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# Reconstructing College English Writing Teaching Models with AI: A Distributed Cognition Theory Perspective

Qi Chen[1]

[1] *Chengdu University of Information Technology, Chengdu, China*

**ABSTRACT**

Against the backdrop of the rapid global advancement of AI, its integration into higher education has become an inevitable trend. In college English writing teaching, traditional models, characterized by limited interaction, fixed resources, and delayed feedback, fail to meet the demands of cultivating compound talents in the digital age. This paper explores a teaching model by deeply integrating Deepseek, an AI tool, into college English writing education. Leveraging the distributed cognition theory, which emphasizes interactions among humans, tools, and environments, this study argues that Deepseek supports students at four key stages during the writing process. The integration of Deepseek not only enhances teaching efficiency but also cultivates students' critical thinking and discourse construction abilities, representing a significant step in the "AI+Education" paradigm shift. However, challenges such as long-text logical fragmentation and the need for teacher role transformation remain. Addressing these issues is crucial for further promoting the digital transformation of college English writing education.

***Keywords:*** *Distributed cognition theory, College English writing teaching, Deepseek.*

## 1. INTRODUCTION

With the unprecedented rapid development of artificial intelligence sweeping the globe, its deep integration into higher education has become an irreversible trend of the times. From intelligent teaching management systems optimizing resource allocation to AI-assisted learning platforms enabling personalized knowledge push, AI technologies are reshaping the educational ecosystem. In the field of college English writing teaching, the traditional model, characterized by monotonous classroom lectures, delayed evaluation feedback, and fixed teaching resources that struggle to meet diverse needs, has created a significant gap with the cultivation goals of new-era compound talents. Students urgently need efficient writing guidance and instant feedback, while teachers aspire to leverage intelligent teaching tools to overcome technical barriers. AI tools represented by DeepSeek, with their advantages of instant response, multi-modal interaction, cross-device continuity, and zero-deployment, can precisely address the pain points of traditional teaching, offering innovative functions such as intelligent writing correction, real-time interaction, and cross-platform collaboration. This paper explores a new model of deeply integrating DeepSeek into college English writing teaching. This is not only a pragmatic measure to address teaching dilemmas, but also an inevitable choice to promote the digital transformation of higher education and cultivate talents who meet the needs of the intelligent era. It is of far-reaching significance for improving teaching quality and efficiency and reshaping the paradigm of English writing teaching.

## 2. DISTRIBUTED COGNITION THEORY

The distributed cognition theory, a pivotal theory in the field of cognitive science, was formally proposed by the American psychologist Edwin Hutchins in "Cognition in the Wild" in 1995. Zhou Guomei and Fu Xiaolan (2002) pointed out that distributed cognition exists and is distributed

within individuals, among individuals, in media, environments, cultures, societies, and time. Weng Fanya and He Xueli (2007) argued that in the distributed cognition theory, cognition is distributed among individuals, groups, and artifacts. Zhang Lixin and Qin Dan (2018) further divided distributed cognition into two distinct levels: socially, individuals are assisted by others in society as cognitive resources during cognitive activities; materially, distributed cognition emphasizes the cognitive components borne by various tools in individual cognitive activities. It can be observed that the distributed cognition theory pays more attention to the situational dependency and distributive characteristics of cognitive activities, as well as the effective interactions within individuals, among individuals, and between individuals and artifacts when solving problems, focusing on the extended human cognitive system. For the distributed cognition theory, it is crucial to consider the interactive relationships among humans, between humans and tools, and among tools, as well as the operation of the entire cognitive system. Knowledge is continuously generated and flows through these interactions.

With the in-depth development of artificial intelligence, the characteristics of digital youth have become increasingly prominent in the growth of the younger generation. The younger generation's high dependence on cyberspace, digital technologies, etc., profoundly influences their thinking patterns, behavioral patterns, lifestyles, and other aspects (Jia Zhaoshuai, 2023). The interactive relationship between humans and intelligent tools has become an increasingly important factor for enhancing individual cognition. Yang Canjun et al. (2000) proposed human-machine integration, arguing that the technical route of human-machine integration is human-centered, with equal cooperation between humans and machines to form a system together. The distribution of cognition between humans and machines represents a form of cognitive enhancement (Kaptelinin V, 1996). Knowledge is generated through interaction and internalized into an individual's knowledge system. In university teaching, how to promote interactions between humans and tools, and thereby drive interactions among humans and tools, has become a contemporary issue. Fang Haiguang et al. (2022) proposed that human-machine collaborative education in the era of artificial intelligence regards tools represented by artificial intelligence and teachers-students as joint educational subjects to participate in the restructuring of educational modes. To meet the development requirements of the new era, many scholars have made attempts. For example, Wang Lianghui et al. (2021) proposed a precise teaching model of human-machine collaboration, emphasizing that the "diagnosis-feedback-intervention-reflection" link of human-machine collaboration should run through the entire teaching process. College English writing teaching should also actively embrace the development opportunities brought by artificial intelligence and construct a teaching model adapted to the new era.

