

Research on the Construction and Application of a Multi-dimensional College English Teaching Model from the Perspective of Human-Machine Collaboration

Yuchen Li

School of International Culture and Communication, Jingdezhen Ceramic University, Jingdezhen, Jiangxi, China

Keywords: Generative Artificial Intelligence; College English; Multi-dimensional Teaching Model; Curriculum Reform

Abstract: Against the backdrop of the deep integration of generative artificial intelligence and educational digitalization, this study analyzes the practical dilemmas of traditional college English teaching, demonstrates the feasibility and adaptability of generative AI in empowering English language instruction, establishes a novel teaching philosophy oriented toward digital intelligence, ideological-political integration, and interdisciplinarity, and constructs a three-dimensional integrated multi-dimensional teaching model that fuses linguistic knowledge, professional skills, and core competencies. Furthermore, it breaks down the educational barriers among the first, second, and third classrooms to form a full-chain, all-round human-machine collaborative talent cultivation system, thereby providing practical references and theoretical support for the reform and innovative development of college English curriculum in the new era.

1. Introduction

With the rapid iteration of generative artificial intelligence (Gen AI) technology, the digital transformation of education has entered an entirely new stage of development, and human-machine collaborative talent cultivation has emerged as a core trend in higher education reform in the new era. The College English Teaching Guidelines explicitly stipulate that college English instruction should leverage modern information technology to innovate teaching models, enrich instructional resources, and refine evaluation systems, thereby cultivating students' English application competence, cross-cultural communication ability, and comprehensive core competencies in service of the national strategy of opening up to the outside world and the cultivation of interdisciplinary talents. For a long time, traditional college English teaching has relied on a rigid model of unidirectional teacher lectures, plagued by such problems as ossified teaching formats, homogenized content, insufficient teacher-student interaction, and a singular evaluation system. These deficiencies have resulted in weak student learning initiative, a lack of cultivation in critical thinking and innovative capacities, and the inadequate realization of the classroom's educational potential.

Generative artificial intelligence, capitalized on such technical advantages as intelligent

learning analytics, personalized resource generation, multi-modal interaction, real-time data feedback, and precise ideological-political empowerment, offers a novel pathway for addressing the pain points of traditional English instruction and reconstructing the English teaching system. Human-machine collaborative teaching breaks the conventional pedagogical pattern of "teacher dominance and student passivity," fostering a new teaching ecology that is empowered by artificial intelligence technology, guided by teacher values, and driven by student agency. Accordingly, this study adopts the perspective of human-machine collaboration, focuses on whole-process innovation in college English teaching, systematically constructs a new multi-dimensionally integrated teaching model, aligns three-dimensional talent cultivation objectives, and breaks down the educational barriers among the first, second, and third classrooms. Through teaching practice, it verifies the feasibility and effectiveness of this model, aiming to promote the transformation of college English instruction from a "knowledge-transmission-oriented" to a "competency-cultivation-oriented" paradigm^[1], and to facilitate the cultivation of interdisciplinary foreign language talents with both moral integrity and professional excellence.

2. Feasibility Analysis of Generative Artificial Intelligence Empowering College English Teaching

Generative artificial intelligence (Gen AI) possesses core technical strengths in big data analytics, intelligent learning analytics, personalized content generation, multi-modal interaction, real-time feedback optimization, and intelligent resource mining. These capabilities can precisely align with the reform needs of traditional college English teaching, empowering instructional innovation across multiple dimensions—including learning analytics, resource allocation, teaching implementation, ideological-political education, classroom expansion, and evaluation optimization—thereby providing solid technical support and a practical foundation for the construction of a human-machine collaborative multi-dimensional teaching model.

2.1 Intelligent Learning Analytics: Supporting Personalized, Individualized Instruction

Generative AI can automatically perform intelligent learning analytics by collecting multi-dimensional learning information, such as students' pre-class preview data, in-class response data, and post-class exercise data. It can accurately assess each student's English proficiency, knowledge gaps, learning weaknesses, and competency differences, generating personalized learning profiles. Relying on these intelligent analytics, teachers can break away from the limitations of traditional uniform instruction, dynamically adjusting teaching content, pace, and plans in accordance with course objectives and difficulty levels. They can match differentiated learning tasks, practice resources, and tutoring plans for students at different levels, truly implementing tiered teaching and individualized instruction, and effectively addressing the core pain point of insufficient personalization in traditional teaching.

