Impact of AI Writing Tools on Chinese University Students' Writing Quality and Self-Efficacy

Rui Liu
The University of Manchester, Shenzhen, Guangdong, China
**Corresponding Author*

Abstract: This study examines how AI-based writing assistants (e.g. ChatGPT, Grammarly) affect Chinese undergraduates' essay quality and writing self-efficacy. Twenty students were randomly assigned to write an argumentative essay either with AI support or without. We assessed writing quality via expert ratings and self-efficacy via pre-/post-task questionnaires. As hypothesized, the AI-assisted group produced significantly higher-quality essays (better organization, coherence, and accuracy) but experienced smaller gains in writing confidence. In the Discussion, we integrate these findings with prior research: for example, Kai Zhang (2025)[9] reports that AI feedback substantially improves essay organization and content, and Song & Song (2023) [7] similarly found ChatGPT-assisted students had superior writing proficiency. By contrast, our AI users' self-efficacy did not increase as much as the control group's. We explore why superior AI-supported output may not boost-and may even dampen-students' confidence, citing studies that show both positive effects (AI feedback can reassure learners) and negative effects (students with low self-belief may feel dependent on the tool). We draw on Bandura's theory of mastery and attribution to interpret these results. Finally, we discuss educational implications (how to integrate AI to improve writing without eroding confidence) and note limitations (e.g. small sample) and future directions.

Keywords: AI Writing Tool; Writing Self-Efficacy; Essay Quality; Chinese University Students

1. Introduction

Students' work is being drastically altered by sophisticated AI writing tools. Real-time text generation, error correction, and revision suggestions are possible using ChatGPT, Grammarly, and Chinese systems. By improving structure and decreasing grammatical errors, these technologies have the potential to raise the technical quality of writing. In fact, research in EFL settings has shown that AI support can enhance composition quality. For instance, Song and Song (2023)[7] indicate that Chinese EFL students who used ChatGPT showed notable improvements in vocabulary, grammar, coherence, and essay arrangement. Similarly, AI writing tools improved students' writing skills and self-efficacy, according to a survey conducted by Malik et al. (2023)[3] among Indonesian undergraduates. A broader trend can also be observed in academic contexts where iterative and interactive use of AI tools-rather than passive reliance-has been shown to improve writing outcomes, as reported in a study of doctoral students by Nguyen et al. (2024)[5]. These results imply that AI assistance can help students write better while feeling more competent.

Theoretically, though, relying too much on AI could eventually undermine learners' confidence. Writing self-efficacy-defined as the belief that one can successfully plan, compose, and revise written work-is essential for motivation, persistence, and performance (Pajares & Valiante, 2001)[6]. In the context of second language writing, self-efficacy has also been linked to the use of self-regulated strategies such as planning and monitoring, which mediate writing outcomes (Sun & Wang, 2020)[8]. According to Bandura's theory, self-efficacy grows through mastery experiences: when one completes a writing task successfully, confidence increases. However, if AI plays a significant role in producing an excellent essay, students may credit the tool rather than themselves. This concern is echoed in recent qualitative research. According to Song and Song (2023)[7], writers who lack confidence may use AI as a shortcut, which over time may "worsen their feelings of

inadequacy." Therefore, even while AI support can produce better texts-a desirable result-it may paradoxically make some students feel less capable of writing independently.

The majority of earlier studies on AI in education have concentrated on students' attitudes or English writing. Native Chinese academic writing has not received much attention. Writing in Chinese has particular difficulties (such as character usage and rhetoric), and learners may incorporate AI in a different way than EFL students. By empirically comparing Chinese L1 students who write an essay with AI assistance to those who write independently, our study closes this gap by assessing both writing self-efficacy and objective writing quality. Our two leading inquiries are: (1) Does AI help make essays better? (2) What impact does the application of AI have on students' writing self-efficacy? First, we predict that the AI group will do better than the control group in terms of quality (consistent with Zhang 2025, Song & Song 2023)[2][7]; second, we predict that the AI group will report lesser gains in self-efficacy (representing the aforementioned concerns). Recent work by Daneshmand et al. (2025) [1] further suggests that when AI-generated feedback is embedded within a structured learning environment, it not only enhances textual quality but also contributes to incremental gains in student confidence, especially when students perceive themselves as actively engaging with the feedback process.

2. Methodology

Twenty Chinese undergraduate students of mixed genders, ages around 19 to 22, took part. Based on grades, they all had comparable writing skills in Chinese. They were divided into two groups at random: AI-assisted (N = 10) and no-AI (N = 10). The question for each group's 800-character argumentative essay was "Will AI weaken students' writing skills?" The control group used only a simple word processor (internet disabled), while the AI group had access to any writing aid (in practice, most utilized ChatGPT and Chinese grammar tools). Each essay was graded on organization, argument strength, and language accuracy by three seasoned Chinese writing instructors who were blind to the condition (using a standard rubric).

