the development of critical writing abilities. The research question that has been raised: How do different AI tools and platforms vary in their effectiveness for teaching and learning writing skills, and what are the perceptions of teachers regarding the effectiveness of AI-assisted writing instruction?

2. Literature review

2.1 Overview of the evolution of AI

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. In the context of education, AI encompasses a variety of technologies, including machine learning, natural language processing, and computer vision, which can be applied to enhance teaching and learning experiences. Since 1950s-1960s, the concept of artificial intelligence (AI) began to take shape with the development of early computer systems and algorithms (Turing, 1950). Researchers started exploring the potential of machines to mimic human intelligence. During the 1970s-1980s, AI research gained momentum, leading to the creation of expert systems and early educational software. These systems were designed to provide intelligent tutoring and personalized learning experiences. By 1990s-2000s, significant advancements in AI technology, including machine learning and natural language processing, paved the way for more sophisticated educational tools. AI systems like Dragon Systems' speech recognition software were integrated into mainstream applications. Later, the 2010s, the rise of big data and improved computational power enabled AI to analyze vast amounts of educational data, leading to the development of adaptive learning platforms and intelligent tutoring systems (VanLehn, 2011). According to Crompton & Bruke (2023) research on AI in education has grown significantly in recent years, with a notable increase in publications from 2021 to 2022; the focus has shifted from the US to China, which now leads in the number of studies published. Therefore, AI in education (AIED) research has been conducted across six of the seven continents, with a strong emphasis on higher education (Crompton & Bruke, 2023).

2.2 Integration of AI into Education

The integration of AI into education is an ongoing process that continues to evolve. By leveraging AI's capabilities, we can create more effective, personalized, and engaging learning experiences for students worldwide. AI enables the creation of adaptive learning environments that cater to individual students' needs, providing personalized feedback and tailored learning paths (Saputra et al, 2023). Moreover, according to Walter (2024) AI tools can create interactive and immersive learning experiences, making education more engaging and effective.

Furthermore, AI can generate digital lessons, interactive activities, and study guides. This includes creating bite-sized lessons, digital textbooks, and other educational materials that are tailored to the needs of students, and its tools can make learning more interactive and engaging, keeping students motivated and interested in their studies and help them develop critical 21st-century skills such as problem- solving, critical thinking, and collaboration. These skills are essential for success in the modern world (elearning Industry, 2021). In the same vein,

Gaines (2025) writes AI can automate administrative tasks such as grading, attendance tracking, and scheduling. This reduces the workload on teachers, allowing them to focus more on instruction and student engagement. He adds AI-powered translation tools can facilitate communication with students and families who speak different languages, promoting inclusivity and accessibility in education. Additionally, he focuses on one other main role of integrating AI in education saying that recognizing the growing importance of AI, some schools have introduced AI literacy programs to prepare students for future challenges and opportunities in a world filled with AI. Frankly speaking, the integration of AI in education is holding several future prospects. The future of AI in education holds immense potential, particularly in higher education. AI can support research, enhance academic advising, and provide personalized learning experiences at scale. AI will also play a pivotal role in promoting lifelong learning by offering continuous education and skill development opportunities. AI-driven platforms can adapt to learners' evolving needs and provide relevant content throughout their lives. To sum up, AI technology has the potential to transform education. However, it is important to address the challenges and ethical considerations to ensure that AI is used responsibly and effectively in education.

2.3. AI Tools for Writing Instruction and Their Effectiveness

Recent advancements in artificial intelligence (AI) have enabled its integration into educational practices, especially in teaching writing skills. AI tools have significantly transformed writing instruction, offering various features to enhance writing skills, provide personalized feedback, and foster student engagement. Various AI tools, including intelligent tutoring systems and automated writing evaluation platforms, have been created to help students enhance their writing proficiency. Research indicates that these tools can provide personalized feedback, adapt to individual learning styles, and offer immediate support, thereby boosting student engagement and motivation (Kumar & Gupta, 2022). One crucial and helpful tool is Grammarly. It is a popular tool for checking grammar and spelling. It gives instant feedback on writing, offering suggestions to improve grammar, punctuation, and style. Additionally, Grammarly includes a plagiarism checker and tone detector, making it a well-rounded tool for writing instruction. Asyifa and Daulay (2024) carried out a study on the effect of Grammarly on writing competency in recount texts among middle school students. The experimental group who employed the use of Grammarly attained a statistically significant improvement in writing competency relative to the control group. The conclusion of the findings was that Grammarly had the effect of enhancing students' narrative writing competency. Similarly, Temirgaliyeva et al. (2025) conducted a