2.2 Intelligent Resource Iteration: Enriching Diverse Teaching Carriers

To address the problems of monotonous content and outdated materials in traditional teaching, generative AI can leverage massive databases to multi-channel mine high-quality teaching resources and ideological-political materials, integrating college English course knowledge points, professional characteristics, and contemporary hot topics. It can generate multi-modal teaching content, including text, audio, video, and situational dialogues. Meanwhile, AI can update teaching resources in real time according to teaching progress, breaking the content limitations of fixed textbooks and achieving dynamic iteration and precise adaptation of instructional resources. Rich and diverse

teaching resources not only enhance the interest and timeliness of classroom teaching, but also provide ample carriers for the precise integration of curriculum-based ideological-political and the cultivation of students' cross-cultural competencies.

2.3 Expanding Teaching Scenarios: Constructing a Hybrid Talent Cultivation Ecology

Generative AI breaks through the temporal and spatial constraints of traditional classrooms, providing technical support for online-offline blended teaching and multi-scenario talent cultivation. Before class, AI can assist students in completing autonomous previewing, organizing basic knowledge points, and collecting questions. During class, it enables immersive classroom through multi-modal interaction technologies. After class, it helps students consolidate and improve through intelligent Q&A, specialized training, and personalized review. At the same time, AI can effectively empower extended scenarios such as second-classroom academic competitions and third-classroom social practice, enriching extracurricular talent cultivation formats, breaking down the barriers between in-class and out-of-class education, and achieving all-time, all-round instructional empowerment.

2.4 Real-Time Data Feedback: Refining a Precise Evaluation System

Generative AI can conduct real-time data tracking and dynamic monitoring of students' entire learning process before, during, and after class. Through multi-modal technologies such as image recognition, voice analysis, and behavior analytics, it records whole-process data, including classroom participation, answer accuracy, thinking activeness, and learning progress. Based on massive dynamic data, a diversified evaluation system combining process-oriented and summative assessment can be constructed, achieving comprehensive and precise evaluation of students' linguistic knowledge, application ability, and core competencies. Simultaneously, it provides data support for teachers to optimize teaching plans and improve teaching methods.

3. Construction of a Multi-dimensional College English Teaching Model from the Perspective of Human-Machine Collaboration

Grounded in the talent cultivation requirements of higher education in the new era and leveraging the technical advantages of generative artificial intelligence (Gen AI), this study takes human-machine collaboration as its core to innovate teaching philosophy, reshape cultivation objectives, reconstruct teaching processes, and integrate educational scenarios. It constructs a multi-dimensional college English teaching model that integrates philosophy, objectives, processes, scenarios, and assessment, thereby realizing a three-in-one talent cultivation framework encompassing linguistic knowledge, professional skills, and core competencies.

3.1 Philosophical Reconstruction: Digital-Intelligence Integration for Precise Ideological-Political Education

College English teaching in the new era must break away from the traditional knowledge-oriented teaching philosophy and establish a new paradigm of “digital-intelligence empowerment, competency-based cultivation, and value-led guidance” to achieve deep integration of artificial intelligence and English language instruction^[2]. On the one hand, by leveraging Gen AI to create an integrated online-offline interactive learning space—through personalized resource recommendation, immersive interactive experiences, and intelligent teaching assistance—English learning can be made personalized, efficient, and immersive, fully highlighting students' agency as

the main actors in learning. On the other hand, capitalizing on the intelligent screening of AI devices and precise matching capabilities, ideological-political materials suited to college students' cognitive characteristics and aligned with English teaching content can be excavated. Core competency elements such as patriotism, cultural confidence, global vision, and craftsmanship spirit can be precisely embedded throughout the entire language teaching process, abandoning the traditional rigid model of ideological grafting. This achieves “precise ideological-political education” empowered by artificial intelligence, constructing a multi-dimensionally integrated talent cultivation pattern that proactively serves the national strategy for foreign language talent development.

