

Empowering Academic Writing Through AI Integration: Exploring Student Perspectives

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Abstract: *The integration of Artificial Intelligence (AI) tools in higher education is reshaping how students engage with academic writing. This study explores student perspectives on the use of DeepSeek, an AI-powered writing assistant, in supporting their writing development. Through guided classroom implementation, students were encouraged to use the tool independently to review and revise their academic texts, with a focus on improving grammar, coherence, and clarity. Qualitative data were collected through student reflections, interviews, and instructor observations. The findings highlight that student perceived DeepSeek as an empowering tool that provided immediate, detailed, and non-judgmental feedback. Lots of students reported increased confidence in identifying and correcting their own errors, greater ownership of the revision process, and a clearer understanding of academic writing conventions. From the student perspective, the integration of AI fostered a more autonomous and reflective approach to writing. This study underscores the potential of AI tools to enhance academic writing instruction by promoting student agency and supporting self-directed learning.*

Keywords: Artificial Intelligence (AI); Academic Writing; Learner Autonomy; Writing Feedback

1. Introduction

In recent years, the role of artificial intelligence in higher education is evolving due to advancements in technology that are changing traditional teaching methods. AI tools, in particular, are emerging as influential resources that can change how students tackle academic tasks, especially academic writing. Academic writing is a key part of university education; it requires precision, clarity, and following specific guidelines. Students often struggle with grammar, coherence, and the process of revising. They usually rely on limited feedback from instructors or peers. AI-powered writing assistants provide a new form of support by offering immediate and personalized feedback, helping to fill gaps in writing instruction. According to Susnjak (2022), these tools can serve as thought partners for students, helping them overcome writer's block and consider different argumentative options.

This study looks into the use of AI tools in higher education, specifically examining student views on DeepSeek, an AI-powered writing assistant. DeepSeek, which is available to both

educators and students, has garnered attention for its widespread use in teaching and learning. Wang (2025) notes that DeepSeek R1 is available as open-source software, which means anyone can use it for free. This accessibility allows researchers around the world to test and confirm its features. A recent report from the World Economic Forum states that "Anyone can download, copy, and build DeepSeek. Its code and detailed technical explanations are freely shared, allowing developers and organizations worldwide to access, modify, and implement it."

DeepSeek is an AI-powered writing assistant that offers thorough feedback on academic texts. Its functions include correcting grammar and spelling, analyzing coherence, suggesting clarity improvements, and enhancing style. Students are encouraged to use DeepSeek on their own to review and revise their academic work, focusing on aspects like sentence structure, logical flow, word choice, and compliance with academic writing standards. The tool provides immediate, specific suggestions, often explaining its reasons behind recommendations.

This study aims to understand how students view the use of this tool in supporting their writing skills and promoting a more independent and thoughtful approach to their academic writing. By concentrating on student experiences during guided classroom use, this research seeks to highlight the practical benefits and sense of empowerment that come from AI-generated feedback, adding to the ongoing discussion about effective AI integration in education.

2. Literature Review

The rise of artificial intelligence (AI) in education has changed how students interact with academic writing. AI-powered writing assistants like Grammarly, ChatGPT, QuillBot, and DeepSeek are now used in classrooms. These tools provide real-time feedback on grammar, punctuation, vocabulary, clarity, and even structure (Li et al., 2023; Zhou & Li, 2022). They offer suggestions that resemble human editing, helping students revise their work on their own. AI feedback is usually immediate, consistent, and available whenever students need it. This makes it a more appealing option than traditional feedback from peers or instructors (Wang & Sleeman, 2021). Early research on AI in writing instruction mainly focused on automated essay scoring (AES) and grammar checkers. While these tools can give quick feedback, concerns arise about their ability to assess complex writing elements like critical thinking or rhetorical skills (Shermis & Burstein, 2003). Studies show that students often depend on AI for translation, grammar refinement, and choosing appropriate academic vocabulary. This support helps them express their ideas more clearly and boosts their confidence in writing (Yancey, 2016). Recently, sophisticated AI models, especially large language models (LLMs), have led to the creation of advanced writing assistants. These can provide feedback that goes beyond just fixing surface errors. Research indicates that AI writing tools can improve student engagement and motivation by offering immediate and accessible help (O'Neill & Russell, 2019). Unlike human instructors, AI tools can give feedback 24/7, allowing students to revise their work at their own pace and convenience. This availability is especially useful for students hesitant to seek help or needing repeated feedback cycles. Furthermore, the non-judgmental nature of AI feedback can help reduce anxiety and create a more positive environment for revision (Roll & Wylie, 2016). Incorporating AI tools into writing education aligns with the principles of self-directed learning (SDL). According to Knowles (1975), SDL encourages learners to take charge of identifying their needs, choosing strategies, and evaluating outcomes. AI tools can support this by empowering students to revise and assess their work independently. Recent studies show that students using AI feedback tools often revise more frequently and become more aware of language mechanics (Nguyen & Habok, 2022; Song & Wang, 2023).