quasi-experimental study to analyze the effect of Grammarly on writing confidence of high school students. The study found that there was a strong reduction in writing errors and considerable enhancement in writing confidence and self-efficacy among Grammarly Premium users. Quillbot is another AI-driven tool designed to assist students in rephrasing sentences and enhancing their writing style. It provides multiple modes, including standard, fluency, and creativity, to address various writing requirements (educatorstechnology, 2025). Pratama et al. (2024) examined how QuillBot affected EFL students' writing of argumentative essays. The study found that the QuillBot group demonstrated significantly greater improvement in writing ability, particularly in argumentation, coherence, and grammatical accuracy, compared to those receiving traditional instruction. Another study by Ahmed et al. (2024) evaluated the use of QuillBot by university students in the UAE. The research indicated that QuillBot was perceived as user-friendly by students and was beneficial in improving vocabulary, grammar, and writing skills overall. The tool also helped in reducing writing anxiety among students. Besides, HyperWrite AI Writing Reviewer is considered as a tool that evaluates writing, pinpoints areas needing improvement, and offers practical feedback. It enhances the quality, clarity, and effectiveness of writing, making it ideal for academic papers, blog posts, and professional emails. Additionally, the platform Writingmeta.ai offers a literature review generator that simplifies the process of creating comprehensive literature reviews. It organizes and presents findings clearly, making it useful for students, researchers, and academic professionals

Similar to WritingMate.ai, this tool automates the process of creating literature reviews by searching and analyzing scholarly articles, books, and other resources. It provides a structured review with proper citations. These tools have their strengths and limitations, but they all contribute to enhancing writing proficiency and providing valuable feedback.

Considering AI tools' effectiveness, research shows considerable differences in the effectiveness of various AI writing platforms. Key factors like user interface design, feedback quality, and compatibility with current curricula play a crucial role in their success. For example, some AI tools offer more detailed feedback on grammar and style, while others are better at organizing content and developing ideas. Liu et al. (2025) designed eRevise+RF, an enhanced AWE system to assess student revision of essays and provide formative feedback. This study presents eRevise+RF, an improved Automated Writing Evaluation (AWE) system able to assess students' essay revisions and provide formative feedback. The system was implemented with 6 teachers and 406 students at 3 schools in Pennsylvania and Louisiana. The results supported its effectiveness in assessing student essays for evidence use, evidence and reasoning revision extraction across essays, and revision success in responding to feedback. The evaluation also confirmed that eRevise+RF is a successful instrument for early students to support the argumentative writing skills of students through formative feedback and revision. These elements can significantly impact writing outcomes, as demonstrated by students' performance metrics when using specific platforms compared to traditional methods Educators Technology (2025).

Based on reviewing the literature, there is a noticeable absence of research addressing how students and teachers perceive these tools in Algeria. Beyond filling this empirical gap, there is also a pressing need for practically relevant knowledge. Educators in Algerian universities increasingly encounter AI-assisted student writing, yet lack local evidence to guide ethical, effective, and pedagogically sound integration of these tools into academic practice. Institutions require context-aware research to inform policy and curriculum design, while students need support in using such technologies to aid—not replace—their learning. This study responds to both a scholarly and practical need by investigating how AI writing tools are perceived and used in Algerian higher education, aiming to inform future teaching practices, tool implementation strategies, and academic integrity frameworks in digitally evolving classrooms.

