

# Generative AI Empowering College English Writing Teaching Model Construction, Practical Path, and Effect Evaluation

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**ABSTRACT** To address persistent problems in college English writing teaching, including low student motivation, delayed teacher feedback, insufficient individualized guidance, and single evaluation methods, this study develops a generative AI-enabled “inspiration-collaboration-internalization” teaching model. The model designs human-computer collaboration across the writing process, including brainstorming, drafting, revising, and reflection. Generative AI is used to provide personalized learning materials, alternative writing perspectives, and timely language feedback, while teachers focus on higher-order guidance involving argument depth, logical coherence, and structural organization. The model further encourages students to gradually reduce dependence on AI support and develop independent writing ability. A multilevel evaluation mechanism combining AI-assisted initial assessment and teacher feedback is established. A one-semester quasi-experiment and mixed-methods evaluation show that the experimental group’s writing score increased more than the control group’s, with gains of 1.65 versus 0.72 points and an effect size of 0.82. Students reported high satisfaction, with  $M = 4.28$ , and AI-use frequency decreased as writing competence improved.

**INDEX TERMS** generative artificial intelligence, english writing instruction, higher education, blended learning, human-computer collaboration

## I. INTRODUCTION

**F**ACING the new stage of artificial intelligence in the process of educational informatization, English writing teaching in higher education is confronted with great opportunities and challenges for the conversion of paradigms. There are still many existing problems in English writing teaching, for example, low students’ motivation of writing, slow teacher feedback, lack of individualized guidance and one-dimensional assessment [1,2]. These problems seriously affect the efficient improvement of students’ writing. How to effectively solve these problems by advanced intelligent technologies and systematically break through the above “deadlock” has become a key problem in enhancing the quality of foreign language teaching and promoting the innovation of teaching methods.

In recent years, the application of generative artificial intelligence in education has attracted much attention. For example, Cha et al. constructed a university teacher competency framework including self empowerment, professional teaching competence, and empowering capability to help teachers cope with challenges brought by generative AI and facilitate teachers to develop in generative AI era [3].

Zhang et al. employed qualitative comparative analysis and system dynamics modeling to explore multidimensional dynamic impact mechanism of generative artificial intelligence on English learning effect in higher education [4]. Kong and Yang built a human-centered learning and teaching framework based on generative artificial intelligence tool to support transformative learning teaching through domain knowledge self-regulated learning development [5]. Ironsi and Solomon examined the impact of using generative artificial intelligence in improving students’ writing skills through mixed methods research design and experiments to study effectiveness of chatgpt in writing instruction [6]. Ashrafova surveyed the theories and practices of second language writing and speaking instruction and suggested a blend of task-based and communicative approaches to addressing classroom challenges and promoting generative skill development [7]. However, according to the review of existing literature, most of the existing studies are still at the level of instrumental application exploration or have verified the local effect, and there is a lack of systematic model construction that integrates technology deeply into the whole teaching process from the holistic view

of teaching and curriculum, and there is a lack of teaching effectiveness assessment based on rigorous empirical design in the long term. To bridge the above research gaps, this study believes that the key lies in constructing a whole-process learner-centered human-computer collaborative teaching model. In order to address the above deficiencies in existing practices, such as the lack of integration between the application of technology and the main teaching process and the deficiency of teaching method innovation, this paper proposes a “generative AI-enabled” approach. Through systematic instructional design, the intelligent tool is embedded into the writing cognition and practice cycle. This paper follows an “design-implement-evaluate” action research approach, and aims at designing an evaluable integrated plan. The primary goal of this study is to build and validate a generative AI-enhanced holistic teaching model of English writing in higher education. That is, this study attempts to design an evaluable integrated plan through two stages: firstly, build a three-tiered “inspiration-collaboration-internalization” teaching approach and then design the concrete implementation plan in a real classroom of English writing instruction; secondly, use a mixed-methods research approach to conduct a multi-dimensional evaluation of teaching effect. The goal of this study is to integrately link technological innovation and pedagogical reform. The findings of this research are expected to provide an model with theoretical support and practical reference for the further reform of foreign language writing instruction in the context of artificial intelligence.

## II. THE DESIGN IS BASED ON A THREE-LAYERED CORE FRAMEWORK: INSPIRATION, COLLABORATION, AND INTERNALIZATION

This study constructed a three-layered core framework—henceforth referred to as the I-C-I framework—the structure of which is shown in Figure 1.