3.2 Objective Reshaping: Interdisciplinary Collaboration for Establishing a Diversified Talent Cultivation System

Based on the interdisciplinary talent cultivation thinking of human-machine collaboration, the singular knowledge-transmission objective of traditional English teaching is broken down, and a diversified “knowledge, ability, and competency” three-in-one cultivation objective is established to realize interdisciplinary collaborative education. First, the linguistic knowledge objective: with the precise empowerment of AI, students are helped to systematically master foundational linguistic knowledge such as English vocabulary, grammar, and syntax, solidifying the foundation for language application. Second, the professional competency objective: by leveraging digital technology to integrate teaching resources and combining them with students' professional characteristics, students' applied competencies in English reading, writing, listening, speaking, and translation are cultivated, along with self-directed learning, critical inquiry, and innovative practice abilities. Third, the core competency objective: through the infiltration of multimodal ideological-political resources and cross-cultural scenario-based teaching, students' cross-cultural communication competence, patriotism, and global perspective are fostered, achieving deep integration of language learning, professional development, and value shaping, and cultivating interdisciplinary foreign language talents with both moral integrity and professional excellence.

3.3 Process Reconstruction: Human-Machine Collaboration for Optimizing a Three-Dimensional Integrated Teaching Closed Loop

Relying on Gen AI's multi-modal monitoring, precise learning analysis, and dynamic optimization functions, the entire college English teaching process—before, during, and after class—is reconstructed and optimized to build a complete human-machine collaborative teaching closed loop that grounds the three-in-one cultivation objectives. In the pre-class stage, AI generates personalized preview plans based on student learning analytical data, push basic knowledge points, preview exercises, and extended materials to help students autonomously organize foundational content and identify knowledge blind spots in advance. Teachers, relying on learning analytical data, precisely locate key and difficult teaching points and optimize classroom instructional design. In the in-class stage, through real-time human-machine interaction, multi-modal scenario simulation, and intelligent classroom Q&A, the unidirectional lecture model is broken and classroom interaction efficiency is enhanced. Meanwhile, AI monitors students' classroom performance in real time, dynamically captures learning data, and assists teachers in adjusting teaching pace on the fly to achieve precise classroom instruction. In the post-class stage, AI generates personalized review plans, specialized training tasks, and extended learning resources based on students' in-class learning conditions, precisely strengthening weak points. Simultaneously, it completes aggregated analysis of classroom data to provide data support for teachers' instructional review and plan optimization, forming a closed-loop teaching model of “preview—instruction—consolidation—

optimization”.

3.4 Scenario Integration: Integration of Three Classrooms for Diversified Teaching Methods

To address the problems of singular teaching scenarios and narrow educational coverage in traditional instruction, this model relies on the technical advantages of human-machine collaboration to break down the educational barriers among the first, second, and third classrooms, achieving deep integration of the three classrooms. The first classroom, centered on regular on-campus classes, relies on AI to achieve precise, immersive, and interactive classroom teaching, grounding the transmission of basic knowledge and the cultivation of core competencies. The second classroom relies on AI to assist extracurricular expansion activities such as academic competitions, English speech contests, translation practicums, and club activities, providing students with personalized competition guidance and skills training to strengthen their English application and innovation abilities. The third classroom focuses on practical scenarios such as social practice, cross-cultural exchange, and volunteer service, leveraging AI to build online practice platforms and provide cross-cultural communication materials and practical guidance plans to help students transform classroom knowledge into practical competencies. The three classrooms complement each other, empower each other, constructing an all-round, all-scenario talent cultivation system that enriches college English teaching methods and extends the boundaries of instructional talent cultivation^[3].

3.5 Assessment Optimization: Full-Process Traceability for Constructing a Multi-dimensional and Multi-layered Evaluation System

Combining the full-process data advantages of human-machine collaborative teaching, a multi-dimensional and multi-layered evaluation system is constructed that integrates process-oriented assessment, summative assessment, and competency assessment. Process-oriented assessment relies on whole-process data collected by AI, including pre-class previewing, in-class interaction, post-class exercises, and participation in the three classrooms, comprehensively recording students' learning trajectories and growth increments. Summative assessment combines traditional methods such as final examinations and comprehensive evaluations to examine students' phased learning outcomes. Competency assessment focuses on students' implicit competencies such as critical thinking, innovation ability, cross-cultural literacy, and value cognition, conducting comprehensive assessments based on human-machine interaction performance, practical outcomes, and competition performance. The diversified evaluation system attends to both students' degree of knowledge mastery and their competency development and growth, while through real-time evaluation feedback, it achieves learning promotion through assessment and teaching improvement through assessment, continuously optimizing teaching quality.