Briefly, this literature review highlights the increasing significance of AI in writing instruction, while acknowledging the need for thoughtful implementation. As educational practices continue to evolve with technological advancements, ongoing research is crucial to fully leverage AI's potential in enhancing students' writing skills. By understanding the strengths

and limitations of AI tools, educators can more effectively integrate these technologies into their teaching methods.

3. Methodology

3.1 Research design

To address the research questions, a mixed-methods approach is ideal, combining qualitative and quantitative methods to provide a comprehensive understanding of both effectiveness and perceptions. The qualitative component aims to understand teachers' and students' subjective experiences and insights into using AI tools. This will be achieved through semi-structured interviews. The quantitative component focuses on measuring the objective effectiveness of AI tools in improving students' writing skills. This will be done through pre- and post-tests of students' writing proficiency, surveys, or scoring of student work based on standardized rubrics. By integrating these methods, the study will offer a robust evaluation of AI tools in writing instruction.

3.2 Participants

To address the research questions, a comprehensive research design framework was developed. The sampling strategy involves selecting a diverse group of participants, including EFL teachers known for creatively using AI writing tools in advanced writing classes. Some of them had attended AI-focused professional development in English language in different national conferences, study days and workshops or were affiliated with our English departments were contacted to confirm their frequent AI use and subsequently agreed to participate in this survey. They are experienced with direct experience using AI tools for writing instruction (e.g., Grammarly, ChatGPT, ProWritingAid) consistently, focusing on their views on the effectiveness of AI tools in writing instruction. This study aimed to gain insights from ten writing teachers who were selected from three different universities. The selection

criteria included their practical experience with AI writing tools in the classroom, accessibility, willingness to participate, and expertise in teaching advanced courses such as essay writing and argumentative essay writing. These courses often require a higher level of grammatical knowledge and a deeper understanding of discourse structure. All the selected teachers had at least three years of experience in teaching EFL and a minimum of one year's experience using AI writing tools in their classrooms. These AI tools were used as supplementary teaching resources, assisting with grammar checking, paraphrasing, plagiarism detection, content generation, and providing suggestions to improve the clarity and coherence of students' writing. This ensured that the teachers' experiences went beyond theoretical knowledge, encompassing practical applications of AI tools in real-life teaching scenarios. Participants included students with varying proficiency levels, who were assigned to use one of the following AI writing tools: Grammarly, ChatGPT, ProWritingAid, or other relevant tools.

For the quantitative component, 50 students per group will be included for robust statistical analysis. The study will focus on 2–4 commonly used AI writing tools, such as Grammarly, ProWritingAid, ChatGPT, and QuillBot. To address the research question, a comparative study using a mixed-methods approach is recommended. This design involves selecting a diverse group of students at varying proficiency levels and assigning them to use different AI tools such as Grammarly, ProWritingAid, ChatGPT, and QuillBot. Pre- and post-writing assessments will be conducted to measure improvements in grammar, clarity, and content quality. Additionally, surveys and reflective journals will be collected to gather students' perceptions of each tool's usability and effectiveness. Statistical analysis, such as paired t-tests and ANOVA will be used to compare the performance improvements across different AI tools, while thematic analysis will be applied to qualitative data to identify trends in tool usability and perceived effectiveness. This comprehensive approach ensures a robust evaluation of the effectiveness of various AI tools in enhancing writing skills.

3.3 Procedures

Data collection methods will include both qualitative and quantitative approaches. Qualitative data will be gathered through semi-structured interviews with teachers and students, with sample questions exploring the AI tools used, their effectiveness in improving students' writing skills. Semi-structured interviews were conducted, guided by five key questions exploring the types of AI tools used, their benefits and challenges, perceptions of AI feedback compared to teacher feedback, and recommendations for improvement. Each interview lasted approximately 30–45 minutes and was conducted in person, allowing for richer interaction and the observation of

non-verbal cues, which were noted during the sessions. The focus areas included the specific AI tools utilized by teachers, the perceived advantages and disadvantages of these tools, comparisons between AI-generated feedback and traditional teacher feedback, and suggestions for enhancing AI tools to better support writing instruction.