## 3. CHALLENGES IN COLLEGE ENGLISH WRITING TEACHING AND OPPORTUNITIES BROUGHT BY DEEPSEEK

Currently, college English writing teaching faces severe challenges. Firstly, traditional classrooms are mostly confined to the single modality of teachers lecturing and students listening, lacking diverse interactive forms. This not only fails to stimulate students' enthusiasm but also restrains their creative writing thinking. Secondly, there is a significant contradiction between students' ubiquitous learning needs and the fixed teaching resources and models. Students find it difficult to flexibly conduct writing exercises according to their own progress. Thirdly, some teachers' ability to integrate information technology lags behind. They are unable to make full use of advanced technologies such as intelligent writing correction tools and online collaboration platforms, making it hard to achieve personalized and efficient writing teaching, which seriously affects teaching quality and the improvement of students' writing abilities.

The features of the DeepSeek web version show great potential in solving the real pain points of college English writing teaching, making it crucial to explore their combination. Its instant response (less than 3 seconds) and multi-modal processing capabilities can quickly provide feedback on students' vocabulary, grammar, and logical problems in writing, presenting explanations in various forms. This breaks the limitation of the single modality in traditional classrooms, stimulating students' interest and creative thinking. The cross-device continuity on the browser side allows seamless switching between mobile phones and PCs, meeting students' needs for ubiquitous learning and solving the contradiction between their

ubiquitous learning needs and fixed teaching resources. Students can use fragmented time to practice writing on different devices. The zero-deployment feature greatly reduces the technical entry threshold. Teachers can easily get started without complex technical operations and make full use of intelligent writing correction tools and online collaboration platforms, improving their ability to integrate information technology and achieving personalized and efficient writing teaching. As a result, the quality and efficiency of college English writing teaching can be effectively improved.

## 4. RECONSTRUCTION OF COLLEGE ENGLISH WRITING TEACHING MODE WITH DEEPSEEK INTEGRATION

The distributed cognition theory emphasizes that the meaning of a subject resides in the interactive activities between the subject and the object. When constructing a writing teaching model, teachers need to comprehensively consider the interactive relationships among humans, between humans and tools, and among tools, as well as the operation of the entire system composed of them, so that knowledge remains in a state of generation and flow. This section mainly focuses on the interactions between teachers and students, and between teachers/students and the DeepSeek web version. In the process of college English writing teaching, instructors can use the DeepSeek web version to construct a support system covering the entire writing cycle. The following explanation will be presented from the stages of writing conception, composition, inspection-revision, and writing evaluation.

### *4.1 The Conception Stage*

In the conception stage of writing, the Deepseek web version can support English writing teaching primarily in three aspects. Firstly, it can generate multi-angle research questions to promote students' diversified thinking. When teachers require students to write on a grand and multi-faceted topic, Deepseek helps students decompose it into more specific and targeted essay topics from multiple dimensions. For example, regarding the broad theme of “Economic Impacts of Climate Change” given by teachers, Deepseek divides it into 17 essay topics from different perspectives by economic sectors/fields affected, temporal-spatial scales and nature of impacts, economic entities influenced, response strategies and policy dimensions, and innovative and future-oriented perspectives. Secondly, it can recommend relevant literature databases and teach students literature retrieval skills. For instance, Deepseek provides comprehensive academic databases (e.g., Web of Science, Scopus, CNKI), specialized resources on climate change economics (e.g., IPCC, Climate Change Knowledge Portal), and featured literature acquisition channels (e.g., Altmetric) for these 17 essay topics. It also informs students of literature retrieval techniques, such as keyword combination, research method limitation, and scholar tracking. Thirdly, Deepseek can assist students in logically optimizing their article structures. Through the “Deep Thinking (R1)” function, Deepseek generates a complete thinking chain to help students sort out the thesis framework. For example, for the topic “Impacts of Climate Change on Agriculture”, Deepseek forms a logical closed loop from five dimensions: impact mechanisms, technical responses, policy management, case verification, and future directions. This construction and reflection of logical chains enable students to think more clearly and comprehensively about the context and core content of each part of their articles before actually starting to write. Through the in-depth interaction between humans and tools, knowledge continuously generates and flows.

### *4.2 The Composition Stage*

In the critical phase of English writing, Deepseek establishes a virtuous writing ecosystem that supports students while preserving their independent thinking through a guided output mechanism. For example, unlike the “shortcut” of directly generating complete theses, when students submit essay-writing requirements, Deepseek outputs an elaborately designed academic blueprint. From refining core arguments and constructing chapter frameworks to guiding literature review directions, each node reserves ample creative space for students. This design breaks the AI dependency trap, compelling students to actively sort out research ideas and fill framework details with their knowledge reserves and critical thinking, ensuring the thesis truly becomes a crystallization of personal academic exploration. When students create based on the outline, Deepseek's cognitive diagnosis function acts as an invisible tutor, scanning for knowledge gaps behind the text. For example, if a student misapplies statistical methods in a social science paper, Deepseek not only identifies the error precisely but also pushes targeted learning resources to help students address

shortfalls. This model of problem-discovery and targeted remediation transforms the writing process into an efficient personalized learning journey.

