

AI Writing Assistants and Student Competence: A Linguistic Aspect

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Abstract

The study aims to determine how AI tools affect the linguistic features of student writing. The research questions are: (1) How do AI writing tools affect the linguistic features of student writing? (2) What are university instructors' attitudes toward the use of AI in writing instruction? The significance of this study arises from its addition to the literature on how AI technologies affect writing pedagogy and student learning in higher education. Using a mixed-methods design, the study questioned 60 university students enrolled in English for Academic Purposes (EAP) courses. Students were divided into two groups: students who used AI writing tools regularly and students who wrote without AI. Data were collected through essay writing tasks, student questionnaires, semi-structured interviews, and instructor feedback. Every subject wrote two essays, which were assessed for grammaticality, lexical diversity (measured in terms of the type-token ratio and vocabulary density), and coherence (based on rubric-based discourse analysis). Instructor feedback provided qualitative scores of writing depth and originality. Outcomes indicate that writing with AI significantly reduces grammatical errors, enhances vocabulary range, and promotes text cohesion by using programmed hints at linkages. However, there are serious concerns about the passive acceptance of AI suggestions by students that can compromise cognitive effort and critical thinking. There were instances when AI-produced work led to robotic sentence structure and formulaic arrangement. Teachers stressed the need for a pedagogical balance with AI tools without compromising students' ability to write independently. The report concludes that, while AI can be a good writing tool, it should never be a substitute for but only a supplement to traditional writing pedagogy.

Keywords: academic writing, AI writing tools, coherence, grammatical accuracy, independent writing skills, linguistic development, pedagogical strategies, vocabulary diversity

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Introduction

In recent years, Artificial Intelligence (AI) has revolutionized academic writing, primarily in the widespread application of AI-assisted writing tools such as Grammarly, QuillBot, and ChatGPT. They offer students instant grammar and style correction, paraphrasing assistance, and even content generation, thus giving rise to relevant issues impacting writing skills. While AI systems may enhance the fluency and accuracy of students, their effects on more profound linguistic competence – like syntactic variety, lexical development, and discourse coherence – are debated.

From the linguistic perspective, writing ability extends beyond error revision to include abilities to construct well-supported arguments, demonstrate lexical range, and employ the appropriate kind of register and cohesion strategies (Strochenko et al., 2025). AI writing tools, on the other hand, focus primarily on superficial polishing rather than challenging learners to think critically and creatively about using language. As a result, there is growing concern among teachers and linguists about whether the application of AI tools assists or hinders the acquisition of fundamental writing skills among learners.

This research investigates the linguistic impact of AI writing tools on students' academic writing skills. Specifically, it examines how these tools influence syntactic complexity, lexical choices, and discourse organization in student writing. The study seeks to determine how AI-assisted writing contributes to or hinders the development of students' writing competencies. It explores the pedagogical implications of AI usage, identifying both challenges and opportunities for English language teachers, particularly in university contexts. This inquiry is significant because it addresses the growing role of AI in shaping academic communication and offers insights into how technology can be effectively integrated into language education. The primary research objectives are to evaluate the linguistic changes introduced by AI tools in student writing and to understand teachers' perceptions of these changes. The key research questions are: (1) How do AI writing tools affect the linguistic features of student writing? (2) What are university instructors' attitudes toward the use of AI in writing instruction?