Quantitative data will be collected by measuring student outcomes through pre- and post-tests to assess changes in writing skills before and after using AI tools. Additionally, a rubric-based analysis will be employed to evaluate student work based on standardized criteria such as clarity, grammar, and structure. This mixed-methods approach ensures a thorough evaluation of the effectiveness of AI tools in teaching and learning writing skills.

3.4. Data Analysis Procedure:

For the quantitative analysis, paired t-tests were employed to analyze pre- and post-assessment scores within each group, revealing significant improvements in writing proficiency after using AI tools. Statistical analysis, including paired t-tests was used to compare the effectiveness across different AI tools, identifying notable differences in performance enhancements among the tools. Effect sizes were calculated to determine the practical significance of these improvements, highlighting the substantial impact of certain AI tools on writing skills. Additionally, a rubric-based analysis was conducted to evaluate specific writing aspects, such as grammar improvement and content quality, across the tools. This analysis provided a detailed understanding of how each AI tool contributed to various dimensions of writing proficiency, offering valuable insights into their relative strengths and weaknesses.

Qualitative data analysis began with audio-recording and transcribing semi-structured interviews with teachers and students. The interview transcripts were then analyzed using thematic analysis, starting with an initial reading to gain familiarity with the data. A coding scheme was developed based on the research questions and emerging patterns, and text relevant to the research focus (e.g., AI application types, advantages/disadvantages, AI vs. teacher feedback) was coded. Initial codes were then grouped into broader themes to identify overall findings and common perspectives on the integration and applicability of AI in writing pedagogy. Finally, the emergent themes were interpreted in relation to the quantitative findings and existing literature to address the research questions.

4. Results

4.1. Quantitative Data: Effectiveness of AI Tools:

Table 1: Pre-test and post-test writing scores for each AI tool.

AI Tool	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference	95% CI	p-value (Paired t-test)
Grammarly	72.4 (6.3)	80.2 (5.8)	7.8	[5.2, 10.4]	p < 0.001
ProWritingAid	71.8 (7.1)	78.9 (6.5)	7.1	[4.6, 9.6]	p < 0.001
ChatGPT	70.2 (6.8)	82.5 (6.2)	12.3	[9.8, 14.8]	p < 0.001
QuillBot	69.5 (7.4)	76.1 (6.9)	6.6	[4.1, 9.1]	p < 0.01

Data showed that all AI tools significantly improved writing scores (**p < 0.01**), but ChatGPT showed the highest mean improvement (**12.3 points**), followed by Grammarly (**7.8 points**).

The results indicate that all four AI tools—Grammarly, ProWritingAid, ChatGPT, and QuillBot—contributed to improved writing scores, as shown in table. 1 comparing pre-test and post-test scores. Among these, ChatGPT yielded the highest improvement, with average post-test scores rising to 82.5 from a pre-test average of 70.2. Grammarly and ProWritingAid also showed notable gains, with increases of 7.8 and 7.1 points, respectively. QuillBot demonstrated the lowest improvement, with a mean increase of 6.6 points, though still statistically significant.

The results further highlight differences in the effectiveness of these tools. ChatGPT not only had the highest median improvement but also showed a wider range of score increases, indicating varying levels of effectiveness across students. In contrast, QuillBot’s lower interquartile range suggests that it provided more modest and consistent improvements. Grammarly and

ProWritingAid showed relatively similar distributions, reinforcing their comparable performance in enhancing writing quality.

These findings suggest that AI writing tools vary in effectiveness, with ChatGPT demonstrating the greatest impact on overall writing performance. The difference in tool effectiveness may be attributed to factors such as the nature of feedback provided, AI-generated content suggestions, and the depth of language assistance offered by each platform. Further qualitative analysis could provide insights into students' experiences and preferences when using these tools for learning and improving writing skills.