Additionally, DeepSeek can enable adaptive learning, giving students access to various educational resources while supporting inclusive education through accessibility features (OECD, 2024).

However, integrating AI into writing instruction does come with challenges. Concerns remain about students becoming too reliant on AI, which could impede their critical thinking and independent writing skills (Lee, 2020). It's also important to understand how students interact with AI feedback. Do they accept suggestions blindly, or do they critically assess them to enhance their understanding of writing principles? This study aims to add to the existing literature by examining student perceptions of the AI writing assistant DeepSeek in a real classroom setting. It will focus on how DeepSeek affects their confidence, revision processes, and understanding of academic writing conventions. The study is guided by the following research questions:

- i. How do students view DeepSeek as a writing support tool in academic writing?
- ii. How does using AI tools like DeepSeek support or hinder self-directed learning in academic writing?

3. Methodology

This study used a qualitative research design to explore student views on incorporating DeepSeek, an AI writing assistant, in their academic writing development and its impact on self-directed learning. The qualitative approach allowed for a deep exploration of student experiences and meaning-making in a natural classroom environment. The research took place in a public technical university in Malaysia, targeting undergraduate students enrolled in a course that required substantial academic writing. A purposive sampling strategy selected 30 participants who had completed at least one academic writing course previously and had limited exposure to AI writing tools. Before the study, students received an introduction to DeepSeek and its features, along with clear guidelines for its ethical and effective use as a supplemental tool rather than a replacement for original thought. Participation was voluntary, and informed consent was obtained from all students. The integration of DeepSeek occurred over six weeks during the semester. At the beginning of the intervention, students received an orientation and demonstration on how to use the tool. Then, they were instructed to use DeepSeek independently outside of class to revise drafts of argumentative texts. This assignment represented common components of academic writing and assessed the tool's influence across different genres and writing tasks. While using DeepSeek was encouraged, students had full autonomy in deciding how often and extensively they engaged with the tool during revision. Qualitative data were collected through three main methods: reflective journals and classroom observations. Students kept weekly reflective journals to document their experiences with DeepSeek, challenges they faced, and any improvements they noticed in their writing. At the end of the intervention, ten students were chosen for in-depth semi-structured interviews focusing on their writing habits, views on AI-generated feedback, and learning processes. Each interview lasted between 25 and 40 minutes and was audio-recorded with participant consent. Additionally, the course instructor maintained a teaching journal to capture classroom observations, student engagement with writing activities, their questions or comments about DeepSeek, and any notable behavioral changes during the writing workshops.

4. Data Analysis

The qualitative data from reflections, interview transcripts, and observation notes were analyzed using thematic analysis. Following Braun and Clarke's (2006) six-phase framework, the process involved familiarizing with the data, initial coding, searching for themes, reviewing themes, defining and naming themes, and producing the report. Researchers independently coded a portion of the data and conducted inter-coder reliability checks to ensure consistency. Emerging themes related to student perceptions, learning processes, and the influence of AI on writing development were identified and organized. This approach allowed students to express their genuine perspectives.