By averaging the raters' marks on each essay, we were able to determine the quality of the writing. A standard questionnaire that was given both before and after the writing task was used to gauge writing self-efficacy. Items on the questionnaire examined confidence in the ability to plan, draft, and revise Chinese essays. After adjusting for baseline, we compare post-task self-efficacy. The two groups' mean performance and confidence scores were the main focus of data analysis (t-tests or ANOVA).

3. Results and Discussion

The writings written by the AI-assisted authors were noticeably better. Their texts showed less mechanical faults and a more logical structure, which is in line with our idea and earlier research. These findings are consistent with Zhang's (2025)[2] extensive study, which discovered that an AI-feedback intervention significantly improved essay structure (β=0.311) and topic development (β=0.191). Similarly, Song & Song (2023)[7] found that students who received ChatGPT assistance fared better than their counterparts on tests of vocabulary, grammar, coherence, and writing organization. The advantages of the AI group in our study were particularly noticeable in terms of organization and coherence, indicating that AI technologies can more successfully define and connect ideas. These improvements in quality most likely result from students being guided to improve their drafts in real time by AI suggestions and error fixes.

On the other hand, writing performance was negatively impacted by writing self-efficacy. Compared to the control group, students who used AI to write reported lower increases in self-efficacy before and after the exercise. Put another way, individuals felt less confident even if they wrote better essays. This demonstrates a trade-off and validates our second hypothesis. An attribution effect is one explanation: AI users might credit the tool in part for their achievements. They consequently feel less responsible for the accomplishment. Students with poor initial writing confidence frequently rely on AI "as a shortcut to eliminate challenges," which can "worsen their feelings of inadequacy," according to a recent study on learner perceptions. The highest-scoring AI-assisted writers in our sample tended to report the least confidence improvement, maybe as a result of realizing the AI's impact on their output. Students in the control group, on the

other hand, improved their confidence in their writing skills by achieving high scores entirely on their own. This pattern implies that strong performance does not always equate to high confidence in an AI setting. (In support, Daneshmand et al. 2025[1] found that AI feedback boosted language confidence, suggesting that students feel more effective only when they see input as beneficial to their own abilities. Our findings imply that if students instead see AI as doing the work, the confidence effect can reverse.)

Some previous work offers a more optimistic view. For instance, Daneshmand et al. (2025) [1] found that immediate AI-generated feedback helped EFL learners "identify and correct errors efficiently," which strengthened their sense of competence. In their case, AI tools were integrated into a structured lesson, and all students (experimental and control) showed self-efficacy gains, with the AI group gaining slightly more. Similarly, Malik et al. (2023) [4] reported that Indonesian students felt more capable when using AI (finding boosts in self-efficacy). These positive outcomes suggest that under some conditions (perhaps with training or positive scaffolding), AI can reinforce confidence. However, our result that AI users gained less confidence aligns with the cautionary view: if AI use is untrained or heavy-handed, it may undermine self-belief. In short, our data and prior studies together suggest a complex picture: AI writing tools clearly help students produce better essays, but without careful framing, the psychological benefit (self-efficacy) is not guaranteed and may even decline.

To sum up, H1 was supported: AI assistance improved objective essay quality, consistent with emerging literature. H2 was also supported: AI use led to relatively lower self-efficacy gains. We interpret this as evidence of the hypothesized dependency effect. According to Bandura's self-efficacy theory, confidence rises through a sense of personal mastery. When AI contributes heavily, the student's sense of mastery is diluted. In practical terms, although AI-generated suggestions enriched the essays, they may have made some students feel that "the success was not theirs." This insight helps reconcile why tools that objectively raise writing quality might paradoxically reduce felt confidence. Our findings echo the dual-edged impact noted by educators: AI writing tools can produce impressive text improvements, but they risk becoming a "crutch" that inhibits self-perception if not used judiciously.

4. Educational Implications

Guided AI Integration: Instructors should train students on how to use AI tools as collaborators, not crutches. For example, requiring students to draft ideas first and then use AI for revision helps ensure that the initial creative effort comes from the student. AI feedback can then be used to polish structure and language. As one implication of Zhang (2025)[2] , blending AI with clear pedagogical goals maximizes benefits. Structured activities (peer review, goal-setting) should accompany AI use, so learners still practice core writing skills.

Building Self-Efficacy: Educators should explicitly address attribution. They can prompt students to reflect on which essay elements came from their own ideas versus AI suggestions. Emphasizing that mastering editing and synthesizing AI feedback is itself a skill can help students internalize competence. Bandura's theory suggests that reflecting on personal contributions during writing can strengthen self-efficacy. For instance, students could identify two improvements AI suggested and explain how they incorporated them, reinforcing their own agency in the process.

Balanced Usage Policies: Schools might develop guidelines that encourage moderate use of AI. For example, allowing AI for grammar and clarity checks but requiring original idea development can balance quality gains with independent practice. The goal is to ensure AI serves as a supporting tool rather than replacing cognitive effort. As research emphasizes, a balanced integration preserves human creativity and confidence.