Facing common coherence challenges in writing, Deepseek serves as a “linguistic intelligence advisor” providing comprehensive solutions. For instance, if a student is uncertain about whether to use "however" or "in contrast" to enhance logical comparison, they can query Deepseek. The tool will provide core distinctions between the two, in-depth analyses of usage scenarios, corrections of classic errors, advanced techniques and alternative options, and a summary of their applications. This multi-dimensional real-time guidance enables students to gradually internalize linguistic logic in writing practice, truly achieving the enhancement of writing competence through the interaction between humans and tools.

### *4.3 The Inspection-Revision Stage*

Leveraging powerful natural language processing (NLP) technology, Deepseek offers detailed linguistic analysis services for college English writing teaching during the inspection-revision stage. Its NLP model can not only quickly locate common grammatical errors (e.g., subject-verb disagreement, tense misuse) but also precisely identify logical issues, such as disjointed expressions between arguments or insufficient evidential support for claims. When a student writes “The data shows a correlation, but it don’t prove causation”, Deepseek marks the incorrect usage of “don’t”, revises it to “doesn’t”, and attaches a detailed grammatical explanation: Third-person singular requires verb agreement. For logical loopholes—such as sudden shifts from one argument to an unrelated point—Deepseek prompts the addition of transitional sentences to help students construct coherent and rigorous discourse logic.

In cross-cultural pragmatic revision, Deepseek benefits non-native English students by addressing pervasive issues like “Chinglish”. Through in-depth comparisons of expressive differences between Chinese and English, it provides professional optimization solutions. For example, if a student writes “This study has big meaning”, the system revises it to the academically appropriate “This study holds significant implications”, while explaining that informal words like “big” have pragmatic limitations in formal academic writing, recommending more precise terminology.

Instructors can also utilize Deepseek to strengthen academic integrity education. The tool incorporates a built-in plagiarism detection module that, upon completion of students’ English writing tasks, rapidly scans the text, marks potential plagiarized paragraphs, and explains specific requirements and operational methods for proper citation in line with academic norms, helping students establish correct awareness of academic referencing. Meanwhile, considering AI-generated “hallucination” issues (e.g., fabricated literature), Deepseek promptly labels unverified content with a not validated warning, reminding students to verify information sources and ensuring the authenticity and rigor of academic writing. The interaction between Deepseek and teachers/students at this stage contributes to the enhancement of students' multi-faceted knowledge and skills.

### *4.4 The Writing Evaluation Stage*

In college English writing teaching, the evaluation stage constitutes a critical link for enhancing students' writing competence. The introduction of Deepseek enables the construction of a multidimensional evaluation system, effectively promoting in-depth interactions between teachers and students, as well as between educators/learners and intelligent tools. Upon completing English writing tasks, students first engage in intragroup peer review. Group members evaluate each other based on criteria such as grammatical accuracy, content coherence, and logical clarity. During the peer review process, members express diverse opinions and propose revision suggestions from different perspectives, which not only help peers identify issues but also prompt self-reflection on individual writing deficiencies through communication.

Meanwhile, Deepseek's multi-role simulation function injects new vitality into writing evaluation. By pre-setting the “teacher” role, Deepseek conducts systematic evaluations of students' compositions from a professional perspective, providing comprehensive and targeted feedback ranging from macro-level article structures to micro-level vocabulary usage. By pre-setting the “student” role, Deepseek simulates peers' perspectives on the composition, offering opinions close to students' cognitive levels. These simulated evaluations, combined with the results of intragroup peer reviews, form rich evaluation materials. After each group receives the evaluations, members can compare peer-to-peer feedback, Deepseek's

simulated teacher evaluations and simulated student evaluations. Students may discuss similarities and differences, analyze the rationality and feasibility of each suggestion, and deepen their understanding of writing key points through intellectual discourse. Finally, instructors can select representative evaluations for class-wide display, guiding students to compare and discuss from a broader perspective and extract more universal writing improvement strategies. In this way, English writing evaluation evolves from a single teacher-driven assessment to a collaborative learning process involving teachers-students, students-students, and human-machine interactions, effectively enhancing students' writing abilities and critical thinking.

## 5. CONCLUSION

The application of artificial intelligence represented by Deepseek in college English writing teaching not only improves the efficiency of teaching but also cultivates students' critical thinking and disciplinary discourse construction capabilities, serving as a beneficial practice for the paradigm shift in “AI+Education”. However, challenges remain—for example, logical fragmentation easily occurs when processing long texts in Deepseek. Additionally, to better integrate artificial intelligence into college English writing teaching in the new era, university teachers need to actively undergo role transition—shifting from knowledge transmitters to learning designers, and focusing on mastering the design of collaborative mechanisms for AI and human feedback, as well as their application in teaching.

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