5. Findings

The qualitative data collected through student reflections, interviews, and instructor observations consistently highlighted several key themes regarding student perspectives on DeepSeek's integration into their academic writing process. The findings of the study are organized based on the two research questions and reflect three major thematic areas; student perceptions of DeepSeek, the perceived impact of the tool on writing development, and its influence on self-directed learning. Based on the analysis of students' perceptions, reflections, and interview data, it can be concluded that DeepSeek has the potential to significantly contribute to the enhancement of pedagogical discussions regarding writing development within the classroom setting.

i. Immediate, Detailed, and Non-Judgmental Feedback

A recurring theme was the immediacy and detail of the feedback provided by DeepSeek. Students frequently contrasted this with the often delayed or less granular feedback they received from human instructors, especially in large classes. One student reflected, "I could get feedback right away, which meant I didn't have to wait to start revising. It pointed out things I would never have noticed on my own, like subtle issues with sentence flow." The detailed nature of the suggestions, often accompanied by explanations, was also highly valued. For instance, instead of just flagging a grammatical error, DeepSeek would sometimes explain reasons it was an error, which students found educational. Students often report that AI tools help them produce higher-quality work by catching mistakes they might have missed (O'Neill & Russell, 2019). Moreover, students view AI as a valuable scaffold for the entire writing process. From brainstorming and outlining to drafting and revising, AI can provide structured support that helps students navigate the complexities of academic writing, which can be particularly daunting for novice writers (Perkins & Smith, 2018).

Equally significant was the non-judgmental nature of the feedback. Students reported that using DeepSeek significantly more comfortable and more confident experimenting with revision and making mistakes when they knew the feedback would come from an AI. Unlike instructor or peer feedback, which some students associated with feelings of anxiety or judgment, the responses from DeepSeek were viewed as objective and nonthreatening. This perceived neutrality made students more willing to accept and act upon the suggestions. As one student stated,

"It doesn't make you feel inadequate for making a mistake. It just tells you what's wrong and suggests how to fix it. That made me more willing to try things and learn."

This suggests that DeepSeek can help students feel safe when they received feedback and it was crucial for fostering genuine engagement with the revision process.

ii. Increased Confidence and Ownership of the Revision Process

A profound impact observed was the increased confidence students gained in their ability to identify and correct their own errors. Through repeated interactions with DeepSeek, students began to internalize writing rules and conventions. Many reported that the tool helped them develop a "critical eye" for their own work, even before using DeepSeek. This newfound confidence extended beyond grammar to broader aspects like coherence and clarity.

Furthermore, students expressed a greater sense of ownership over the revision process. Instead of passively waiting for instructor feedback, DeepSeek enabled them to take a proactive role. They could iterate on their drafts multiple times, receiving instant feedback with each revision. This iterative cycle empowered them to make informed decisions about their writing, rather than simply implementing corrections dictated by others. The student stated that, "It felt like I was truly in charge of my paper," and the other student noted,

"DeepSeek just gave me the tools to make it better, but the decisions were mine."

iii. Clearer Understanding of Academic Writing Conventions

The consistent and explicit feedback from DeepSeek contributed to a clearer understanding of academic writing conventions. Students reported that the tool helped them grasp the nuances of formal language, appropriate vocabulary, and the structural elements expected in academic discourse. For example, DeepSeek's suggestions on improving logical transitions between paragraphs or clarifying ambiguous phrasing helped students internalize the principles of coherence. This was particularly beneficial for students who were new to academic writing or those for whom English was a second language. The tool served as a constant reference point for best practices.

iv. Support self-directed learning and Reflective Approach to Writing

The most significant finding was that the integration of DeepSeek fostered a more autonomous and reflective approach to writing. Students moved beyond simply correcting errors to actively thinking about reasons certain changes were suggested and how those changes improved their writing. They engaged in a deeper level of self-assessment and critical reflection. Students reported noticeable improvements in grammar accuracy, sentence clarity, and overall coherence of their academic texts. Many described the tool as particularly useful in highlighting long, confusing sentences and offering clearer rewordings. Several students also noted that repeated use of DeepSeek helped them begin to identify and correct their own errors independently, suggesting a transfer of learning. One participant reflected that she had started to think like DeepSeek when reviewing her drafts, anticipating the kinds of changes the tool might suggest. This observation aligns with the idea that AI feedback can serve as a form of cognitive scaffolding, gradually enabling learners to internalize revision strategies.

This was evident in student reflections where they detailed their thought processes when deciding whether to accept or reject DeepSeek's suggestions. The tool acted as a catalyst for metacognitive development in writing, encouraging students to become more independent learners and self-editors.

