Corpus-based Analysis on DeepSeek-Assisted Feedback in Junior High School English Writing

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Manuscript received May 9, 2025; accepted September 5, 2025; published November 24, 2025.

***Abstract*—With the rapid advancement of technology, Artificial Intelligence (AI) has become an integral tool in education, particularly in language learning. This study examines the role DeepSeek as a feedback mechanism plays for improving junior high school English writing. Through a corpus-based analysis of 30 essays written by junior high school students, the study evaluates DeepSeek's effectiveness in providing feedback across three key dimensions, namely, vocabulary, grammar, and discourse. The findings indicate that at the lexical level, DeepSeek provides contextualized corrections that help address Chinglish-related issues, leading to greater lexical accuracy and diversity. At the grammatical level, it identifies common errors and improves sentence structures, which facilitates a structured learning cycle of "error recognition → cognitive adjustment → knowledge internalization." This process enhances linguistic coherence and overall writing accuracy. At the discourse level, DeepSeek aids in organizing ideas logically and fosters critical thinking, ultimately contributing to promote students' language proficiency and cognitive development. As artificial intelligence continues to evolve, integrating AI-powered feedback into writing instruction presents new opportunities for facilitating language learning and improving writing proficiency for junior high school students.**

***Keywords*—DeepSeek-assisted, junior-high school, English writing feedback**

I. Introduction

Writing is a critical skill in Second Language Acquisition (SLA), and it reflects learners' knowledge literacy and language proficiency, involving complex activities such as cognitive creativity, social interaction, and psychological cognition [1]. Writing feedback is considered "a continuation of the writing process" [2], which helps authors recognize areas for improvement in both form and content, ultimately enhancing their writing abilities. Second language (L2) writing feedback refers to the responses and evaluations given to the writing output of L2 learners [3]. Through L2 writing feedback, learners can identify issues in their writing and improve their skills through reflection and practice. Traditionally, L2 writing feedback primarily relies on direct guidance from teachers and peer reviews. However, due to constraints such as the large class size and limited teaching resources, teacher feedback often takes a long time to be provided, such feedback often lacks personalization, and struggles to meet the unique learning needs of each student [4]. Besides, under China's New Curriculum Standards for Compulsory Education [5], junior high school English teaching is expected to cultivate students' core competencies in language, including critical thinking, autonomous learning, and reflective ability. English writing feedback is no longer limited to the mechanical correction of linguistic errors, but emphasizes the process of meaning negotiation, argument construction, and self-revision.

With the rapid development of generative artificial intelligence, natural language processing technology has made it possible for language models to be integrated into L2 writing feedback. Existing studies on AI-assisted writing feedback have primarily focused on tools like Grammarly and ChatGPT, which demonstrate initial capabilities in addressing linguistic errors. Studies have shown that Grammarly's feedback accuracy is satisfactory at the linguistic form level (e.g., grammar, vocabulary, syntax, collocations, and conventions), but relatively weak at the discourse level (e.g., content, structure) [6]. Furthermore, Grammarly offers both free and paid version, the latter typically detects significantly more errors. Evidence suggests that developers deliberately limit the recall rate (i.e., the proportion of actual errors identified) in the free version for commercial reasons [7]. ChatGPT is able to provide clear, targeted revision suggestions through systematic enhancements in linguistic refinement, conceptual depth, and structural flow patterns [4]. While ChatGPT is able to provide feedbacks, it still requires students to provide clear instructions or needs, which is a huge challenge for students with insufficient English proficiency [1].

In January 2025, China's DeepSeek Exploration Company released the DeepSeek model, marking a significant breakthrough in generative AI technology. Firstly, combining linguistic precision (e.g., grammar correction) with discourse coherence analysis (e.g., argument flow optimization), DeepSeek supports end-to-end writing refinement beyond syntax-level corrections. Besides, unlike commercial tools that restrict core functions to paid tiers, DeepSeek integrates advanced discourse analysis and error detection into its baseline offering, prioritizing pedagogical impact over profit-driven limitations. Furthermore, DeepSeek makes a breakthrough in the interpretability of the cognitive process. The model not only generates final outputs but also visualizes the reasoning process by transforming implicit logical chains into interpretable derivation paths, thereby greatly enhancing model transparency [8].