The first layer is the “Inspiration” layer, designed to activate, not replace, students’ original thinking. Prior to any AI interaction, students are required to independently brainstorm their own perspectives, generate a personal outline, and articulate initial ideas. Only after this independent thinking phase do they consult AI to generate alternative outlines and viewpoints, which serve as comparative references to expand, challenge, or refine their own initial conceptions. Students then critically evaluate, selectively integrate, and justify their choices, ensuring that AI functions as a cognitive amplifier rather than a substitute for original thought. The second layer is the “Collaboration” layer, wherein generative AI serves as a gradually fading scaffold. In early tasks, it provides comprehensive, real-time feedback; in later tasks, its support is systematically reduced—from offering corrections to merely flagging errors, and finally to on-demand availability only. This staged withdrawal ensures that reduced AI dependence is a pedagogically designed outcome rather than an incidental trend. Students have to make judgments on whether to follow the suggestions made

by AI. This way, students are trained in language judgment and metacognition effectively.

The third layer is the “Internalization” layer. The goal of this layer is to internalize acquired skills and transfer them. For the “Internalization” layer, teachers guide students to reflect on their own writing by comparing their own drafts and the ones generated by AI and making sense of their own revision decisions [8].

## III. SPECIFIC STRATEGIES FOR INTEGRATING AI TOOLS WITH COURSE CONTENT

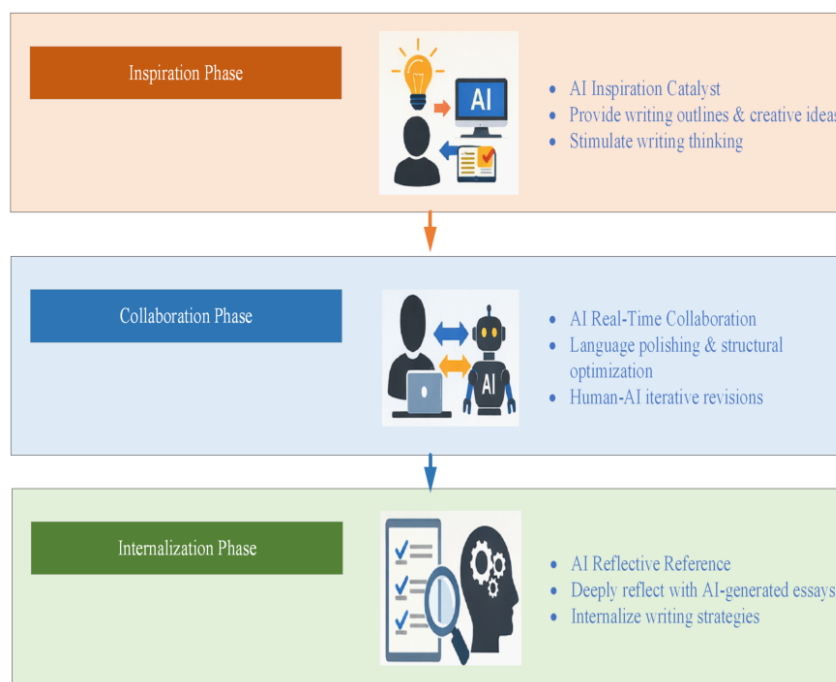
To apply generative AI to university English writing courses organically, this study designed integration strategies for generative AI at the level of the entire teaching process, aiming to make technology application focus on teaching goals.

In the pre-class preparation stage, AI serves as a contrastive material generator. For the same writing topic, teachers instruct AI to produce sample essays with varied arguments, difficulty levels, and stylistic approaches. However, these materials are not presented as models for direct emulation; rather, they are used for critical comparative analysis—students first articulate their own perspectives, then examine AI-generated alternatives to identify gaps, evaluate reasoning quality, and refine their own arguments accordingly.

In the classroom teaching and skill training links, we position AI as an object of critical analysis rather than an authoritative reference. Through the task chain design of “analysis-instruction-evaluation”—such as having students critique and revise an AI-generated paragraph for logical flaws, or instructing AI to produce counterarguments that students then challenge with evidence—students are trained to approach AI outputs with systematic skepticism. This design cultivates the habit of questioning AI-generated content, reinforcing that outputs from large language models represent statistically probable patterns rather than normative standards, and that students’ own reasoning must remain the ultimate arbiter.