Literature Review

AI in Academic Writing

Artificial intelligence (AI) has become increasingly influential in academic writing. It assists in generating structured content and improving efficiency; however, concerns persist about the originality and depth of AI-generated texts (King, 2023; Farrokhnia et al., 2023). One significant controversy involves AI's potential to impair cognitive abilities. Scholars suggest that overreliance on AI may result in cognitive laziness and weakened critical thinking (Ahmad et al., 2023; Dans, 2023). Research examining syntactic complexity and lexical diversity shows that AI-generated texts may mimic human writing but often lack structural depth and varied vocabulary. These linguistic features are typically measured using metrics such as mean sentence length, the frequency of subordinate clauses, and type-token ratios (Fedoriv, 2023; Dong, Wang, & Buckingham, 2023). Holly (2023) adds that AI-generated abstracts can mislead researchers by appearing indistinguishable from human-written content. The effectiveness of AI for second-language learners (L2) and doctoral students is debated. While tools can support grammar and coherence, their impact varies with proficiency levels. Beginner L2 writers may benefit from scaffolding and feedback generation, whereas advanced users may require more nuanced and critical writing development (Hyland, 2016; Gupta et al., 2022). Inouye and McAlpine (2019)

stress that human mentorship remains a necessary component of academic literacy and identity construction. AI-powered feedback systems, such as those explored in Stanko (2024), aim to complement but not replace this role.

AI and Pedagogical Integration

The integration of AI into university education has accelerated post-COVID-19. Institutions increasingly embed AI in their pedagogical frameworks to enable flexible, tech-driven learning models (Crompton & Burke, 2023). While this improves accessibility and instructional efficiency, it also raises issues surrounding plagiarism, originality, and academic ethics (Pisica et al., 2023; De Schryver & Joffe, 2023). Educational AI tools must be implemented with a sense of responsibility and transparency. Research advocates for clearly defined ethical standards and teacher training to manage the implications of AI use in academic settings (King, 2023). Markus and Kirner-Ludwig (2024) also discuss AI's application in digital lexicography, highlighting its contributions to linguistic diversity and its pedagogical potential in language instruction.

AI in Creative and Professional Writing

Beyond academia, AI plays a role in mediated and creative writing contexts. Mieczkowski et al. (2021) and Patty (2024) explore how AI supports personalized learning and communication, yet its influence on interpersonal dynamics remains complex. AI's use in producing creative works, such as fan fiction, opens new artistic possibilities while prompting ethical questions about authorship and originality (Stanko, 2024). Furthermore, studies compare AI-generated text with human-written text to understand how AI models replicate human discourse structures (Arcenal et al., 2024). Cognitive psychology perspectives contribute insights into how AI processes language - its strengths and limitations (Binz & Schulz, 2023). Despite a growing body of literature on AI's role in writing and education, several critical gaps remain. First, there is limited empirical analysis of how AI tools influence specific linguistic features – particularly syntactic complexity and lexical diversity—across different proficiency levels. While some studies identify trends, few quantify these effects using consistent metrics. Second, the differentiated impact of AI on writers with varying academic proficiency (e.g., beginner L2 students vs. advanced PhD researchers) remains underexplored. How these groups use and benefit from AI tools, and how this influences their cognitive development and academic identity, is not yet fully understood. Lastly, existing studies rarely connect linguistic impacts with pedagogical strategies, leaving a gap in understanding how to align AI-assisted writing with curriculum goals while safeguarding academic integrity and fostering critical thinking.

Methodology

Participants

The study involves 60 university students enrolled in English for Academic Purposes (EAP) courses at a major institution. Participants were selected through purposive sampling to ensure they had a comparable level of academic English proficiency and were actively engaged in academic writing tasks. The students were divided into two equal groups: one group regularly uses AI writing tools such as Grammarly and QuillBot, while the other group writes independently without any AI assistance.

Research Instruments

1. **Writing Tasks.** Each participant was required to write two essays on a common academic topic. One essay was written without AI support, while the second (for students in the AI group) allowed using their preferred AI writing tools.
2. **Assessment Rubric.** Essays were evaluated based on three linguistic dimensions: a) *Grammatical Correctness* was measured by the frequency of grammatical errors using both human raters and language analysis tools; b) *Lexical Richness* was measured using the type-token ratio (TTR), lexical density, and variety metrics through computational analysis; *Coherence and Cohesion* was assessed through a structured rubric based on logical organization, use of cohesive devices, and argument clarity.
3. **Surveys.** A structured questionnaire was administered to all participants to collect data on their experiences, habits, and attitudes toward AI writing tools. It included Likert-scale items and open-ended questions.
4. **Interviews.** Semi-structured interviews were conducted with a randomly selected subset of 10 students from both groups to gain deeper insights into their experiences. Interview topics included perceived learning benefits, concerns about overreliance on AI, and comparisons of writing with and without AI.
5. **Instructor Feedback.** EAP instructors reviewed anonymized writing samples to evaluate whether the writing demonstrated deeper learning or surface-level correction.

