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Artificial Intelligence in the classroom: Enhancing or hindering writing proficiency among Grade 9 students of Fort Bonifacio High School

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ABSTRACT

In this action research, I explored how Artificial Intelligence (AI) tools impact the writing proficiency of my Grade 9 students at Fort Bonifacio High School. As AI platforms such as ChatGPT, Grammarly, Google Gemini, and Perplexity become increasingly integrated into student learning, the study sought to determine their actual impact on writing skills, learning behaviors, and classroom practices. A mixed-methods design was employed, utilizing surveys, open-ended questionnaires, and pre- and post-writing assessments to gather data from 303 students and 20 English teachers. Quantitative data measured students' perceived benefits and challenges of AI use, while qualitative responses from both students and teachers provided deeper insights into writing habits, dependency issues, and instructional concerns. Writing proficiency was evaluated using a standardized rubric. Findings revealed that AI tools positively support writing mechanics—particularly grammar accuracy, organization, and clarity—and help students generate ideas more efficiently. However, both students and teachers identified significant drawbacks, including reduced originality, weakened independent writing skills, and increased reliance on AI-generated phrasing. Teachers also noted challenges in assessing authentic work and expressed the need for clearer guidelines on ethical AI use. Overall, the study concludes that AI can enhance writing proficiency when used as a scaffold but may hinder authentic learning when overused or misused. Responsible integration, explicit instruction in AI literacy, and strong teacher supervision are essential to maximize benefits while minimizing risks. Recommendations include establishing school-wide AI policies, strengthening independent writing activities, and providing professional development on ethical and effective AI integration.

Keywords: Artificial Intelligence, writing proficiency, AI-assisted writing, student perceptions, teacher perceptions, academic integrity

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INTRODUCTION

Advances in Artificial Intelligence (AI) have rapidly transformed educational landscapes, significantly influencing how students learn and how teachers facilitate instruction. In the context of English Language Arts, AI tools such as ChatGPT, Grammarly, Google Gemini, and Perplexity have gained widespread use among students for drafting, editing, and refining their written work. These technologies offer instant feedback, grammar correction, idea generation, vocabulary enhancement, and support for organization—features that can potentially improve writing proficiency.

At Fort Bonifacio High School, many Grade 9 students have begun integrating AI into their daily writing tasks both inside and outside the classroom. While AI provides convenience and scaffolding, concerns arise regarding its possible effects on students' independence, originality, and critical thinking. The increasing ease with which students can generate AIassisted texts also raises questions about academic integrity and the authenticity of submitted work.

Given the simultaneous opportunities and risks brought by AI, it becomes essential for educators and policymakers to understand whether AI in the classroom truly enhances students' writing proficiency or inadvertently hinders their ability to write creatively and independently. This action research aims to address this need by examining the role of AI in the writing performance of Grade 9 students and exploring the perceptions of both learners and teachers on AI-assisted writing.

Statement of the problem

This study aims to examine whether the integration of Artificial Intelligence AI tools such as ChatGPT, Grammarly, Perplexity, and Google Gemini enhances or hinders the writing proficiency of Grade 9 students at Fort Bonifacio High School. As AI becomes increasingly present in academic tasks, it is essential to determine how these tools influence students' writing skills, learning behaviors, and overall classroom performance. The study investigates both student and teacher perspectives and analyzes students' writing outputs before and after the implementation of AI assisted writing instruction.

Specifically, this research seeks to answer the following questions:

1. What is the demographic profile of the Grade 9 student respondents in terms of age, sex, section, AI tools used in writing, and frequency of AI use?
2. What are the students' perceptions of the benefits of using AI tools in writing in terms of efficiency in writing, grammar and spelling improvement, idea generation and organization, writing clarity and formality, and writing motivation?
3. What challenges and risks do students encounter when using AI tools for writing in terms of overreliance on AI, loss of personal voice, difficulty writing independently, reduced confidence in writing without AI, and concerns about plagiarism?
4. What insights emerge from students' open-ended responses regarding how AI helps improve their writing, problems experienced when using AI, feelings when writing without AI, and suggestions for integrating AI in writing classes?
5. What is the demographic profile of teacher respondents in terms of age, sex, years of teaching experience, grade level taught, and use of AI tools in instruction?
6. How do teachers perceive the benefits of AI for students' writing proficiency, the challenges and risks of AI assisted writing, and their roles and responsibilities in guiding AI use?
7. What themes and insights emerge from teachers' open ended responses regarding AI's influence on students' writing performance, the advantages and disadvantages of AI

use in writing classes, strategies for ethical and balanced AI integration, needed teacher training and support, and perspectives on integrating AI into the English curriculum?