6. Discussion

The findings of this study strongly support the notion that AI-powered writing assistants, exemplified by DeepSeek, hold significant potential for empowering students in their academic writing journey. The perceived lots of benefits such as immediate, detailed, and non-judgmental feedback, increased confidence, greater ownership of the revision process, and a clearer understanding of academic conventions that align with and extend existing literature on the positive impact of technology in education.

The immediacy and detailed nature of DeepSeek's feedback address a common bottleneck in traditional writing instruction, where instructors often face time constraints in providing comprehensive, personalized feedback to every student. By offering instant insights, AI tools enable students to engage in rapid iterative revision cycles, a process crucial for writing development that is often difficult to facilitate without technological assistance. This resonates with research highlighting the importance of timely feedback for effective learning (Hattie & Timperley, 2007).

Furthermore, the non-judgmental aspect of AI feedback appears to play a critical role in fostering a nonthreatening environment for learning. This finding is particularly important as writing can be a vulnerable activity for many students, and fear of judgment can inhibit experimentation and risk-taking. DeepSeek's impartial feedback mechanism seems to mitigate this fear, encouraging students to engage more openly and frequently with the revision process, and this, in turn, enhances their overall learning experience.

The reported increase in student confidence and ownership over their writing aligns with constructivist learning theories, which emphasize the importance of active engagement and self-direction in knowledge construction. By providing tools that enable students to identify and correct their own errors, DeepSeek shifts the locus of control from the instructor to the learner, promoting agency and self-efficacy. This transition from passive recipients of feedback to active agents in their learning process is a significant pedagogical outcome.

Moreover, the study indicates that AI tools can serve as effective scaffolds for understanding complex academic writing conventions. For students, especially those from diverse linguistic backgrounds or those new to higher education, deciphering the unwritten rules of academic discourse can be challenging. DeepSeek's explicit suggestions and explanations on coherence, clarity, and grammatical precision appear to demystify these conventions, making them more accessible and understandable.

The most compelling finding, however, is the observed shift towards a more autonomous and reflective approach to writing. DeepSeek did not merely automate corrections; rather, it prompted students to think critically about their choices and the rationale behind the suggested revisions. This metacognitive engagement is vital for developing transferable writing skills that extend beyond the immediate task. It suggests that when integrated thoughtfully, AI tools can move beyond simple error correction to facilitate deeper learning and self-regulation in academic writing.

Overall, the findings suggest that DeepSeek functions as both a writing support tool and a metacognitive aid. It empowers students to revise with greater confidence, deepens their understanding of writing conventions, and encourages them to take more responsibility for their learning. These outcomes align with current pedagogical shifts toward learner-centered

instruction and the integration of educational technology to promote autonomy and reflection. However, to maximize the benefits of AI-assisted writing, educators must provide structured opportunities for students to reflect on their use of these tools and develop the evaluative skills necessary to make informed decisions about language and style. George (2023) added that instructors with high level artificial intelligence literacy should provide students with necessary knowledge and skills, enabling them to effectively use various artificial intelligence tools and achieve practical abilities necessary for sustained success in a world driven by intelligent technology.

7. Limitations

While this study provides valuable insights, it is important to acknowledge its limitations. The qualitative nature means the findings are context specific and may not be generalizable to all educational settings or AI tools. The study relied on self-reported perceptions, which could be subject to bias. Future research could incorporate quantitative measures of writing improvement and compare outcomes with control groups. Additionally, exploring potential challenges or negative perceptions of AI integration, such as over reliance or ethical concerns, would provide a more comprehensive understanding.

8. Conclusion

This study provides compelling evidence that the strategic integration of AI-powered writing assistants, such as DeepSeek, can significantly empower students in their academic writing development. The findings underscore that student perceive these tools as invaluable resources that offer immediate, detailed, and non-judgmental feedback, leading to increased confidence, greater ownership of the revision process, and a clearer understanding of academic writing conventions. Crucially, the use of DeepSeek fostered a more autonomous and reflective approach to writing, encouraging students to become active participants in their own learning. Educators should acknowledge the transformative potential of AI tools to enhance academic writing instruction by promoting student agency and supporting self-directed learning. As AI technology continues to advance, educators should explore innovative ways to leverage these tools not as replacements for human instruction, but as powerful complements that can personalize feedback, accelerate learning cycles, and cultivate independent, confident writers. Further research is warranted to explore long term impacts, optimal integration strategies, and potential challenges in diverse educational contexts.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study.

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