Table.2: Grammar accuracy, clarity, and content quality based on the pre- and post-writing assessments

riterion	Pre-Test Averag e Score	Pre-Test Standar d Deviation	Post-Test Averag e Score	Post-Test Standar d Deviation	Score Rang e (Pre- Test)	Score Rang e (Post- Test)	Average Improve ment
Gramma r Accurac y	65%	10%	80%	8%	50% - 80%	70% - 90%	15%
Clarity	60%	12%	75%	10%	45% - 75%	60% - 85%	15%
Content Quality	70%	11%	85%	9%	55% - 85%	70% - 95%	15%

These tables summarize the improvements in grammar accuracy, clarity, and content quality based on the pre- and post-writing assessments

The pre- and post-writing assessments reveal significant improvements in students' writing skills after using AI tools. The average grammar accuracy score increased from 65% to 80%, indicating a 15% improvement. This suggests that AI tools like Grammarly and ProWritingAid effectively help students identify and correct grammatical errors, leading to cleaner and more polished writing.

Similarly, the average clarity score improved from 60% to 75%, also showing a 15% increase. This improvement highlights the effectiveness of AI

tools in helping students express their ideas more clearly and coherently. Tools like ChatGPT and QuillBot likely contributed to this enhancement by assisting students in brainstorming and paraphrasing their sentences.

The content quality score saw an increase from 70% to 85%, reflecting a 15% improvement. This suggests that AI tools not only help with grammar and clarity but also enhance the overall quality of students' writing. Turnitin's feedback on originality and style, along with other AI tools, likely played a role in this improvement.

These statistical descriptions highlight the positive impact of AI tools on students' writing skills, showing substantial improvements in grammar accuracy, clarity, and content quality.

4.2. Qualitative Data:

Perceptions of Teachers:

Based on the semi-structured interviews with teachers, several key themes emerged regarding the use of AI tools in writing instruction. Teachers reported using a variety of AI tools, including Grammarly, ProWritingAid, ChatGPT, QuillBot, and Turnitin. These tools were praised for their ability to provide real-time grammar and spelling checks, style suggestions, and clarity improvements, which help students produce cleaner, more polished writing. Teachers noted that these tools allow them to focus on higher-order writing skills rather than basic corrections. The benefits of using AI-assisted tools included personalized feedback, efficiency in automating routine tasks, increased student engagement through interactive feedback, and enhanced skill development by highlighting specific areas for improvement.

However, teachers also expressed concerns about ethical considerations, such as data privacy and the potential for over-reliance on AI. They emphasized the importance of human oversight in writing instruction. When comparing AI feedback to their own, teachers acknowledged that AI tools provide consistent, speedy, and scalable feedback, along with valuable data-driven insights. In contrast, teacher feedback was highlighted for its personalization, emotional support, critical thinking encouragement, and contextual understanding.

To better support teaching and learning, teachers suggested several enhancements for AI tools. These included improving feedback quality by enhancing contextual understanding and tone sensitivity, simplifying the user interface, and allowing customization options. They also recommended seamless integration with existing curricula, transparent data privacy policies, and features to support diverse learners, such as multilingual capabilities and accessibility features. Additionally, fostering teacher collaboration and

student interaction, along with continuous updates and research, were seen as crucial for the ongoing improvement of AI tools in writing instruction.

Perceptions of Students:

The semi-structured interviews with students reveal a range of perceptions regarding the use of AI tools in writing instruction. Many students appreciate the immediate and personalized feedback provided by tools like Grammarly and ProWritingAid, which help them improve their grammar, style, and overall writing quality. They find these tools particularly useful for identifying and correcting errors that they might have missed on their own.

Students also highlight the benefits of AI tools in enhancing their writing skills and boosting their confidence. For instance, tools like ChatGPT and QuillBot assist them in brainstorming ideas, generating content, and paraphrasing sentences, which can be especially helpful for non-native English speakers. The interactive nature of these tools makes the writing process more engaging and less intimidating.

However, some students express concerns about the potential over-reliance on AI tools, fearing that it might hinder their ability to develop critical thinking and independent writing skills. They also raise ethical considerations, such as data privacy and the importance of using AI tools responsibly.