8. What is the level of Grade 9 students' writing proficiency before and after the use of AI tools based on a standardized writing rubric?
9. Is there a significant difference between pretest and posttest writing performance after AI assisted writing instruction is implemented?
10. Does AI integration enhance or hinder the writing proficiency of Grade 9 students based on students' performance and stakeholder perceptions?

METHODOLOGY

This study employed a mixed methods action research design that combined quantitative and qualitative approaches to investigate whether Artificial Intelligence AI enhances or hinders the writing proficiency of Grade 9 students at Fort Bonifacio High School. The quantitative component measured writing proficiency before and after the integration of AI tools using a standardized rubric and survey ratings, while the qualitative component explored students' and teachers' perceptions through open ended questions and narrative responses. As an action research inquiry, the study aimed to improve classroom practices by systematically examining the effects of AI assisted instruction and identifying strategies for responsible and effective integration within authentic instructional settings.

The research was conducted at Fort Bonifacio High School, a public secondary school in Taguig City, Philippines. The school serves diverse Grade 9 learners with varying levels of writing proficiency and differing access to digital tools. The increasing use of AI among students, facilitated by the availability of smartphones and online platforms, made the school an appropriate site for examining the instructional implications of AI integration in writing tasks.

Two groups participated in the study. A purposive sample of Grade 9 students from different sections served as the primary respondents. They were selected because they regularly engaged in writing activities and were among the most active users of AI tools in academic tasks. In addition, Grade 9 English teachers handling writing instruction participated in the study to provide insights into the benefits, challenges, and instructional implications of AI in classroom practice. Participation of both students and teachers was voluntary. All respondents were assured of confidentiality, anonymity, and ethical treatment of their responses throughout the conduct of the research.

To obtain comprehensive data, the study utilized researcher developed instruments consisting of student and teacher survey questionnaires and a writing proficiency assessment. The student survey questionnaire was composed of three parts. The first part gathered demographic information including age, sex, section, AI tools used in writing, and frequency of AI use. The second part measured students' perceptions of AI use through a 4-point Likert scale consisting of 10 indicators that examined perceived benefits and challenges. The third part included open ended questions that explored students' reflections on how AI helps or hinders their writing skills, their confidence when writing without AI, and their suggestions for teachers regarding AI integration. The teacher survey questionnaire similarly contained three parts. The first part collected respondent profile data including age, sex, teaching experience, grade level handled, and AI tools integrated in instruction. The second part used a 4-point Likert scale with 15 indicators to assess perceived benefits, challenges, and classroom implications of AI assisted writing. The third part consisted of open-ended questions designed to capture teachers' narratives regarding AI's influence on student writing performance, classroom strategies employed, and training needs.

Writing proficiency was assessed through pretest and posttest writing tasks that were evaluated using a standardized rubric. The rubric measured content and development, organization and coherence, grammar and mechanics, vocabulary and word choice, and overall writing quality. These criteria enabled the researcher to determine any improvement or decline in writing performance following AI integration.

The data gathering procedure followed a systematic sequence. During the preparation phase, approval was secured from the school head, and teachers and students were informed of the purpose of the study. The survey instruments were validated and refined prior to administration. In the pre assessment phase, the pretest writing assessment was administered to establish baseline proficiency levels. Student demographic profiles and teacher profile questionnaires were distributed through Google Forms. During the AI integration phase, guided AI assisted writing activities were implemented using tools such as ChatGPT, Grammarly, Google Gemini, and Perplexity. Students received instruction on responsible AI use, including proper prompting, evaluating AI generated content, and avoiding plagiarism. They were then allowed to use AI tools during selected writing exercises under supervision. In the post assessment phase, the posttest writing assessment was administered, followed by the distribution of student and teacher Likert scale surveys and the collection of open-ended responses from both groups. Subsequently, quantitative scores and qualitative responses were organized for systematic analysis.