In light of this, this study investigates the operational characteristics of DeepSeek-assisted feedback using corpus based analysis of Chinese junior high students' essays. By comparing student' original essays with DeepSeek's revised versions across the three dimensions of vocabulary, grammar, and discourse., this research aims to examines the role DeepSeek as a feedback mechanism plays for improving junior high school English writing. It is hoped

doi: 10.18178/ijlll.2025.11.6.612

that the findings will contribute to the emerging field of AI-driven assessment, offering actionable insights for educators navigating the integration of advanced AI tools into language teaching.

II. Literature Review

A. Theoretical Framework: Bandura's Social Cognition Theory

Social Cognitive Theory emphasizes the triadic reciprocal causation among behavior, personal cognitive factors, and environmental influences, and suggests that individuals are not passive recipients of information but active participants in the learning process through observation, imitation, and feedback [9]. Within this framework, self-efficacy is regarded as a core psychological mechanism that affects learning behaviors. Self-efficacy refers to an individual's belief in their capability to accomplish a specific task; it not only influences the learner's choice of activities and level of motivation but also determines their persistence when encountering difficulties [10]. Bandura identified four primary sources of self-efficacy beliefs: (1) mastery experiences, which are the most direct and effective source, help learners form positive self-attributions through successful performance; (2) vicarious experiences, which enhance self-belief through observing others succeed; (3) verbal persuasion, such as encouragement and feedback from teachers or systems, which can strengthen learner' confidence; (4) physiological and emotional states, which affect individuals' subjective evaluations of their capabilities [10].

In AI-assisted writing feedback, these sources of self-efficacy can be concretized and enhanced. For instance, AI tools can generate immediate and specific feedback using natural language processing technologies, while also visualizing both the AI's and the learner's thinking process in structured forms — such as argument chains or textual organization diagrams.

B. Research on Feedback in Second Language Writing

Research on feedback in second language (L2) writing has long been a focal topic in language education and applied linguistics. Generally, feedback refers to the information provided by the feedback provider to the writer to revise their composition, helping the writer recognize the gap between their interlanguage and the target language. This process enables the writer to reconstruct their assumptions about the target language and reorganize linguistic structures. In terms of form, feedback can be categorized into human feedback and AI-assisted writing feedback, which encompasses both Automated Writing Evaluation (AWE) and Natural Language Generation (NLG) feedback systems [11]. Structurally, feedback mainly consists of two components: "evaluation" and "correction". Evaluation typically involves directional comments from the feedback provider regarding the responsiveness and completeness of the writing task, while correction refers to explicit rectifications of errors made by the writer. Essentially, both components serve as stimuli for the writer, encouraging reflection and improvement, with the ultimate goal of achieving writing intentions and enhancing writing proficiency [12].

In the international context, human feedback has been explored from diverse perspectives. Ferris highlighted the long-term effectiveness of teacher-written feedback in enhancing writing accuracy, especially when feedback is clear, focused, and supported by revision opportunities [13]. Hyland and Hyland emphasized the complexity of teacher feedback, noting the interplay between praise and criticism and its impact on learner motivation [14]. Bitchener and Ferris further argued that the effectiveness of corrective feedback depends on feedback type, timing, and clarity. These studies suggest that well-designed human feedback plays a vital role in developing L2 writing proficiency [15].

In recent years, research on writing feedback in China has been predominantly empirical, focusing on four dimensions: teacher feedback, peer feedback, comparative studies of teacher and peer feedback, and intelligent feedback. Empirical studies on teacher feedback can be categorized into three main themes: feedback focus, feedback scope, and feedback strategies [16].

Regarding junior high school English writing, improving the accuracy, scientific validity, and effectiveness of writing feedback remains a key concern in academia. Numerous scholars have conducted theoretical and empirical studies on diversified evaluation models, error analysis theory, teacher-written feedback strategies, and peer review feedback models. While these studies provide practical guidance for frontline teachers, common issues persist, such as the validity of feedback being constrained by individual teacher and student factors, as well as concerns over the quality and specificity of feedback. Focusing on AI-assisted writing feedback, international research has primarily explored three models: writing conference-style feedback, automated essay feedback and evaluation, and corpus-based feedback. Writing conference-style feedback, mediated by computers, is student-centered, with the teacher acting as a facilitator [17]. Although this model relies on computer technology, the feedback process remains largely huamn-driven. AWE systems offer an economical and efficient alternative to teacher feedback by providing rapid feedback on content, text structure, and writing details. However, such systems primarily focus on language-related errors (e.g., grammar and spelling) and exhibit limitations in assessing content depth, logical coherence, and creativity. Corpus-based feedback, grounded in authentic language data, provides more realistic language exposure, helping students grasp native-like expressions. Additionally, it enables students to identify language errors, guiding them to make corrections and avoid similar mistakes in future writing. Nevertheless, corpus-based feedback requires a certain level of language proficiency to be effectively understood and applied, making it less suitable for beginners or students with weaker foundations.

