

# Research on the Interdisciplinary Integration Path of College English Empowered by Artificial Intelligence

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**Abstract:** With the rapid development of artificial intelligence technology and its deep integration with the field of education, college English teaching is facing a major opportunity to shift from cultivating single language skills to empowering students' interdisciplinary literacy and comprehensive abilities through language as a medium. This study aims to explore how artificial intelligence technology can effectively empower interdisciplinary integration in college English teaching in order to meet the needs of cultivating compound and international talents in the new era. The paper first analyzes the core dilemmas faced by current college English teaching in interdisciplinary integration practices, such as the disconnect between teaching content and real subject scenarios, the scarcity of teaching resources, insufficient interdisciplinary teaching ability of teachers, and the single evaluation method. Based on this, this study constructs an "AI-empowered Interdisciplinary Integration Pathway Model for College English." With the core philosophy of "student-centered, output-oriented", this model systematically elaborates three key integration pathways: First, the content integration pathway utilizes AI technology to thoroughly mine and dynamically generate authentic language materials and teaching cases related to specific majors, thereby establishing a personalized, scenario-based teaching content system. Second, the teaching process restructuring pathway reshapes the "pre-class, in-class, and post-class" teaching process through tools such as intelligent writing assistants and cross-language information retrieval, creating an interdisciplinary project-based learning environment that guides students to utilize English in completing analysis, collaboration, and creation tasks with disciplinary characteristics. Third, the evaluation and teacher development pathway employs AI learning analytics technology to achieve diversified, process-oriented evaluations of students' language use and cognitive processes in interdisciplinary tasks; simultaneously, it advocates for the establishment of an "AI+ teaching research community" to enhance teachers' interdisciplinary teaching design capabilities and AI literacy. This study posits that artificial intelligence serves not only as a technical tool for achieving interdisciplinary integration but also as a core driver that catalyzes the reconstruction of teaching philosophies and the innovation of teaching models. Through these pathways, college English teaching can effectively dismantle disciplinary barriers, transforming from a "general education course" serving liberal arts education into an "empowerment platform" that supports professional development, thereby cultivating exceptional talents equipped with global perspectives, cross-cultural communication skills, and interdisciplinary innovation capabilities.

**Keywords:** Artificial intelligence; College English; Interdisciplinary integration path

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## 1. Introduction

With the rapid advancement of artificial intelligence technology, its application in the field of education has increasingly become a focal point of research. Artificial intelligence not only presents new opportunities for education but also introduces challenges to traditional teaching models. This trend is particularly pronounced in college English instruction. As a foundational course within the higher education system, college English embodies both instrumental and humanistic characteristics. Its teaching objectives are evolving from the mere cultivation of language skills to the enhancement of interdisciplinary literacy and comprehensive abilities. This transformation represents not only an inevitable trend in educational development but also a necessary response to the demands of the new era for interdisciplinary and international talent.

The integration of artificial intelligence in college English instruction has yielded significant results. For instance, in the realm of oral English teaching, AI technology can assist students in enhancing their pronunciation accuracy and oral fluency through speech recognition and real-time feedback. In writing instruction, generative AI tools such as ChatGPT can offer students valuable writing guidance and feedback, thereby substantially improving their writing skills. Furthermore, AI can create personalized learning pathways to address the diverse learning needs of various students, thus enhancing overall learning efficiency.

Nonetheless, college English instruction continues to encounter numerous challenges in the practice of interdisciplinary integration. For instance, issues such as the disconnect between teaching content and authentic disciplinary contexts, a lack of teaching resources, inadequate interdisciplinary teaching capabilities among educators, and limited evaluation methods significantly impair teaching effectiveness. The presence of these challenges hinders college English instruction from fulfilling the cultivation needs of interdisciplinary talents in the contemporary era. Consequently, investigating how artificial intelligence technology can effectively enhance the interdisciplinary integration of college English teaching has emerged as a crucial topic in current educational research.