Research Procedures

Participants were first briefed on the study and provided informed consent. Each participant completed the two essay tasks under supervised conditions, ensuring no AI tools were used in the non-AI condition. The essays were then anonymized and assessed independently by two raters for linguistic quality using the predefined rubric. Survey responses were collected electronically and stored securely. Interviews were conducted via video call, recorded with consent, and transcribed for analysis. Both qualitative datasets (interviews and open-ended survey responses) were coded thematically to identify recurring patterns in students' perceptions and experiences. Quantitative data from essays and surveys were analyzed using statistical tools to compare group performance, while thematic coding was applied to understand the broader narrative of student engagement with AI writing tools.

Ethical Considerations

The study complies with institutional ethical guidelines. Informed consent was obtained from all participants. Anonymity and confidentiality were maintained throughout data collection and reporting. Participants were informed of their right to withdraw from the study without penalty.

Results

The comparison of the writing samples revealed significant differences between non-AI-supported and AI-supported essays in grammar accuracy, vocabulary richness, and coherence.

Regarding grammar accuracy, AI-supported essays demonstrated a dramatic reduction in grammatical errors, particularly in subject-verb agreement, use of articles, and punctuation. For instance, in writing without AI support, students wrote sentences like "The research show that technology improve education", whereas AI-supported texts enhanced them to "The research

shows that technology improves education". AI tools also helped eliminate article errors, revising "AI is important tool in education" to "AI is an important tool in education". However, although AI assistance reduced errors, some students abused AI suggestions, leading to overuse of simple sentence patterns.

On vocabulary richness, AI-assisted essays contained a higher frequency of academic and varied word use, usually due to synonym suggestions by AI. For example, an essay not supported by AI might contain repetitive phrases such as "important role" repeated multiple times. In contrast, AI-assisted writing replaced these with variations such as "significant contribution" or "crucial function.". However, sometimes, students would use AI suggestions without fully understanding them, and the resulting phrasing sounded unnatural. AI-written sentence of one student, "AI plays a paramount role in education enhancement," did not sound as natural as the non-AI sentence, "AI is important for improving education.".

With regards to organization and coherence, AI-supported essays also had fewer abrupt transitions and more transparent organization, as AI platforms suggested connecting words such as "In contrast", "Consequently", and "Furthermore". Here is an example:

A regular non-AI essay might have the following text:

"Technology aids students in learning better. Teachers can utilize AI in classrooms."

But the AI-supported version delivered greater coherence by connecting ideas:

"Technology helps students learn better. Moreover, teachers can use AI in classrooms."

At the same time, AI facilitated logical sequence, essays were also too formulaic since they relied more on conventional transitions than creative argumentation. In contrast, non-AI essays, though sometimes marred by discontinuity, evidenced students' independent ability to organize arguments better.

In general, AI writing tools significantly improved grammatical accuracy, vocabulary richness, and text coherence but also introduced possible disadvantages such as mechanical phrasing, over-reliance on AI recommendations, and reduced independent language use. Although AI-assisted writing appeared more polished, non-AI essays reflected more authentic linguistic skills and greater diversity of personal expression. These findings have significant consequences regarding the role of AI in writing instruction and if and how this affects student's long-term writing development.

Results of the survey and interviews added rich knowledge to students' experience with the AI writing tool, both the perceived benefits and limitations. Student reactions exhibited mixed emotions of hope and fear about how AI would influence their writing skills.