Current research findings fully reflect the potential of AI-assisted writing feedback, as it aligns with the development trends of second language (L2) writing feedback in the digital era, particularly the future integration of artificial intelligence (AI) with L2 writing feedback. AI is applied in writing feedback primarily through two approaches: (1) Automated Writing Evaluation (AWE) Systems—These systems use Natural Language Processing (NLP) and Latent Semantic Analysis (LSA) techniques to evaluate

students' writing across multiple dimensions, including grammar, structure, semantics, and style. (2) Natural Language Generation (NLG) Systems—These systems analyze input texts using NLP techniques and, based on content planning, generate natural language texts through language models and rule-based mechanisms [18].

In recent years, AI language models, exemplified by ChatGPT, have further propelled the advancement of AI-assisted writing feedback. Powered by extensive corpora and deep learning technology, ChatGPT can comprehend textual meaning, analyze author intent, and provide revision suggestions to enhance clarity, fluency, and linguistic accuracy. In particular, DeepSeek, a generative AI tool developed in China, has demonstrated strong reasoning capabilities. Unlike traditional AWE systems, DeepSeek introduces a visualized "thinking process", transforming abstract reasoning process into an interpretable, step-by-step feedback chain [19]. This feature helps students gain a better understanding of the logic behind feedback, enhances their engagement, fosters independent learning.

However, research on applying AI-assisted writing feedback in junior high school English writing remains limited. In response, this study utilizes junior high school English compositions as a corpus to analyze the application of DeepSeek in English writing feedback. It explores the potential, feasibility, and effectiveness of AI-assisted writing feedback. Aligning with the trend of educational digitalization, this study seeks to utilize DeepSeek to promote transformative changes in L2 writing instruction, optimizing educational service delivery. This adjustment represents a forward-thinking adaptation of L2 writing pedagogy in response to the global trends of AI-driven education in the new era [20].

III. Research Design

To explore the effectiveness of AI-powered feedback in junior high school English writing, this study adopts a corpus-based research design, which allows for detailed linguistic analysis of authentic learner output across vocabulary, grammar, and discourse features. Drawing on data from 30 Chinese junior high school students, the study incorporates both quantitative and qualitative approaches to ensure a comprehensive and balanced analysis.

A. Research Questions

The study focuses on the effectiveness of AI-powered feedback regarding English writing of junior high school students, and two questions are raised:

RQ1: How does DeepSeek perform in providing feedback on junior high school English writing?

RQ2: What reference value does DeepSeek have for junior high school English writing feedback?

B. Corpus Source

This study selected a total of 30 English essays as the research corpus, comprising 4,529 words in total. The sample was randomly drawn from 82 second-year junior high school students at a public school in Shaanxi Province, China. The participants have completed over one year of task-based writing training under China's Compulsory Education English Curriculum Standards (2022 Edition). The essays were collected from a classroom writing task administrated during regular instructional hours (45minutes). Dictionaries, electronic devices, and peer consultations are prohibited. Prior to data collection, all participants were informed of the research purpose and provide their consent. Anonymity and confidentiality were strictly maintained throughout the study to protect their privacy. The writing prompt was as follows: "My ideal happy life." The content should revolve around the students' understanding of a happy life (e.g., health, family, friendship, education) and their personal reflections. The expected word count was approximately 100 words. Among the 30 collected essays, the longest contained 251 words, the shortest 76 words, with an average length of 150 words.

C. Research Methods

Referring to the functional overview of DeepSeek provided in the article by Li Hongxiu and Wang Mengmeng [21], the researcher input relevant instructions into DeepSeek using a structured questioning approach, that is, "defining the role + specifying tasks + providing detailed requirements." This guided DeepSeek to revise students' essays from three dimensions: vocabulary, grammar, and discourse, while also explaining the reasons for its modifications. The specific instruction was as follows:

"You are a junior high school English teacher. Please revise this English essay and provide feedback on three aspects: vocabulary, grammar, and discourse. Explain your suggested modifications and provide a sample revised version. The essay topic is 'My Ideal Happy Life,' and the content should focus on the student's understanding of happiness (e.g., health, family, friendship, education) and personal reflections, with an expected length of approximately 100 words."