When students write and revise, a “teacher-AI-student” tripartite link feedback relationship is established very clearly. AI must give prompt feedback on language forms (grammar, vocabulary), and after that, the teacher gives subsequent prompts on arguments, logic, structure, etc. This is very clear sequence feedback relationship, both efficient and deep, complement each other in assessment.

In the evaluation and reflection stage, AI acts as an auxiliary analysis and reflection intermediary. Teachers can use AI to analyze the overall language characteristics and trends of student corpora, providing a basis for teaching adjustments; students can compare their final drafts with AI-generated “benchmark texts,” developing clear self-assessment abilities through reflection and promoting metacognitive development [9].



**FIGURE 1.** “Inspiration-Collaboration-Internalization” Three-Layer Core Framework Diagram

#### IV. DESIGNING A HUMAN-COMPUTER COLLABORATIVE WRITING TASK WORKFLOW

To realize the I-C-I model in teaching practice, this study designed a simple and repeatable human-computer collaborative operation process for the writing tasks as follows:

**Process 1: “Inspiration and Planning Stage with Independent Pre-writing.”** Students first independently analyze the task requirements, generate their own preliminary perspectives, and draft a personal outline without AI assistance. Only after completing this independent ideation do they input their refined keywords or core questions into a generative AI to obtain a “multi-perspective possibility matrix” — a structured set of 2–3 alternative outlines or perspective clusters presented as explicitly non-authoritative options. To prevent students from treating AI outputs as definitive standards, they are required to systematically compare these AI-generated options against their own initial ideas using a structured evaluation rubric (assessing relevance, originality, and logical coherence), and to document in writing why they retain, modify, or reject each AI suggestion. The final outline is thus an integrated product of critical comparison, ensuring that AI functions as a tool for expanding cognitive boundaries rather than as a source of ready-made answers.

**Process 2: “Iterative Drafting and Revision Stage.”** Students write a first draft of their essay based on the selected outline. After finishing the first draft, the process enters the first round of systematic human-computer collaboration. Students need to submit their first draft to the AI for a complete check and revision suggestions regarding language form (such as grammar accuracy, appropriate word choice, and sentence fluency). Students need to review all

suggestions provided by the AI and choose whether to accept them or modify and accept them or reject them and retain all revision traces in their document and briefly note the reasons for rejection. After finishing a second draft based on the AI feedback, students need to submit their manuscript to their teacher. The teacher then provides feedback regarding the depth of arguments, rigor of reasoning, and structural coherence—dimensions that, while increasingly accessible to AI, are most impactful when addressed through personalized guidance, Socratic questioning, and sustained instructional dialogue. Notably, because AI has already addressed surface-level language issues, students can devote fuller cognitive attention to these higher-order teacher comments, making the feedback more effective and directly contributing to the substantial score gains observed in the experimental group. Students then make substantial changes to both content and structure based on the feedback from their teacher. During this process, students can again ask the AI to help them refine language on particular paragraphs, which forms a spiral “writing-technical feedback-teacher feedback-re-writing” process.

**Process 3: “Reflective Finalization and Internalization Stage.”** After making use of all feedback and completing the final draft, students are required to participate in a structured reflection activity. Using the AI to generate a “comparison essay” based on the same topic and outline. Students then systematically compare their final draft with the AI-generated comparison essay in multiple dimensions, including development of arguments, use of evidence, coherence, and language style and write a short reflection note regarding their strengths and weaknesses [10].