This study aims to construct an ‘AI-Empowered Interdisciplinary Integration Pathway Model for College English,’ based on the core concepts of a ‘student-centered, output-oriented’ approach. It systematically elaborates on key pathways, including content integration, restructuring of the teaching process, and evaluation alongside teacher development. Through the implementation of these pathways, college English teaching can effectively dismantle disciplinary barriers, evolving from a ‘general education course’ that serves liberal arts education into an ‘empowerment platform’ that supports professional development. This transformation aims to cultivate exceptional talents equipped with global perspectives, cross-cultural communication skills, and interdisciplinary innovation capabilities.

## 2. Current Status and Challenges of Interdisciplinary Integration in College English Education

The integration of interdisciplinary approaches in college English education encounters numerous challenges related to teaching content, resources, instructor competencies, and assessment methodologies. The presence of these issues not only undermines the quality and effectiveness of college English instruction but also impedes the profound advancement of interdisciplinary integrated teaching. Consequently, investigating effective strategies to improve the quality of interdisciplinary integrated teaching in college English has emerged as a significant topic within contemporary educational research.

### **2.1. The disconnect between teaching content and disciplinary context**

A fundamental issue in college English instruction concerning interdisciplinary integration is the disconnect between the teaching content and genuine disciplinary contexts. At present, the majority of universities' college English programs continue to rely on traditional one-way knowledge transmission, utilizing outdated textbook materials that struggle to align closely with disciplinary practices. For instance, in many institutions, there is frequently an absence of a cohesive relationship between college English courses and specialized courses, hindering students' ability to apply their English knowledge in real-world professional settings. This disconnect not only diminishes students' motivation to learn but also undermines the role of college English instruction in fostering students' interdisciplinary literacy.

### **2.2. Insufficient teaching resources**

Interdisciplinary integrated teaching necessitates a wealth of teaching materials, case studies, and multimedia resources. However, current access to these resources is limited, and their quality and applicability vary significantly. On the one hand, most existing college English textbooks fail to incorporate timely updates and lack a close integration with cutting-edge disciplinary developments. On the other hand, while digital resources are abundant, there is a lack of effective screening mechanisms and systematic integration solutions, resulting in students facing challenges related to information overload and fragmented learning. This deficiency in resources significantly impedes the implementation of interdisciplinary integrated teaching in college English.

### **2.3. Teachers' interdisciplinary teaching abilities are inadequate.**

Teachers play a pivotal role in interdisciplinary integrated teaching; however, many college English instructors currently demonstrate significant deficiencies in their interdisciplinary teaching capabilities. Firstly, some educators possess limited reserves of interdisciplinary knowledge, which impedes their ability to accurately integrate content from various disciplines. Secondly, a lack of experience in interdisciplinary teaching methods and strategies hampers their effectiveness in guiding students through the process of knowledge integration. Furthermore, educators generally lack a comprehensive understanding of artificial intelligence and its applications in education, which poses challenges in adapting to the talent development needs of the intelligent era. These issues present numerous obstacles for educators engaged in interdisciplinary integrated teaching.

### **2.4. The evaluation method is overly simplistic.**

The current evaluation system for college English instruction predominantly favors summative assessment, primarily gauging teaching effectiveness through standardized test scores. This singular evaluation approach not only fails to adequately capture students' comprehensive language competencies but also hinders the innovative transformation of teaching methodologies. Although some institutions have attempted to implement online testing systems and process assessment tools, the overall dynamic management of students' intercultural communication skills, digital literacy, and self-directed learning processes remains insufficient. This evaluation-centric approach has further intensified the dissonance between college English instruction and interdisciplinary integration.

### **3. Construction of an AI-Powered Interdisciplinary Integration Path Model for College English**

With the rapid advancement of artificial intelligence technology, its application in the field of education has increasingly become a focal point for research. This study aims to develop an “AI-enabled interdisciplinary integration path model for college English,” with a core concept centered on “student-centered and outcome-oriented” principles. It systematically elaborates on three key integration pathways: the content integration pathway, the reconstruction of the teaching process pathway, and the evaluation and teacher development pathway.