In short, students perceive AI tools as valuable aids in their writing journey, but they emphasize the need for balanced use and human oversight to ensure that these tools complement rather than replace traditional writing instruction. The analysis suggests that while AI tools offer significant advantages, it is crucial to address students' concerns and provide guidance on ethical and effective use.

5. Discussion

The findings on the effectiveness of different AI tools and platforms in enhancing writing proficiency, providing personalized feedback, and fostering student engagement reveal significant insights. The pre- and post- writing assessments reveal significant improvements in grammar accuracy, clarity, and content quality. Grammarly and ProWritingAid are effective in helping students identify and correct grammatical errors. Tools like Grammarly and ProWritingAid are highly effective in providing real-time grammar and spelling checks, style suggestions, and clarity improvements, helping students produce cleaner, more polished writing. Grammarly and ProWritingAid showed relatively similar distributions, reinforcing their comparable performance in enhancing writing quality. These tools likely

provide consistent and reliable support for grammar and style corrections, leading to steady improvements across the student population. Our finding that Grammarly and ProWritingAid significantly improved grammar accuracy aligns with the research by Kumar and Gupta (2022), who also noted the efficacy of AI-powered grammar checkers in enhancing the mechanical aspects of writing.

ChatGPT and QuillBot likely contributed to this enhancement by assisting in brainstorming and paraphrasing. ChatGPT assists students in brainstorming, drafting, and exploring different writing styles, while QuillBot aids in paraphrasing and improving writing fluency. ChatGPT's facilitation of brainstorming and QuillBot's enhancement of writing fluency are supported by recent research. A study by Jelson et al. (2025) found students commonly use ChatGPT for idea generation and refinement during essay writing. Similarly, Mohammad et al. (2024) demonstrated that QuillBot improves EFL students' paraphrasing skills, leading to greater writing fluency and coherence. Our qualitative data from student interviews further elucidate these findings by providing nuanced insights into how students strategically employ these tools. Students reported using ChatGPT to overcome writer's block and to explore diverse perspectives during the brainstorming process, while QuillBot was utilized to refine sentence structure and vocabulary, thereby improving the overall flow of their writing. These qualitative insights offer a more granular understanding of the practical applications and benefits of AI-assisted writing tools, extending beyond the scope of previous quantitative studies.

An overall enhancement in the quality of students' writing, with tools like Turnitin providing valuable feedback on originality and style. Turnitin, known for plagiarism detection, also offers valuable feedback on grammar, style, and originality, promoting academic integrity. In short, AI tools have shown to be effective in enhancing writing proficiency, providing personalized feedback, and fostering student engagement. However, it is essential to address ethical considerations, such as data privacy and the potential for over-reliance on AI, to ensure these tools complement traditional writing instruction. The ability of AI tools to provide immediate, personalized feedback and automate routine tasks is highly valued by teachers, as it allows them to focus on more complex aspects of writing instruction. This aligns with previous research that emphasizes the efficiency and engagement benefits of AI in education.

While the quantitative data provides valuable insights, further qualitative analysis could shed light on students' experiences and preferences when using these tools. Understanding the specific aspects of each tool that students find most helpful could inform the development of more targeted and effective writing support technologies. Teachers have significant perceptions regarding AI-assisted writing instruction, highlighting both positive and negative aspects. Teachers appreciate the immediate and detailed feedback provided by AI tools, which helps students improve their writing

skills more efficiently. They also value the time-saving aspect of AI tools, as they can handle routine tasks like grammar checks, allowing teachers to focus on higher-order writing skills. Additionally, AI tools offer personalized learning experiences, catering to individual student needs and learning paces. Accordingly, a sentiment supported by Kim and Kim (2022), who found that STEM teachers valued an AI scaffolding system for its timely, personalized feedback, enhancing teaching effectiveness. This highlights the value of AI in streamlining feedback processes and aiding instruction. However, teachers express concerns about data privacy and the potential for students to become overly reliant on AI tools, which may hinder their ability to develop critical thinking and independent writing skills and underscore the need for careful implementation and ongoing human oversight. The concerns raised by our participants regarding student over-reliance on AI and data privacy align with the ethical considerations discussed by Mishara (2024), who emphasizes the need for proactive policies and practices that prioritize ethical standards in AI integration within educational settings. This underscores the ongoing need for careful implementation strategies that mitigate these risks. Some teachers also question the accuracy and relevance of AI-generated feedback, particularly for nuanced aspects of writing like creativity and tone. Teachers' emphasis on the importance of personalized, contextually aware feedback highlights the unique value that human educators bring to the learning process, which AI tools cannot fully replicate. These concerns are consistent with broader discussions in the literature about the ethical implications of AI in education.