IV. Results and Discussions

The English writing corpus of junior high school students reflects, to some extent, the common issues they have in English writing. On the one hand, the composition topics are not the practical writing and narrative essays emphasized in the high school entrance examination but are instead closely related to students' real-life experiences. It effectively prevents them from relying on templates to complete their writing, thereby providing a more authentic reflection of their writing proficiency. On the other hand, the collected composition corpus exhibits significant differentiation in terms of language quality, cognitive skills, and word count, highlighting the linguistic competence and writing characteristics of students at different proficiency levels.

A. Lexical Level

The lexical errors in the student corpus were categorized into four main types: spelling (28%), inappropriate word choice (26%), Chinglish expressions (30%), and redundancy (16%). These error patterns reveal both surface-level linguistic issues and deeper cross-linguistic transfer problems common among Chinese EFL Learners. DeepSeek addressed these errors through multiple strategies, including context-sensitive word substitutions, eliminated direct translation artifacts, and enriched vocabulary through synonym enhancement. The examples are as follows:

Example 1:

Student's sentence: Ths is a problem...

DeepSeek's revision: This is a problem...

Example 2:

Student's sentence: I have something moved to share with you.

DeepSeek's revision: I have something touching to share with you.

Example 3:

Student's sentence: Everyone have everyone's think.

DeepSeek's revision: Everyone has their own opinipns.

Example 4:

Student's sentence: Treat people with integrity, and the society will feed back with integrity.

DeepSeek's revision: If we treat others honestly, society will reward us with trust.

In Example 1, DeepSeek effectively identified and corrected a basic spelling error — substituting "Ths" with "This" — demonstrating its utility in capturing mechanical mistakes. Although this is a low-level correction, eliminating such errors can boost learner confidence by preventing unnecessary point deductions, thereby contributing to mastery experience, a key component in developing self-efficacy [10]. In Example 2, the student's limited vocabulary led to a semantically inappropriate word choice due to L1 interference. DeepSeek suggested more emotionally appropriate alternatives like touching, inspiring, and heartwarming. This not only corrected the lexical choice but also modeled contextually appropriate emotional expression. According to Social Cognitive Theory, such scaffolded feedback acts as verbal persuasion, helping learners expand their expressive repertoire and reinforcing their belief in their ability to convey complex meanings — thus strengthening self-efficacy [9]. In Example 3, the revision is a clear instance of resolving Chinglish-style expression caused by literal translation of Chinese syntactic structure ("每个人有每个人的想法"). DeepSeek not only adjusted the grammar (have → has) but also substituted "think" with the appropriate noun form "opinions". This demonstrates AI's ability to facilitate cross-linguistic abstraction, helping students internalize target language norms. As such, this supports cognitive modeling within the framework of social learning, where the AI functions as an "expert model," showing how native-like expressions are formed. In Example 4, the student's sentence originally contained redundancy and awkward literal translation. DeepSeek improved fluency and coherence by replacing "feed back" with "reward" and avoiding repetition by using "honestly" and "trust". Such feedback supports learners' metacognitive awareness of coherence and rhetorical appropriateness, allowing them to reflect on tone, register, and discourse conventions—skills crucial for advanced writing.

B. Grammar Level

According to DeepSeek's feedback, the common grammatical errors in students' writing are mainly concentrated in the following areas: subject-verb disagreement (28%), tense and voice errors (34%), and sentence structure confusion (38%). These types of grammatical issues reflect typical difficulties encountered by junior high school English learners in China, many of which stem from L1 interference, limited grammatical awareness, and insufficient metalinguistic knowledge. Specifically, it optimized sentence structure by upgrading simple sentences to compound or more logically coherent expressions. And it corrected grammatical errors and annotated grammatical rules. By integrating real-time feedback with rule explanations, DeepSeek forms a closed-loop learning pathway of "error identification - cognitive correction - knowledge internalization," providing an effective digital platform for junior high school students' grammar development. This aligns with Bandura's concept of reciprocal determinism, in which learners actively construct knowledge through interaction with feedback-rich environments [9].

Example 5:

Student's sentence: Everyone in the world need a complete family.

DeepSeek's revision: Everyone in the world needs a loving family.

Example 6:

Student's sentence: We born the century of 21, which winds and clouds are stirring.

DeepSeek's revision: We were born in the 21st century, an era full of challenges and opportunities.