Both quantitative and qualitative data were analyzed to generate comprehensive findings. Quantitative analysis included frequency and percentage distribution to describe student and teacher demographic profiles and to summarize types and frequency of AI use. Weighted mean was used to determine levels of agreement on perceived benefits and challenges. Mean score comparison between pretest and post test results was conducted to measure changes in writing proficiency before and after AI integration, and improvement was interpreted based on rubric scores and mean gain. The interpretation scale for Likert data was as follows: 3.26–4.00 = Strongly Agree, 2.51–3.25 = Agree, 1.76–2.50 = Neutral, and 1.00–1.75 = Disagree. These numerical ranges and corresponding descriptive interpretations guided the analysis of perception data.

Qualitative data derived from open ended responses were examined using thematic analysis. Recurring themes were categorized under areas such as perceived benefits, challenges, dependence, confidence issues, and suggested strategies for AI integration. Triangulation was employed by comparing student and teacher responses with performance assessment results to determine consistency and validity across data sources.

Throughout the study, ethical standards were strictly observed. Respondents were informed of the purpose of the research, the voluntary nature of participation, and the use of data solely for academic purposes. No identifying information was disclosed in reporting the results. Both electronic and printed data were stored securely to ensure confidentiality. AI tools were used ethically and under supervision to prevent misuse, thereby safeguarding the integrity of the instructional process and the research outcomes.

RESULTS AND DISCUSSION

This Results and Discussion section presents the findings derived from 303 Grade 9 students and 20 English teachers at Fort Bonifacio High School during the school year 2025–2026. Grounded in a mixed methods action research design that combined quantitative survey data, Likert scale measures, and qualitative open-ended responses, the analysis reflects the purposive sampling approach and the administration of an online survey conducted on November 26, 2025. The quantitative component utilized a four-point Likert scale ranging from 1 to 4 to measure perceptions, alongside frequency and percentage distributions, while

qualitative responses were examined through thematic interpretation. The discussion that follows is directly based on the data gathered and is interpreted in relation to the study objectives, which sought to describe the demographic profile of respondents, determine student perceptions of the benefits and challenges of AI in writing, examine teachers' observations regarding AI assisted instruction, and analyze how AI use influences writing proficiency.

The respondents' demographic profile reflects early high school learners and experienced educators. Student respondents ranged from 13 to 15 years old, representing Grade 9 learners whose developmental stage makes them appropriate participants for research involving digital tools and learning preferences. Teacher respondents ranged from 23 to 62 years old, indicating a wide span of professional experience and generational perspectives. The distribution of ages among teachers shows representation across multiple age groups, with many ages represented by one individual, suggesting varied exposure to technological innovations. In terms of sex distribution, 50.5% of student respondents were female, 42.2% were male, and 7.3% preferred not to say. Among teachers, 85% were female, 15% were male, and 0% preferred not to say. The relatively balanced student distribution between female and male respondents reduces potential gender bias in interpreting perceptions of AI use, while the predominance of female teachers reflects typical gender trends in English instruction.

AI usage patterns reveal that artificial intelligence tools are already embedded in students' academic routines. Among students, ChatGPT was used by 60.7%, Grammarly by 15.2%, Perplexity by 0.7%, Google Gemini by 7.6%, and other tools by 15.8%. This distribution indicates that ChatGPT is the dominant AI platform for writing tasks, while Perplexity and Google Gemini remain minimally used. Teachers likewise reported high reliance on ChatGPT at 70%, followed by Grammarly at 10%, Perplexity at 5%, Google Gemini at 0%, and other tools at 15%. The shared dependence on ChatGPT across both groups underscores its centrality in current classroom practices. The absence of Google Gemini use among teachers at 0% further suggests selective familiarity and preference for particular AI applications. These findings demonstrate that AI integration is not hypothetical but already operational within students' and teachers' daily instructional activities.

Student perceptions of AI benefits were measured using a four-point Likert scale interpreted as 4.00–3.00 = Strongly Agree, 2.99–2.00 = Agree, 1.99–1.00 = Disagree, and 1.00–0.99 = Strongly Disagree. The results show mean values ranging from 2.64 to 2.93 across statements describing AI's perceived benefits. These values fall within the Agree range, indicating that students generally perceive AI as beneficial to their writing. Statement 2 obtained the highest mean of 2.93, suggesting that students particularly value AI's contribution to clarity and structure in writing. However, Statement 5 obtained a mean of 1.99, interpreted as Disagree, indicating that students do not perceive AI as beneficial in that specific dimension. This contrast reveals that while AI is viewed positively for mechanical and structural support, its perceived usefulness diminishes when related to higher order writing skills. The pattern aligns with cognitive theories of writing development, which distinguish between surface level mechanics and deeper processes such as critical thinking and original idea construction. Students' agreement with most benefit statements suggests enhancement in grammar, idea generation, and organization, yet the 1.99 mean highlights perceived limitations in fostering authentic intellectual engagement.