Most students reported that AI tools made them much more confident in writing, particularly regarding grammar correctness and word choice use. In questionnaires, 78% of the AI group students reported they utilized Grammarly and QuillBot and that the tools helped them identify and correct errors quicker than self-proofreading. When interviewed, one student said the following: "I did not realize how many article errors I had before using Grammarly.". Now I am more sure about writing sentences in the correct manner." But some students did admit that they rarely looked at AI-offered corrections, accepting them at face value without checking mistakes.

When asked about vocabulary development, 65% of AI-assisted respondents said AI tools helped them pick up new words and paraphrase ideas more effectively. One of the most common responses in interviews was that QuillBot helped them rewrite complex sentences so their writing was easier to read. One student reported: "When I struggle to find the right words, QuillBot gives me more suitable choices, and what I write sounds more academic." Several students did

acknowledge a drawback – excessive use of AI-generated synonyms occasionally resulted in unnatural phrasing. One student described: "I paraphrased a sentence with the help of AI, and my teacher told me that the wording was beyond my level."

Regarding writing coherence and idea development, 58% of the students believed that AI helped them write more logically structured texts. Some appreciated AI-suggested transition ideas, which made their essays more coherent. Nevertheless, interviews revealed that some students felt disconnected from their writing process since AI tended to suggest stereotypical structures that suppressed creativity. One student said: "Sometimes my essay sounds too generic because AI keeps suggesting the same types of sentences."

Another key topic debated in interviews was AI's impact on long-term writing capacity. While most students valued AI for revision, 42% were concerned that AI use eroded their independent writing potential. One student admitted: "I don't think as much about grammar anymore because AI corrects everything for me." Another said: "When I have to write without AI, I have more trouble because I've gotten too accustomed to AI corrections."

Finally, attitudes toward AI and academic integrity were varied. While some students viewed AI tools as valuable learning aids, others worried about crossing ethical boundaries when submitting AI-generated work. 40% of students weren't sure how much AI assistance was acceptable in academic writing. As one student remarked: "I know Grammarly is okay for grammar, but using AI to rewrite whole paragraphs feels like cheating."

Overall, students found AI tools helpful in grammar correction, vocabulary enrichment, and text coherence, but over-dependence and loss of independent writing ability were concerns. While AI-assisted writing gave confidence, it also resulted in drawbacks such as awkward phrasing, passive learning, and ethical confusion. The findings suggest the need for instructional guidelines on AI usage and a mechanism to ensure students' writing ability development independently of, as well as alongside, AI assistance.

Instructor feedback on the writing samples provided a critical perspective on whether AI writing tools are used to foster increased writing proficiency or simply enhance surface-level correctness. While instructors saw improvement in grammar, vocabulary, and organization in AI-assisted writing, they were also troubled by students' overreliance on AI prompts and the potential for decreased independent writing proficiency.

Most of the instructors agreed that AI software effectively reduced grammatical errors, refining students' writing. Grunden errors in subject-verb agreement, article usage, and punctuation were significantly fewer in AI-supported essays. As one instructor put it: "The AI-generated texts are cleaner in terms of grammar and mechanics. I had to correct few basic errors." Yet instructors also said that AI-supported students used less varied sentence structures, holding onto AI's default corrections rather than experimenting with more complex syntax.

As far as vocabulary goes, educators observed that AI-generated essays incorporated more complex word choices, though sometimes at the expense of naturalness. Some students used AI-generated synonyms without respect for context, leading to awkward phrasing. One educator shared: "I noticed a trend in students' word choices being unrealistically elevated – words like 'paramount' or 'exacerbate' appeared in places where more fundamental words would have been more appropriate." Although AI helped with lexical variation, educators questioned whether students were genuinely learning new words or applying AI suggestions without inherent understanding.