Example 7:

Student's sentence: I don't think Music, Gaming, Hobbies aren't the addiction.

DeepSeek's revision: I believe music, gaming, and hobbies are not addictions but ways to relax.

In Example 5, the original sentence demonstrates a classic case of subject-verb disagreement. DeepSeek accurately corrected "need"to "needs," recognizing that indefinite pronouns like everyone require a singular verb form. Additionally, it substituted "complete" with "loving," shifting the focus from structural wholeness to emotional support—a more contextually appropriate expression. This kind of feedback promotes linguistic accuracy and semantic precision, reinforcing mastery experiences for the learner. According to Bandura, repeated success in applying grammatical rules contributes to higher levels of self-efficacy, encouraging students to engage more confidently in future writing tasks [10]. In Example 6, this sentence illustrates multiple grammatical problems, including incorrect tense ("born" instead of "were born"), misuse of relative pronoun ("which" introducing an unclear clause), and awkward metaphorical phrasing. DeepSeek's revision corrected the verb tense, clarified the syntactic relationship with an appositive phrase ("an era full of..."), and improved overall coherence and logical flow. This reflects not only grammatical correction but discourse-level scaffolding, which fosters students' awareness of rhetorical structures. By modeling how complex ideas are expressed in English, the AI feedback serves as a cognitive model, fulfilling the social cognitive principle of vicarious learning [9], whereby learners internalize linguistic norms by observing correct usage. In Example 7, the original sentence suffers from logical confusion due to the presence of a double negative. DeepSeek resolved this by rephrasing the statement into a clear and affirmative form, using a not...but structure to draw a contrast between addiction and

relaxation. This revision not only improved logical clarity but also introduced a more idiomatic and persuasive tone. When learners see their thoughts clearly and effectively expressed, it strengthens their perceived linguistic competence, a major determinant of self-efficacy in academic writing.

C. Discourse Level

As reflected in DeepSeek's feedback, the common discoursal problems in students' writing are as follows: loose logical structure (70%), theme deviation and redundancy (50%), and awkward paragraph transitions (80%). These issues reflect not only limited genre awareness but also a lack of organizational strategies for constructing coherent arguments. Specifically, DeepSeek pays special attention to logical connections between parts of the text and is able to add necessary linking sentences to enhance the logicality and coherence of the expression. In the revision process, DeepSeek focuses on the completeness of the content and is able to progressively enrich the content, refine the central theme in accordance with the context, thereby expanding the depth of the article's ideas and enhancing its content. More importantly, this type of feedback embodies the core mechanisms of Social Cognitive Theory [9], particularly the principle that learning is shaped by a triadic interaction of behavior (student writing), personal cognition (text planning and revision), and environmental feedback (AI corrections). By visualizing improved structures and modeling coherent discourse, DeepSeek enables learners to engage in self-reflective revision, which are essential to enhancing writing self-efficacy.

Example 8:

Student's sentence: The good life covers from social life... Then we should have a wonderful social life and much money, which try to own things. Finally, we must healthy...

DeepSeek's revision: A good life includes three key parts: social connections, health, and personal growth. First, a happy social life with friends and family gives us love and support. Second, health is the foundation—only with energy can we enjoy life. Finally, personal growth through education helps us achieve our dreams. In short, a good life depends on balancing these aspects.

Example 9:

Student's sentence: What is a good life? Had a healthy body, another key to a good life I think is love. This love includes everything, such as friends, family, and your pets, and so on. I think the most important aspects of leading a good life are exercise with love.

DeepSeek's revision: A good life starts with health and love. On one hand, daily exercise like walking or jogging keeps us energetic. On the other hand, love from family and friends warms our hearts. For instance, playing with my dog or having dinner with parents are simple moments that make me feel happy. In conclusion, health and love together build a truly good life.

Example 10:

Student's sentence: How to lead a good life?…Everyone need a complete family…health is important…

DeepSeek's revision: To lead a good life, we need to focus on two pillars: relationships and health. Firstly, a loving family and true friends prevent loneliness and give us strength. Secondly, regular exercise and a balanced diet keep our bodies strong. Remember, happiness grows when we balance connection with self-care.