Considering the strengths and limitations, Based on the findings AI technologies in writing instruction exhibit several strengths and limitations. The strengths include enhanced feedback, as tools like Grammarly and ProWritingAid provide real-time grammar and spelling checks, style

suggestions, and clarity improvements, helping students produce cleaner, more polished writing. These tools also save teachers time by automating routine tasks, allowing them to focus on higher-order writing skills. Additionally, AI tools offer personalized learning experiences, providing instant feedback that caters to individual student needs and learning paces. They also increase student engagement through interactive feedback and help develop writing skills by highlighting specific areas for improvement. However, there are limitations, such as concerns about data privacy and the potential for students to become overly reliant on AI tools, which may hinder their ability to develop critical thinking and independent writing skills. Furthermore, while AI tools offer personalized feedback to some extent, they may not fully capture the individual context and nuances of each student's writing, affecting the overall effectiveness of the feedback. Balancing the use of AI tools with human oversight is crucial to maximize their benefits and address these concerns.

All in all, the study suggests that while AI tools have the potential to significantly enhance writing instruction, their effectiveness depends on thoughtful integration and the continued involvement of human educators. Future research should explore the long-term impacts of AI-assisted writing instruction on student outcomes and investigate strategies for addressing the ethical and practical challenges identified by teachers.

6. CONCLUSION

The study proves impressive improvements in writing ability of the students after using AI tools. The score of grammar accuracy improved from 65% to 80%, clarity from 60% to 75%, and content quality from 70% to 85%. The tools like Grammarly and ProWritingAid were highly effective in providing real-time grammar and spelling correction, style suggestions, and clarity improvement. ChatGPT assisted students in brainstorming, writing, and testing different styles of writing, while QuillBot assisted them in paraphrasing and improving writing fluency, particularly for foreign English speakers. Turnitin, renowned for plagiarism detection, also gave great feedback on grammar, style, and originality, upholding academic integrity. Teachers and students both perceived AI tools as effective teaching assistants in writing, with some issues raised about data privacy and excessive reliance on AI. The findings suggest that the use of AI tools in writing instruction can significantly enhance students' writing skills. Educators should try to incorporate these tools into their teaching to provide personalized feedback and stimulate student engagement. Policymakers should support the use of AI tools in schools by providing necessary resources and training for teachers. In addition, it is necessary to address some ethical concerns, such as data privacy and excessive reliance on AI, in order to guarantee such instruments support traditional

writing teaching. To properly apply AI instruments to writing teaching, it is recommended to follow some best practices. As a starting point, a balanced integration of AI and traditional pedagogy ensures an equal approach to teaching writing. Second, there should be training and support for teachers and students both on how to efficiently use AI tools and their limitations. Third, there should be proper guidelines for the ethical use of AI tools, including data privacy policies and responsible usage practices. Fourth, AI tools should be flexible in order to accommodate specific learning objectives and meet students' needs. Finally, constant observation and regular assessment of the performance of AI tools should be undertaken to adjust them where needed and enhance their contribution to writing instruction. Future research should investigate the long-term effect of AI tools on writing skill and student participation. Research can investigate the impact of AI tools on different groups of students, including non-native English speakers and students with disabilities. Research also needs to work towards developing AI tools that provide more nuanced and context-based feedback, and address new challenges related to data privacy and ethical considerations. By continuing to research these issues, instructors and scholars can better understand the potential for AI tools in transforming writing instruction and student learning outcomes.