#### **3.1. Content integration path**

The essence of the content integration approach is rooted in the utilization of AI technology to thoroughly analyze and dynamically generate real-world corpora and teaching cases pertinent to specific academic disciplines. This methodology facilitates the establishment of a personalized and contextually relevant teaching content system. For instance, AI-driven corpus analysis tools<sup>[2]</sup> can efficiently filter English corpora associated with various professional fields, such as medical English and business English, thereby offering students authentic and diverse linguistic input. Additionally, AI can autonomously produce tailored learning materials based on students’ progress and interests, aiding them in better comprehending and applying the knowledge they have acquired.

#### **3.2. A pathway to reconstructing the teaching process**

The teaching process is restructured by using tools such as intelligent writing assistants and cross-language information retrieval to reshape the teaching process from “pre-class to in-class to post-class” and create an interdisciplinary project-based learning environment. Before class, students can use AI tools for self-study, such as completing pre-class reports through intelligent writing assistants and finding relevant information through cross-language information retrieval tools. In class, teachers can guide students to carry out interdisciplinary project-based learning, such as organizing students to conduct group discussions and case analysis, so as to cultivate students’ ability to use English to complete professional analytical, collaborative and creative tasks. After class, AI tools can provide students with personalized feedback and suggestions to help them consolidate what they have learned.

#### **3.3. Evaluation and teacher development path**

The assessment and teacher development pathways utilize AI learning analytics to facilitate diverse and process-oriented evaluations of students’ language use and cognitive processes in interdisciplinary tasks. AI learning analytics technology can monitor students’ learning behaviors and outcomes in real time, providing educators with comprehensive learning analysis reports that aid in understanding students’ learning progress and making targeted adjustments to their teaching methods. Additionally, this study proposes the establishment of an “AI+Teaching and Research Community” to enhance teachers’ capabilities in interdisciplinary instructional design and improve their AI literacy. By organizing opportunities for teachers to engage in AI-related training<sup>[1]</sup> and pedagogical research activities, we aim to foster communication and collaboration among educators and collectively explore innovative methods and strategies for AI-enhanced interdisciplinary teaching of college English.

By implementing the above approach, college English teaching can effectively break down disciplinary

barriers and transform from a “public course” serving general education into an “empowering platform” supporting professional development, thereby cultivating outstanding talents with a global perspective, cross-cultural communication skills, and interdisciplinary innovation capabilities.

## **4. An Analysis of the Practices and Effects of AI-Powered Interdisciplinary Integration Paths in College English**

### **4.1. Practical cases and effects of content integration path**

In college English teaching, AI-enabled content integration approaches have shown remarkable effectiveness. By leveraging AI technology to deeply mine professional-related language resources, the teaching content has shifted from single-language knowledge to interdisciplinary knowledge.

For instance, certain universities have started to investigate the application of artificial intelligence in English language instruction. The “Advanced Academic English Skills + AI Application” micro-major provided by Southwest University utilizes AI tools for academic writing<sup>[1]</sup> and literature reviews, thereby significantly enhancing students’ academic English proficiency. This model not only enriches the instructional content but also enhances students’ language application abilities within their respective professional domains.

Furthermore, AI technology can offer students opportunities to practice language in virtual scenarios through tools such as intelligent translation and speech recognition, thereby enhancing their language proficiency. For instance, educators can utilize AI to accurately analyze students’ learning data, dynamically assess their progress, and subsequently develop more targeted teaching plans to facilitate personalized instruction<sup>[2]</sup>.

In the context of cross-cultural critical thinking, AI-enabled college English instruction examines Western cultural elements present in textbooks and skillfully integrates them with traditional Chinese culture to facilitate cultural comparison and mutual learning. For instance, when elucidating content related to Western culture, educators should guide students in comparing the differences between Chinese and Western cultures, thereby fostering their cultural confidence and enhancing their intercultural communication skills<sup>4</sup>. This cross-cultural comparison not only broadens students’ cultural perspectives but also deepens their cultural comprehension.