## V. ESTABLISHMENT OF A MULTI-DIMENSIONAL FEEDBACK MECHANISM BASED ON AI ASSISTANCE

At the level of individual linguistic forms, AI plays the role of a “micro-diagnostician,” yet its feedback intensity is dynamically reduced following the scaffolding fading schedule—shifting from exhaustive correction to minimal hints as students progress. Through the application of natural language processing technology, AI can complete instant grammar correction, spell checking, collocation suggestions for vocabulary use, as well as analysis of complexity of sentence structure for the texts submitted by students. The advantage of using AI lies in the fact that it can offer objective feedback of language data based on massive corpus, such as appearance frequency of certain word in academic context, advantages and disadvantages of certain sentence patterns, etc. This greatly reduces the workload of teachers in correcting the use of basic languages. Students can get opportunities of corrections when they are writing, and handling the issues of language accuracy is not separated from the whole process of writing, but embedded in the evaluation of the final draft. At the level of content and structure, a collaborative feedback model of “AI preliminary assessment and teacher in-depth guidance” is established. AI can be programmed to perform preliminary analysis of thematic relevance, paragraph coherence, and structural completeness, and to generate descriptive reports—capabilities that continue to evolve with advancements in large language models. Rather than basing the division of labor on fixed assumptions about AI’s limitations, this study anchors it in pedagogical principles: AI handles scalable, pattern-based analysis—particularly in language form and structural clarity—while teachers focus on dimensions that demand contextual judgment, ethical reasoning, and formative dialogue, such as the depth and innovativeness of arguments. Critically, AI’s contribution to lower-level writing skills (grammar, fluency, coherence) frees students’ cognitive capacity, allowing them to engage more deeply with teachers’ higher-order feedback. Thus, the experimental group’s superior performance stems not from AI directly enhancing argument depth, but from a synergistic effect: AI reduces surface-level writing burdens, enabling students to better internalize and apply the teacher’s guidance on substantive argumentation. This complementary approach ensures that both human and machine contribute according to their respective strengths, regardless of ongoing technical progress. Based on the descriptive report of preliminary analysis provided by AI, and combined with their own professional judgment, teachers give students high-level guidance on how to deepen ideas, clarify logic, optimize structure, etc. in a way of complying with academic ethics based on their preliminary analysis. This division of labor between humans and machines achieves complementarity in efficiency and depth, i.e. AI finishes rapid standardized preliminary screening, and teachers can focus their limited time and energy on the creative thinking level that requires the most professional intervention [11].

At the level of process and development, AI, as a “learning behavior data recording and analysis tool”, enables personalized teaching. This mechanism based on technical backend realizes continuous collection of anonymized process data of students’ interaction with AI. Through aggregation and analysis of data, teachers can transcend the learning results of a single assignment, and understand the learning behavior, strategy application and ability bottleneck of the class in general and each student individually. This transmits feedback from evaluating the “writing product” to focusing on and guiding the “writing process” and provides data support for making decisions on implementing truly personalized teaching.

## VI. EVALUATION PLAN FOR THE EFFECTIVENESS OF TEACHING MODELS

### A. OVERALL EXPERIMENTAL SETUP

In order to systematically study the application effect of “Generative AI-enabled English writing teaching model in higher education”, this study adopts the mixed-methods research design. The empirical evaluation is conducted on two parallel English writing classes (the experimental group and the control group) during one teaching cycle of semesters. To mitigate potential novelty effects and unequal instructor engagement—common threats in technology intervention studies—both groups were taught by the same instructor, followed identical class schedules and total instructional hours, and completed equivalent writing tasks. The instructor also maintained consistent time allocation for feedback across both groups, ensuring that any observed differences could be more confidently attributed to the instructional model rather than extraneous factors. In summary, the overall experimental design is quantitative comparison combined with qualitative in-depth tracking, and there are three sub-studies in this experimental design: Firstly, the quantitative analysis of pre-test and post-test writing scores are conducted to explore the overall experimental effect on the students writing results; Secondly, the writing process versions and interviews as well as learning logs of the selected students in the experimental group are analyzed in a longitudinal case study to explore the ability development process and AI using strategies of the students in the experimental group; Finally, the questionnaires and focus group interviews are conducted and analyzed to collect and explore the subjective experiences and attitudes of the teachers and students.

### B. A QUASI-EXPERIMENTAL STUDY ON THE IMPACT OF TEACHING MODELS ON STUDENTS’ WRITING PERFORMANCE

This study adopted a quasi-experimental design. We randomly chose two parallel English writing classes in a university as the experimental group (n=45) and control group (n=48), respectively. The experimental group received generative AI-enhanced instruction for one academic semester, and the control group received regular instruction. We



administered standardized writing tests before and after the experiment. The two sets of scores were graded in a double-blind way. Finally, we used independent samples t-tests to statistically test the differences between the two groups in pre-test scores and post-test scores, respectively. This study was approved by the Ethics Committee of Xinxiang Vocational and Technical College, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form. The design is illustrated in Figure 2.