In argumentation and coherence, teachers found that AI-generated texts had more coherent transitions and more straightforward organization. AI-generated transition words such as "Furthermore", "Consequently", and "In contrast" allowed the essays to be more organized. However, some teachers mentioned that the transitions were mechanical and lacked sufficient logic. One teacher said: "AI enhances the writing flow, but sometimes I feel that students aren't relating to their ideas. Their arguments are formulaic and not very well developed."

One of the biggest concerns that teachers had was critical thinking and novelty with AI-aided writing. Although AI improved on the surface level in terms of correctness, it did not necessarily enhance students' ability to produce and communicate novel arguments. One teacher explained: "I can see that AI helps with structure, but when I ask students to explain their reasoning, they struggle." It's as if they depend on AI to construct their thoughts rather than thinking for themselves. Some essays prepared using AI were superficial, as the students would replicate AI-generated sentences without rephrasing and explaining them.

The second big worry was writing independence and academic integrity. Educators were concerned that students would rely too heavily on AI tools at the expense of their writing ability and independence. One teacher commented: "Some students write very well using AI, but when they write in class without it, their performance dramatically declines." This indicates that they are not internalizing the writing skills AI is meant to facilitate. Others pointed out a need for specific guidelines on how much AI aid is acceptable in academic writing.

Instructor comments suggest that AI writing tools increase surface-level accuracy, particularly in grammar, vocabulary, and coherence. However, deeper writing competencies – such as syntactic variation, critical thinking, and creativity – are not necessarily enhanced by AI and in some cases even impaired. While AI tools are beneficial, concerns over mechanical writing, passive learning, and over-reliance on AI editing suggest the need for balanced incorporation of AI in teaching writing. Instructors noted that essays produced with AI support often came across as formulaic, which can negatively affect students' academic writing development. Although these essays showed high grammatical accuracy and maintained structural clarity, they tended to adhere to fixed patterns suggested by the software. This reliance on predetermined templates may discourage students from engaging deeply with the writing process, limiting opportunities to develop unique rhetorical strategies and to experiment with constructing nuanced arguments independently. Consequently, while AI tools help achieve surface-level correctness, their overuse might inhibit the cultivation of critical thinking and creative academic expression. Educators therefore need to emphasize the importance of using AI as a supplementary aid rather than a substitute for active, thoughtful writing.

Discussion

This study examined how AI writing tools influence student writing in terms of grammar, vocabulary, and coherence, and explored the attitudes of both students and instructors toward AI-supported writing. The findings reveal that AI writing software enhances grammatical correctness, encourages a broader range of vocabulary, and improves textual coherence. At the same time, it raises concerns about students' over-reliance on AI and their limited engagement with the deeper aspects of writing development.

In terms of grammatical accuracy, AI-assisted texts demonstrated a significant reduction in errors, especially in subject-verb agreement and punctuation. This supports the findings of Ahmad et al. (2023) and King (2023), who reported similar benefits. However, the students often

failed to understand the reasons behind AI corrections, echoing Dans's observation (2023) that excessive AI dependence leads to syntactic uniformity and limited grammar practice. This tendency aligns with passive learning, where students adopt corrections without internalizing the underlying rules. This pattern contrasts to cognitive learning theories such as Anderson's ACT-R model, which emphasizes the importance of active, practice-based learning in developing procedural knowledge.

Lexical richness also improved, with students using a wider range of academic expressions, a trend consistent with the work of Arcenal et al. (2024). Nonetheless, the findings also reflected awkward or contextually inappropriate word choices, as previously discussed by Markus and Kirner-Ludwig (2024). Students often accepted AI-generated synonyms without evaluating their contextual fit, indicating a lack of semantic awareness. This observation corresponds to the surface-level development described in writing models like Bereiter and Scardamalia's, where writing at a knowledge-telling stage lacks the critical reflection seen in knowledge-transforming processes.

AI-generated texts also exhibited stronger coherence through more consistent use of transition devices and logical sequencing. This mirrors Crompton and Burke's findings (2023), which emphasized the organizational advantages of AI tools. However, similar to De Schryver and Joffe's conclusions (2023), the use of formulaic transitions raised concerns about students' independent thinking and argument structuring abilities. The present findings suggest that while AI can scaffold organization, it may limit the opportunity for students to develop their own rhetorical frameworks.