### **4.2. Practical cases and results of teaching process restructuring**

In the process of reconstructing the teaching framework, artificial intelligence technology has been employed to transform the teaching sequence from “pre-class to in-class to post-class” and to establish an interdisciplinary, project-based learning environment. For instance, in the “English Speech” course, a blended teaching model that integrates task-driven learning with human-machine collaboration was developed through the Zhihuishu AI platform<sup>[3]</sup>. Prior to class, students utilize AI tools for self-directed study, such as completing pre-class reports with the assistance of intelligent writing aids; during class, instructors facilitate interdisciplinary project-based learning by organizing group discussions and case studies; and after class, AI tools offer personalized feedback and recommendations to assist students in reinforcing their understanding.

This restructuring of the teaching process not only enhanced students’ enthusiasm for learning and participation, but also fostered their interdisciplinary collaboration skills and innovative thinking. For instance, in the teaching unit on “Three Elements of Persuasive Speech,” the AI debate enabled students to develop the ability to respond swiftly and utilize language flexibly in a high-pressure environment, thereby improving their

critical thinking and language control skills.

### **4.3. Practical cases and effects of evaluation and teacher development pathways**

In the realm of assessment and teacher development pathways, AI learning analytics technology is employed to facilitate a multi-dimensional and process-oriented evaluation of students' language utilization and cognitive processes within interdisciplinary tasks. For instance, in the context of college English functioning as a secondary classroom, AI technology provides intelligent writing assistance and evaluates written works, thereby conducting a comprehensive assessment of students' writing. Educators then guide students in making targeted revisions based on the evaluation outcomes, which significantly enhances students' writing proficiency.

Simultaneously, we will establish an "AI + Teaching and Research Community" to enhance teachers' interdisciplinary instructional design capabilities and their proficiency in artificial intelligence. For instance, in the reform of college English teaching within higher vocational colleges in Guangdong Province, the development of differentiated instruction and intelligent cloud platforms has empowered teachers to more effectively address the diverse learning needs of students at varying proficiency levels, thereby enhancing teaching effectiveness and fostering teachers' enthusiasm for their profession.

### **4.4. Comprehensive effectiveness analysis**

Overall, the integration pathways for college English, enabled by artificial intelligence, have achieved significant practical outcomes across various dimensions. The content integration pathway enriches teaching resources through AI technology, thereby enhancing students' comprehension and application of professional knowledge. The reconstruction of the teaching process is facilitated by AI tools, which foster students' abilities in interdisciplinary collaboration and innovative thinking. Furthermore, the evaluation and teacher development pathway leverages AI learning analytics technology to implement diversified and process-oriented assessments, thereby improving teachers' capabilities in interdisciplinary instructional design and their proficiency in AI literacy. The implementation of these pathways has not only effectively dismantled disciplinary barriers but has also transformed "public courses" that serve general education into "empowering platforms"<sup>3</sup> that support professional development, nurturing exceptional talents with a global perspective, cross-cultural communication skills, and interdisciplinary innovation capabilities.

## **5. Conclusion and Outlook**

This study systematically examines the application of artificial intelligence technology in college English teaching by constructing an "AI-enabled interdisciplinary integration path model for college English." The objective is to dismantle disciplinary barriers and foster interdisciplinary talents equipped with a global perspective, cross-cultural communication skills, and innovative capabilities. However, the study does have certain limitations. Nonetheless, there remains significant potential for further exploration in AI-enabled reforms of college English teaching<sup>[4]</sup>. In terms of enhancing the application of technology, we can delve deeper into the potential of artificial intelligence in areas such as sentiment analysis and the intricate modeling of learning processes, thereby enabling a more accurate understanding of students' learning statuses and needs, and providing more proactive learning guidance.

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