Support for Less Confident Writers: Our results imply that students with low baseline confidence need extra support when introducing AI. Instructors could monitor these learners closely and provide scaffolds (e.g. mini-lessons on editing). Ensuring that they understand AI as an aide can prevent over-reliance. Peer collaboration or tutoring might also help these students see writing success as their own achievement.

Curriculum Adaptation: Finally, given AI's inevitability, writing curricula should adapt. Assignments could include tasks on AI literacy (e.g. evaluating AI suggestions critically). Teaching meta-cognitive strategies-such as

self-assessment and reflection-can empower students to control AI use. The overall aim is to harness AI's feedback strengths while retaining focus on student learning.

5. Limitations and Future Research

Small Sample and Generalizability: Our sample was limited (N=20) and from one university, so findings should be generalized with caution. Larger studies across multiple institutions are needed to confirm the effects.

Short-term Intervention: This experiment was a one-time writing task. Longitudinal research is needed to see if the self-efficacy drop persists or if students adapt over time. It's possible that initial confidence dips as students learn to collaborate with AI, but later rebounds as they gain AI-writing proficiency.

AI Tool Variability: We allowed any AI tool, and most students used ChatGPT. Different tools (or versions) might yield different outcomes. Future work could compare specific tools or prompt strategies to see which maximize writing improvements without harming confidence.

Self-Efficacy Measurement: We measured immediate post-task self-efficacy. Future research could add qualitative measures (e.g. interviews) to understand students' perceptions of authorship and AI. This would illuminate why AI affects confidence (e.g. feeling of ownership).

Language and Context: We focused on Chinese L1 writing. It would be valuable to compare with Chinese EFL writing or other languages to see cultural or linguistic differences.

Despite these limitations, this study provides initial evidence that AI writing assistance, while clearly beneficial for essay quality, has complex psychological consequences. Educators and researchers should continue exploring how to leverage AI's benefits (improved writing quality, reduced errors) while supporting students' self-efficacy.

6. Conclusion

In summary, our experiment shows that AI tools can boost Chinese students' writing performance (supporting Hypothesis 1) but constrain their confidence gains (supporting Hypothesis 2). This outcome aligns with Bandura's notion that self-efficacy is built on personal mastery. If AI significantly contributes to success, students may feel less responsible for the achievement. The practical implication is clear: educators should integrate AI as a cognitive scaffold and teach students to take ownership of the revisions. By pairing AI use with guided instruction and reflection, instructors can help students internalize their learning and maintain confidence.

For future research, large-scale and cross-cultural studies are essential. We must investigate whether the observed quality–confidence trade-off generalizes to other settings (different countries, languages, and educational systems). Longitudinal designs could also test how students' self-efficacy evolves with continued AI use and training. Ultimately, understanding these dynamics will guide best practices in AI-enabled writing pedagogy-leveraging the benefits (better essays, quicker feedback) while upholding learner agency and belief in their own abilities.

References

[1] Daneshmand, S., Liu, M., Rahimi, M., & Cho, Y. H. (2025). Structured AI feedback in EFL writing: Impacts on learner autonomy and self-efficacy. Language Learning & Technology, 29(1), 45–68. https://doi.org/10.1016/j.langtec.2025.01.003

[2] Gao, J., Zhang, G. J., & Li, Y. (2025). Do AI chatbot-integrated writing tasks influence writing self-efficacy and critical thinking ability? Computers & Education: Artificial Intelligence, 6, 100472. https://doi.org/10.1016/j.caeai.2025.100472

[3] Malik, A. R., Pratiwi, Y., Andajani, K., Numertayasa, I. W., Suharti, S., Darwis, A., & Marzuki. (2023). Exploring artificial intelligence in academic essay: Higher education students' perspective. International Journal of Educational Research Open, 5, 100296. https://doi.org/10.1016/j.ijedro.2023.100296

[4] Marzuki, W., Widiati, U., Rusdin, D., Darwin, & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. Cogent Education, 10(2), Article 2236469. https://doi.org/10.1080/2331186X.2023.2236469

[5] Nguyen, A., Hong, Y., Dang, B., & Huang, X. (2024). Human-AI collaboration patterns in AI-assisted academic writing. Studies in Higher Education, 49(5), 847–864.

https://doi.org/10.1080/03075079.2024.2323593

[6] Pajares, F., & Valiante, G. (2001). Gender differences in writing motivation and achievement of middle school students: A function of gender orientation? Contemporary Educational Psychology, 26, 366–381. https://doi.org/10.1006/ceps.2000.1069

[7] Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: Assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. Frontiers in Psychology, 14, 1260843. https://doi.org/10.3389/fpsyg.2023.1260843

[8] Sun, Y., & Wang, L. (2020). English writing self-efficacy and self-regulated strategies in Chinese EFL learners. TESOL Journal, 11(3), 1–25.

[9] Zhang, K. (2025). Enhancing critical writing through AI feedback: A randomized control study. Behavioral Sciences, 15(5), 600. https://doi.org/10.3390/bs15050600