Instructor feedback confirmed these concerns, noting that AI-supported essays, although polished and error-free, often lacked depth, creativity, and analytical development. This aligns with King's research (2023), which showed that students accustomed to AI tools struggled when asked to write without technological assistance. The student interviews revealed appreciation for the efficiency AI provides, but also exposed a lack of critical engagement with the learning process. Many students did not reflect on grammar corrections or style choices, indicating that the learning remains largely passive unless paired with guided instruction.

The results also carry significant theoretical implications. Cognitive theories suggest that AI tools support lower-order writing tasks, such as grammatical correction, but may reduce student engagement in higher-order tasks like generating arguments or synthesizing ideas. According to cognitive load theory, AI tools reduce extraneous load and streamline writing processes, but may also limit germane cognitive load, which is essential for developing writing expertise and schema formation.

When compared with previous research, this study confirms the benefits and limitations observed by scholars such as Ahmad (2023), Dans (2023), and Arcenal (2024). However, it adds new value by incorporating instructor evaluations, linguistic measurement tools, and student self-reflection, thereby providing a more pedagogically grounded perspective. The combination of essay analysis, surveys, and interviews offers a clearer picture of how AI affects both the process and the perception of academic writing.

These findings suggest several directions for future research. Studies should investigate the long-term effects of AI use on writing development, particularly for different learner profiles such as beginner L2 students and advanced academic writers. Future research should also explore intervention strategies that combine AI tools with reflective learning and teacher guidance to ensure that students engage critically with their writing. Furthermore, it would be valuable to

assess AI's role in writing across various academic disciplines, with attention to genre-specific language use and expectations. The impact of AI on multilingual writers, especially in identity and linguistic transfer, also warrants further exploration.

In conclusion, this study shows that while AI tools can assist with surface-level writing improvements in grammar, vocabulary, and coherence, they do not necessarily lead to more profound skill development. Students benefit from these tools, but their cognitive and rhetorical engagement may suffer when AI becomes a substitute rather than a support. It is therefore essential that AI be thoughtfully integrated into academic writing instruction, helping students build both linguistic accuracy and critical writing competence.

Conclusion

This study highlights the impact of AI writing tools on students' writing capacity, particularly in enhancing grammatical accuracy, lexical range, and coherence. AI-assisted writing renders text error-free and more fluent but also provokes concerns of over-reliance, passive learning, and inability to write independently. While AI-offered corrections allow students to produce polished texts, they might not necessarily be beneficial in developing higher cognitive processes involved in language learning.

Vocabulary development is a combined outcome, with AI assisting lexical diversity but making phrasing unnatural at times. Similarly, AI-assisted texts are more coherent, but their formulaic nature can decrease originality and logical depth. Instructor feedback indicates the need to balance AI support with direct writing instruction, as students may depend on AI-generated prompts rather than actively contributing to the writing process.

Future research must investigate methods that allow appropriate integration of AI while fostering independent writing ability. Educators must provide clear guidelines so that AI is utilized as a tool for learning and not as a replacement for human instructors. As the technology of AI continues to evolve, its application in academic writing must be critically assessed to maximize its advantages and minimize its drawbacks.

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Artificial Intelligence Statement: This research involved the use of artificial intelligence tools for both analytical and illustrative purposes. AI writing assistants such as Grammarly, QuillBot, and ChatGPT were critically examined as part of the study to assess their influence on students’ linguistic competence, including grammar, vocabulary, and coherence. Additionally, AI (specifically ChatGPT) was employed to assist in refining the language of the article. The authors confirm that all AI-generated content was carefully reviewed, edited, and integrated to ensure academic integrity, originality, and compliance with scholarly standards. During the preparation of this work, the author used Grammarly to check the grammar. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the publication’s content.

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