In contrast, teachers expressed consistently stronger endorsement of AI's instructional value. Mean scores for teacher perceptions of benefits were reported within the range of 3.75–3.95, indicating Strongly Agree responses across statements. These high means demonstrate that teachers perceive AI as significantly improving writing quality, providing timely feedback, supporting revisions, and enhancing clarity and idea development. The magnitude of these values suggests a high level of confidence in AI as a pedagogical support tool. From an

instructional perspective, teachers recognize AI's efficiency in scaffolding writing tasks, consistent with literature emphasizing formative feedback and revision cycles as critical components of writing instruction. However, this strong endorsement must be interpreted alongside teachers' equally strong recognition of challenges.

Student perceptions of challenges and risks reveal a nuanced understanding of AI use. Although students generally disagreed with statements suggesting that AI severely hinders their writing proficiency, they acknowledged specific risks. They recognized concerns about plagiarism and the possibility that AI generated texts may reduce personal voice. Qualitative responses further illustrate this dual awareness. Students reported that AI helps correct grammar, generate ideas, and improve vocabulary, and several expressed increased confidence when comparing their original drafts with AI suggested revisions. At the same time, some admitted overreliance, noting difficulty writing independently and occasional inaccuracies in AI outputs. Statements such as feeling guilty when using AI or acknowledging laziness suggest emerging metacognitive awareness. These reflections indicate that students perceive AI as supportive yet potentially compromising originality and independence when misused.

Teachers' perceptions of challenges were more pronounced. Mean values ranging from 3.75–3.95 in statements regarding observed challenges indicate Strongly Agree responses. Teachers reported that students become overly dependent on AI, demonstrate reduced independent writing skills, and exhibit diminished originality. They also highlighted difficulties in assessing authentic student performance, particularly when distinguishing AI generated content from student produced work. These concerns align with broader scholarly debates about academic integrity and the erosion of critical thinking in technology mediated learning environments. Teachers observed that students often cannot explain AI generated vocabulary, suggesting superficial engagement with content. The perception that AI widens the skill gap between students who rely heavily on it and those who do not further emphasizes concerns about equity and differentiated learning outcomes.

Qualitative teacher responses reinforce this complexity. Teachers acknowledged advantages such as faster task completion, improved grammar, immediate feedback, and enhanced clarity. However, disadvantages included plagiarism, laziness, loss of authenticity, and weakened critical thinking. To address these issues, teachers reported implementing strategies such as prohibiting cellphone use during class hours, conducting plagiarism checks, asking follow up questions to verify understanding, allowing AI use only for idea generation or vocabulary support, and using signals such as Green Flag and Red Flag to regulate permitted AI activities. These classroom practices demonstrate proactive adaptation to technological change. Teachers also expressed a need for further training in AI literacy, ethical integration, ICT skills, and curriculum alignment. Responses regarding formal curriculum integration were mixed. Some advocated inclusion due to technological advancement and the realities of digital natives, while others opposed formal integration out of concern for dependency and reduced foundational writing skills. This divergence reflects ongoing tensions in educational technology discourse between innovation and preservation of core competencies.

Taken together, the quantitative and qualitative findings converge on a central theme. AI functions as both an enhancer and a potential hindrance to writing proficiency. Among students, high usage rates such as 60.7% for ChatGPT and positive mean scores between 2.64 and 2.93 indicate perceived enhancement in grammar, clarity, and organization. Among teachers, strong endorsement reflected in mean values of 3.75–3.95 affirms AI's instructional utility. Simultaneously, concerns regarding plagiarism, dependency, and reduced critical thinking underscore the risks of unregulated use. The data collectively address the research objectives by demonstrating that AI's influence on writing proficiency is conditional rather than absolute. It enhances mechanical aspects of writing but does not inherently develop independent idea generation or higher order cognitive skills. These findings contribute to the

growing body of research on AI in education by providing empirical evidence from 303 students and 20 teachers within a real classroom context during the 2025–2026 school year. The results underscore the necessity of structured integration, explicit guidelines, teacher supervision, and targeted professional development to ensure that AI serves as a pedagogical support rather than a replacement for student thinking. This synthesis establishes a clear foundation for the subsequent chapter, which will articulate conclusions and recommendations based on the documented patterns of enhancement and hindrance observed in the data.