The experimental results show that the generative AI-enabled teaching model effectively improves students' English writing scores. After one semester of instruction, the experimental group ( $n=45$ ) achieved an average post-test score of 6.85, an increase of 1.65 points compared to the pre-test (5.20 points); the control group ( $n=48$ ) had an average post-test score of only 5.91, an increase of 0.72 points compared to the pre-test (5.19 points). An independent samples t-test showed a highly significant difference between the post-test scores of the two groups ( $p < 0.001$ ), with a Cohen's  $d$  effect size of 0.82, indicating a large effect. This suggests that this teaching model has a significant and substantial positive impact on improving students' writing abilities compared to traditional methods.

### C. A LONGITUDINAL CASE STUDY OF STUDENT WRITING PROCESSES AND SKILL DEVELOPMENT

In this study, we performed a longitudinal case study of six students in AI-assisted writing instruction for one semester. From the high, medium, and low initial writing ability levels, we randomly selected two students in each level. We adopted a mixed-methods method using both qualitative and quantitative methods to thoroughly describe the writing ability development process and learning strategy change pattern of these six students. The details are shown in Fig. 3, in which we collected multi-dimensional information, including the scores of four major writing tasks, text complexity, frequency of using AI assistance, and the revision history.

Figure 3(a) shows a stepwise improvement in writing scores for students at different proficiency levels as the tasks progressed, with low-proficiency students showing the greatest improvement; Figure 3(b) reveals a between-student correlation: students with higher average AI usage frequency across the semester tended to show greater score improvement ( $r = 0.48$ ). Specifically, low-proficiency students used AI most frequently (average 10.0 times per task) and achieved the largest gains (+1.8 points), while high-proficiency students used AI less (average 8.0 times per task) and showed steadier gains (+0.9 points). Meanwhile, within-student longitudinal data show that all students' AI usage decreased over time—from an average of 12.3 times in Task 1 to 8.1 times in Task 4—as they internalized writing strategies and became less reliant on external support. These two findings are not contradictory: the between-student correlation indicates that students who engaged more intensively

with AI (typically those at lower starting levels) derived substantial benefit, while the within-student decline reflects the successful scaffolding fading mechanism, wherein AI support is systematically reduced as students' autonomous competence develops.

### D. MIXED-METHODS INVESTIGATION OF TEACHING PARTICIPANTS' EXPERIENCES AND ATTITUDES

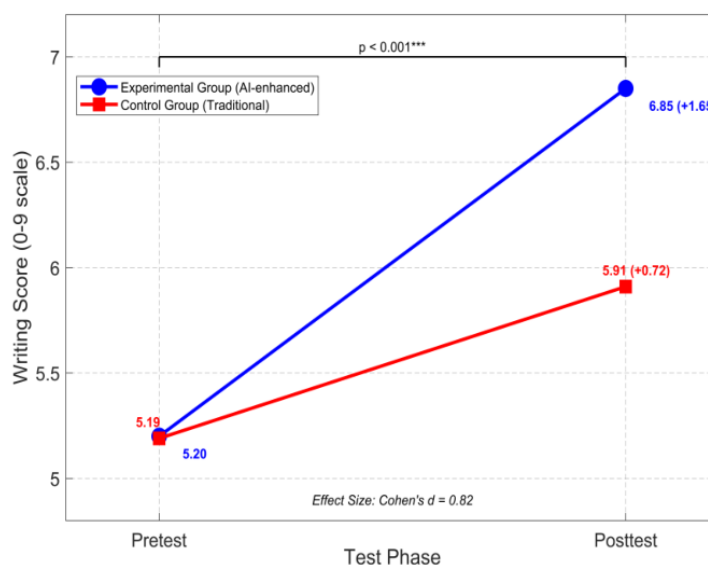
This study used a mixed-methods design to describe the experience and attitude of 45 students and 3 instructors who were involved in AI-enabled writing instruction reform. The quantitative data were collected from the five-point Likert scale questionnaires (including perceived usefulness, ease of use, satisfaction and self-efficacy), and the qualitative data were collected from the semi-structured interviews and focus group interviews. The purpose was to systematically describe the subjective acceptance, usage experience, and effectiveness of this new model from students and instructors' perspectives. The details are presented in Table 1:

**TABLE 1.** Mixed-Methods Assessment of Teaching and Learning Stakeholders' Experiences and Attitudes

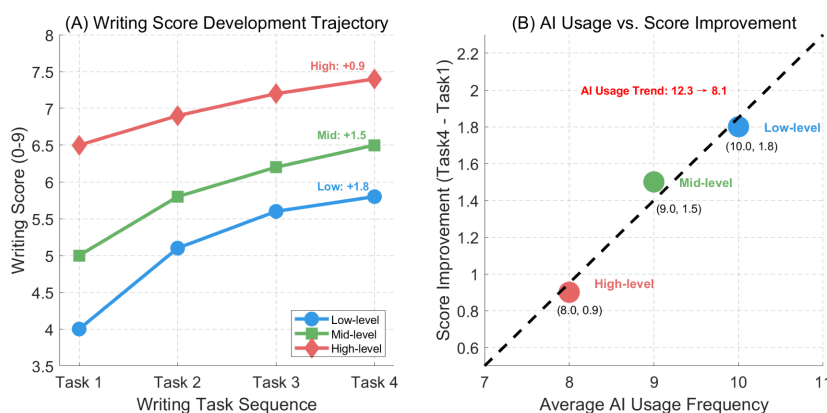
| Dimension             | Item Description                         | Mean (M) | SD   |
|-----------------------|------------------------------------------|----------|------|
| Perceived Usefulness  | Helpfulness for writing improvement      | 4.32     | 0.56 |
| Perceived Ease of Use | Ease of learning and use                 | 4.15     | 0.61 |
| Learning Satisfaction | Satisfaction with the AI-empowered model | 4.28     | 0.52 |
| Self-efficacy         | Confidence in writing tasks              | 4.05     | 0.67 |
| Behavioral Intention  | Willingness to continue using AI         | 4.2      | 0.58 |

Note: A five-point Likert scale was used for scoring, with 1 representing "strongly disagree" and 5 representing "strongly agree."

Based on the results of the survey analysis, the students have a very positive attitude towards the writing instruction based on AI. The mean scores of four dimensions were all higher than 4.0. The score of perceived usefulness ( $M=4.32$ ) and teaching satisfaction ( $M=4.28$ ) got the highest score. It means that the students firmly believe that the model has a positive effect on their learning. The result of the writing self-efficacy improvement ( $M=4.05$ ) shows that the model has a positive effect on the improvement of students' confidence. The standard deviation ( $SD=0.67$ ) is relatively large, which means there is a certain difference among students. The behavioral intention score of  $M=4.20$  also shows that the students approve of the model and are willing to use it. The qualitative analysis results are consistent with the quantitative analysis. Students generally believe that the model provides immediate and personalized feedback for them, and they also hope that teachers can provide more deep-level guidance in key areas.



**FIGURE 2.** Assessment of the impact of teaching methods on students' writing performance



**FIGURE 3.** Longitudinal Case Study Assessment of Student Writing Process and Ability Development

## VII. CONCLUSION

This study constructed and empirically tested a generative AI-enabled "inspiration-collaboration-internalization" English writing teaching model. The results show that this model effectively improves students' writing scores through a synergistic human-AI feedback framework: AI handles scalable, pattern-based tasks (grammar, fluency, structural clarity), thereby reducing students' cognitive load on lower-level writing demands; this cognitive release enables students to engage more deeply with teachers' context-sensitive feedback on argument depth and reasoning. Consequently, the substantial score gains in the experimental group (+1.65 vs. +0.72) reflect not AI's direct contribution to higher-order thinking, but its enabling role in creating optimal conditions for students to internalize and apply teacher guidance on the very dimensions where AI remains limited.

Students reported high satisfaction with the model, and their use of AI decreased progressively across tasks, demonstrating the teaching value of "empowerment" rather than "replacement." However, this study acknowledges certain methodological limitations: the sample was limited to a single institution, and despite efforts to control for instructor engagement and novelty effects by having the same teacher deliver both conditions with equal contact hours, the generalizability of the findings requires further validation through multi-site replication. Future research could conduct larger-scale empirical tests across multiple institutions and further explore the integration pathways of AI in cross-genre writing and critical thinking skills development, to promote a deeper and more organic integration of intelligent technology and writing instruction.

## AUTHOR CONTRIBUTIONS

Xiaojing Shen designed, collected and analyzed the data, and drafted the manuscript. Xiaojing Shen conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Xiaojing Shen participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

## CONFLICTS OF INTEREST

The author declares no conflict of interest.

## HUMAN RESEARCH SUBJECTS

This study was approved by the Ethics Committee of Xinxiang Vocational and Technical College, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

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Not applicable.

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