In Example 8, the student's writing lacks a central organizing idea and includes abrupt, disjointed transitions between unrelated concepts. DeepSeek reconstructed the paragraph by establishing a clear topic sentence, organizing sub-arguments with transitional markers ("First, Second, Finally"), and eliminating vague or irrelevant ideas (e.g., "which try to own things"). This kind of structured revision offers a cognitive model of coherent academic writing, allowing learners to internalize logical sequencing — an important step in the development of metacognitive writing skills. In Example 9, DeepSeek addresses the abrupt shift in argument and the lack of clear relational logic between points. By introducing the "On one hand... On the other hand..." structure, the revised version clearly shows two key components of the argument and integrates illustrative examples to substantiate each point. This aligns with Bandura's emphasis on verbal persuasion and modeling as means of enhancing self-efficacy: learners are not only corrected but also shown how to express abstract ideas with clarity[10]. The process encourages deeper engagement with content organization, reinforcing both conceptual understanding and confidence in expressing complex ideas. In Example 10, the student's sentence indicates problems of incomplete argumentative structure and lack of development. DeepSeek added a clear thesis statement and reorganized the supporting ideas into a coherent two-point structure. It also concluded with a reflective sentence to reinforce the theme. By demonstrating how to build balanced argumentation, the AI feedback supports learners' planning and revision strategies, fostering self-regulation, a key construct in social cognitive theory. According to Zhang et al., such structured and intelligible feedback contributes to learners' perceived writing control, thereby improving their self-efficacy and task persistence [22].

V. Conclusion

The introduction of DeepSeek provides a new path for second language writing feedback at the primary education level. It not only offers teachers a new writing feedback model but also helps expand language pragmatics teaching resources, developing students' language pragmatics and written expression abilities. The findings, implications, limitations and suggestions for future research are as follows.

A. Findings

The findings of this study shed light on the performance of DeepSeek and its potential value in enhancing feedback for junior high school students' English writing. At the lexical level, DeepSeek was found to provide highly contextualized corrections that addressed common Chinglish expressions and misuse of vocabulary. The feedback facilitated an increase in lexical accuracy and diversity, contributing to more native-like and varied word usage among students. At the grammatical level, DeepSeek effectively identified recurring structural errors and

provided corrective suggestions that led to improved sentence construction. More importantly, it enabled a recursive learning cycle of "error recognition → cognitive adjustment → knowledge internalization", which not only corrected surface-level issues but also enhanced students' deeper grammatical awareness. At the discourse level, DeepSeek's feedback supported students in organizing ideas more logically and cohesively. The tool guided learners toward better discourse structuring and argument development, fostering the cultivation of critical thinking skills.

B. Pedagogical Implications

The integration of AI-powered tools such as DeepSeek into primary-level second language writing instruction offers valuable pedagogical insights. According to the findings summarized above, several pedagogical implications are provided for teachers in Chinese junior high schools.

Primarily, by automating surface-level corrections (e.g., vocabulary and grammar), DeepSeek allows teachers to focus more on higher-order skills such as discourse organization and cognitive development. Teachers can also design different tasks based on DeepSeek's personalized feedback-beginner learners concentrating on accuracy, while advanced students refine sentence structure and thematic depth. Besides, teachers can utilize DeepSeek's annotated corrections and examples to build thematic vocabulary lists and grammar reference banks, providing learners with authentic language input and structured output models. In addition, beyond linguistic accuracy, DeepSeek also offers suggestions for elaboration and idea development, enabling teachers to guide students in deepening content and cultivating discourse-level thinking. In summary, AI-driven feedbak tools such as DeepSeek are reshaping traditional second language writing instruction by shifting the focus from product-oriented correction to process-oriented development.

C. Limitations and Suggestions for Future Research

Despite the findings in this study, there are still several limitations that should not be ignored. First, the sample size of this study was relatively small, involving only 30 junior high school students. This limited scale may affect the generalizability of the results to broader student populations with varying proficiency levels and learning contexts. In addition, while DeepSeek offers detailed feedback, its evaluations may inherently contain a degree of subjectivity due to its algorithmic mechanisms and lack of transparent scoring criteria, this may lead to potential inconsistencies in how writing quality is assessed across different texts. Third, the absence of a teacher-assessed control group restricts the study's ability to compare AI-generated feedback with traditional human evaluation, which would provide a more balanced perspective on DeepSeek's effectiveness.

Future research could benefit from expanding the sample size, incorporating teacher feedback as a benchmark, and conducting longitudinal studies to examine the sustained impact of AI-assisted writing feedback.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Qiao Huixin conducted the research and wrote this paper with supervision of Liu Fei. Both authors approved the final version.

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