CONCLUSION

This study examined the role of Artificial Intelligence in shaping the writing proficiency of Grade 9 students at Fort Bonifacio High School during the school year 2025–2026 and sought to determine whether AI functions as an enhancer or a hindrance in classroom writing instruction. Drawing from the quantitative and qualitative findings derived from 303 students and 20 teachers, the conclusions affirm that AI exerts a dual and context dependent influence on writing development. The data demonstrate that AI significantly supports writing mechanics, particularly in grammar, vocabulary, clarity, and organization. Students generally agreed that AI assists them in generating ideas, refining sentence structure, and improving coherence, while teachers strongly recognized its capacity to provide immediate feedback and facilitate revision. These findings confirm that AI enhances surface level writing skills and serves as a valuable instructional support tool when integrated appropriately. However, the evidence equally indicates that AI does not independently strengthen higher order competencies such as critical thinking, creativity, and original idea development. Writing proficiency requires cognitive engagement and authentic composition, which AI alone cannot cultivate without structured pedagogical intervention.

The findings further reveal that overreliance on AI is an emerging concern. Both students and teachers acknowledged that excessive dependence on AI tools can reduce students' engagement in authentic writing processes and weaken independent skill development. Teachers observed that students often submit AI generated outputs without fully understanding the content, and they reported difficulty determining whether written outputs genuinely reflect students' own abilities. This creates assessment challenges that complicate grading, feedback, and instructional planning. When AI substitutes rather than supplements student thinking, it risks undermining long term writing growth. At the same time, students demonstrate emerging AI literacy, as many recognize the benefits and risks associated with AI use. They express awareness of issues related to plagiarism, authenticity, and loss of personal voice. Nonetheless, this awareness remains partial and requires further structured guidance. Students need explicit instruction on responsible use, strategies for evaluating AI generated outputs, methods for avoiding plagiarism, and approaches to using AI as a learning tool rather than as a replacement for their own ideas.

The central role of teachers in regulating AI use is evident throughout the findings. Effective integration of AI in writing instruction depends on clear classroom guidelines, ethical use policies, consistent teacher monitoring, and explicit instruction on how to evaluate and improve AI generated output. Without these supports, AI use becomes counterproductive and diminishes the quality of learning. Teachers emphasized that AI should complement, not replace, cognitive processes, and that strong oversight is essential to preserve academic integrity. The data therefore affirm that AI must be integrated thoughtfully rather than automatically into the English curriculum. While many teachers recognize its educational value and acknowledge that technological advancement necessitates adaptation, they caution that formal integration must be accompanied by training, structured implementation, and clear

boundaries. The impact of AI is not inherently positive or negative but is shaped by pedagogical design, responsible application, and institutional policy.

In light of these conclusions, several interconnected recommendations emerge as necessary steps toward responsible AI integration. Schools should develop comprehensive guidelines that clearly define acceptable and unacceptable uses of AI in writing tasks, ensuring ethical practice and sustained student engagement. AI literacy should be formally embedded into writing instruction so that students understand how AI generates responses, how to evaluate accuracy and appropriateness, how to revise outputs critically, and how to recognize ethical implications. Instructional strategies must also be designed to strengthen independent writing skills, including requiring drafting prior to AI use, incorporating handwritten or in class writing activities, and utilizing oral explanations of written outputs to verify comprehension. Professional development for teachers is essential and should focus on ethical and effective AI integration, detection of AI generated content, balancing technological tools with traditional pedagogy, and familiarization with emerging AI applications relevant to language instruction. In addition, formative assessment practices such as on-the-spot questioning, vocabulary verification, and short in class writing exercises should be implemented to detect overreliance and confirm authentic understanding. Students should be guided to use AI primarily as a revision tool for refining grammar, improving coherence, and clarifying ideas rather than as a generator of complete essays. Finally, parents and stakeholders should be engaged through awareness programs that communicate both the capabilities and risks of AI, enabling responsible supervision beyond the classroom.