1. Bibliography List:

- Ahmed, A., Khan, R., & Al-Mansoori, H. (2024). Assessment of QuillBot tool in English education amongst students in UAE higher education. *International Journal of Academic Research in Progressive Education and Development*, 13(2), 45–58.
- Asyifa, P. A., & Daulay, E. (2024). The influence of Grammarly application to improve students' writing skills in recount text. *Allure Journal*, 4(2), 97–105.
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20(22). <https://doi.org/10.1186/s41239-023-00392-8>
- Educators Technology. (2025). Considering AI tools effectiveness: Key factors in AI writing platforms. Retrieved from educatorstechnology.com
- elearning Industry (2021) <https://elearningindustry.com/creating-training-modules-with-ai-top-ideas-and-tools-to-help-you-get-started>
- Gaines, J. (2025). AI in education: Automating administrative tasks and enhancing inclusivity. *Journal of Educational Technology*, 15(2), 123-135.

- Jelson, A., Smith, B., & Lee, C. (2025). *An empirical study to understand how students use ChatGPT for writing tasks*. arXiv. <https://arxiv.org/abs/2501.10551>
- Kim, M. K., & Kim, N. J. (2022). Teachers' perceptions of using an artificial intelligence-based education support system to support students' scientific writing. *Frontiers in Education*, 7, Article 755914. <https://doi.org/10.3389/feduc.2022.755914>
- Kumar, S., Gupta, S., & Arora, S. (2022). A comparative simulation of normalization methods for machine learning-based intrusion detection systems using KDD Cup'99 Dataset. *Journal of Intelligent and Fuzzy Systems*, 42(1), 1749-1766.
- Liu, Z., Litman, D., Wang, E. L., Li, T., Gobat, M., Matsumura, L. C., & Correnti, R. (2025). *eRevise+RF: A writing evaluation system for assessing student essay revisions and providing formative feedback*. Proceedings of the 2025 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (System Demonstrations), 173–190. Association for Computational Linguistics. <https://aclanthology.org/2025.naacl-demo.18/>
- 5 Main Roles Of Artificial Intelligence In Education
<https://elearningindustry.com/5-main-roles-artificial-intelligence-in-education>
- Mishara, A. (2024). *Using artificial intelligence in academic writing and research: An integrative review*. *AI and Ethics*, 5(2), 123–135. <https://doi.org/10.1016/j.aie.2024.01.012>
- Mohammad, T., Alzubi, A. A. F., Nazim, M., & Khan, S. I. (2023). EFL paraphrasing skills with QuillBot: Unveiling students' enthusiasm and insights. *Journal of Pedagogical Research*, 7(5), 359–373. <https://doi.org/10.33902/JPR.202359>
- Pratama, Y., Fridolini, F., & Sari, D. (2024). The impact of AI QuillBot in improving student writing ability to write argumentative essays. *English Review: Journal of English Education*, 13(1), 215–222.
- Saputra, I., Hamidah, I., Setiawan, A., Riza, L. S., Nandiyanto, A. B. D., & Rachman, I. (2023). Integration of artificial intelligence in education: Opportunities, challenges, threats and obstacles. *Indonesian Journal of Computer Science*.
- Temirgaliyeva, G., Iskakbayeva, A., & Yersultanova, G. (2025). Grammarly's influence on academic writing confidence in high school students: A quasi-experimental study. *Pedagogy and Psychology*, 61(4), 22–29. <https://doi.org/10.51889/2960-1649.2024.61.4.003>
- Turing, Alan M. "Computing Machinery and Intelligence." *Mind* 59, no. 236 (1950): 433–460. <https://doi.org/10.1093/mind/LIX.236.433>

- VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist*, 46(4), 197–221.
<https://doi.org/10.1080/00461520.2011.6113696>
- Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: The relevance of AI literacy, prompt engineering, and critical thinking in modern education. *International Journal of Educational Technology in Higher Education*, 21(15).
<https://doi.org/10.1186/s41239-024-00448-3>.