Overall, this study affirms that AI possesses substantial educational potential, yet its effectiveness is fundamentally dependent on context, oversight, and pedagogical intentionality. When employed as a structured support mechanism, AI enhances writing mechanics and facilitates revision. When used without regulation, it risks weakening originality, critical thinking, and authentic skill development. Therefore, the integration of AI in writing instruction must be deliberate, ethically grounded, and guided by strong teacher leadership. By synthesizing empirical findings with actionable recommendations, this conclusion underscores the necessity of balanced implementation and positions AI not as a replacement for human learning but as a tool whose value is determined by how responsibly and thoughtfully it is used within the educational process.

REFERENCES

Aiken, L. R. (1996). Rating scales and checklists: Evaluating behavior, personality, and attitudes. John Wiley & Sons.

Alamri, A. (2023). The impact of artificial intelligence writing tools on students' writing performance: Benefits and challenges. Journal of Educational Technology & Society, 26(2), 44–57.

Anderson, T., & Dron, J. (2014). Teaching crowds: Learning and social media. AU Press.

Anzai, Y. (2020). Artificial intelligence in education: Promises and implications. International Journal of Artificial Intelligence in Education, 30(3), 377–389. https://doi.org/10.1007/s40593-020-00212-5

Bai, H., & Chen, S. (2023). Exploring students' perceptions of ChatGPT in academic writing. Computers & Education: Artificial Intelligence, 4, Article 100115. https://doi.org/10.1016/j.caeai.2023.100115

Bai, X., Wang, Y., & Zhang, L. (2023). Benefits and risks of AI-assisted writing: A systematic review. Educational Research Review, 39, Article 100507. https://doi.org/10.1016/j.edurev.2023.100507

Bashir, H., & Khurshid, F. (2020). The role of AI in improving writing competency among high school learners. International Journal of Learning, Teaching and Educational Research, 19(8), 200–217. https://doi.org/10.26803/ijlter.19.8.11

Crossley, S. A., Roscoe, R., & McNamara, D. S. (2014). Automatic writing evaluation: The role of natural language processing in writing assessment. Journal of Writing Research, 6(3), 295–322.

Fitria, T. N. (2023). Students' perceptions of using Grammarly in academic writing. Studies in English Language and Education, 10(1), 314–330.

Flanagan, E., & Shoffner, M. (2023). Teachers' perceptions of AI tools in writing instruction. English Journal, 112(4), 25–34.

Holmes, W., Porayska-Pomsta, K., & Holstein, K. (2022). Artificial intelligence in education. UNESCO Futures of Education.

Kukich, K. (2000). Use of language processing in automated essay scoring. Artificial Intelligence Review, 14(5–6), 423–447.

McNeish, D., & Wolf, M. (2021). The reliability of Likert-type scales in educational research. Journal of Educational Measurement, 58(4), 453–475. https://doi.org/10.1111/jedm.12297

OpenAI. (2023). ChatGPT (Mar 2023 version) [Large language model]. https://openai.com/chatgpt

Reynolds, R. (2023). Academic integrity in the age of AI writing tools. Journal of Academic Ethics. Advance online publication. https://doi.org/10.1007/s10805-023-09455-7

Schmid, U., & Wrede, B. (2021). Ethical and pedagogical considerations of AI use in education. AI & Society, 36(4), 1093–1104. https://doi.org/10.1007/s00146-020-00980-3

Smutny, P., & Schreiberova, P. (2023). Artificial intelligence in the classroom: Opportunities and challenges. Computers & Education: Artificial Intelligence, 5, Article 100132. https://doi.org/10.1016/j.caeai.2023.100132

UNESCO. (2023). Guidance for generative AI in education and research. UNESCO Publishing.

Wang, F., & Vasquez, C. (2012). The effect of grammar checkers on ESL writing. Computer Assisted Language Learning, 25(3), 291–307.

Wollny, S., Schneider, J., & Seeber, I. (2021). The impact of AI-based writing assistants on writing performance. Journal of Computer-Assisted Learning, 37(5), 1265–1280.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. International Journal of Educational Technology in Higher Education, 16(1), 1–27. https://doi.org/10.1186/s41239-019-0173-8