4. Practical Application and Optimization of the Human-Machine Collaborative Multi-dimensional Teaching Model

4.1 Practical Implementation Pathway of the Teaching Model

To verify the feasibility and effectiveness of the human-machine collaborative multi-dimensional teaching model, this study applied the model to regular college English teaching practice at a university, selecting non-English major undergraduate classes for a one-semester teaching experiment. During the practice, the three-classroom integrated talent cultivation mechanism was strictly implemented, relying on the generative artificial intelligence platform to complete the

full-process work of learning analytics, resource recommendation, classroom interaction, after-class tutoring, and data-based evaluation. Teachers focused on core tasks such as value guidance, instructional design, classroom management, and competency cultivation, playing the leading role in talent cultivation, thereby forming a human-machine collaborative talent cultivation pattern of “AI-empowered technology, teacher-led education, and student-centered development”. Throughout the teaching practice, student learning data, classroom teaching effects, and student competency growth were recorded. Through classroom observation, student interviews, grade comparison, and competency assessment, the application effects of the model were comprehensively evaluated.

4.2 Analysis of Practical Application Effects

After one semester of teaching practice, the educational advantages of the human-machine collaborative multi-dimensional teaching model were fully demonstrated. Compared with traditional teaching classes, students in the experimental classes showed significant improvement in English learning initiative and classroom participation, with obvious amelioration of learning inertia and dependency. Students’ comprehensive applied competencies in English listening, speaking, reading, and writing, as well as their critical thinking, innovation ability, and cross-cultural communication competence, were comprehensively enhanced. The average score and excellence rate of the final comprehensive assessment were both higher than those of traditional classes. Meanwhile, the effects of precise ideological-political education were remarkable; students’ cultural confidence, international vision, and patriotism were effectively cultivated, achieving synchronous improvement in knowledge, ability, and competency^[4]. From the teaching perspective, the human-machine collaborative model effectively reduced teachers’ burden of repetitive instructional work, allowing teachers to focus on core educational tasks such as instructional design, competency cultivation, and personalized tutoring. Classroom teaching efficiency and educational precision were substantially improved, and the integrity and scientific nature of the curriculum system were further optimized.

4.3 Model Optimization and Promotion Pathways

Based on feedback from teaching practice, the teaching model was continuously optimized to address issues existing in the application process, such as insufficient technical adaptation, uneven AI literacy among teachers and students, and inadequate depth of integration among the three classrooms. On the one hand, training in teachers’ digital-intelligence instructional capabilities was strengthened to enhance teachers’ abilities in human-machine collaborative instructional design, intelligent resource utilization, and precise integration of ideological-political education. On the other hand, the functions of the AI teaching platform were optimized to improve the precision of learning analytics, resource matching, and evaluation feedback, and to deepen the linkage and integration of three-classroom scenarios. Meanwhile, this teaching model was gradually promoted from basic college English courses to related courses such as professional English, intercultural communication, and English translation, promoting the overall teaching reform of foreign language courses in higher education institutions and refining the digital-intelligence English curriculum talent cultivation system.

5. Conclusion

The empowerment of educational reform by generative artificial intelligence represents an inevitable trend in the development of higher foreign language education in the new era, and human-machine collaborative talent cultivation serves as the core pathway for resolving the

dilemmas of traditional college English teaching and promoting curriculum innovation and development. From the perspective of human-machine collaboration, this study systematically analyzes the practical problems of traditional college English instruction, demonstrates the feasibility of generative AI in empowering English language teaching, reconstructs a teaching philosophy and cultivation objectives oriented toward digital intelligence, competency cultivation, and diversification, and constructs a multi-dimensional college English teaching model covering the entire instructional process and all educational scenarios^[5]. This achieves a three-in-one cultivation framework integrating linguistic knowledge, professional skills, and core competencies, as well as a deeply integrated talent cultivation pattern across the three classrooms.

Teaching practice has proven that this model can effectively activate students' agency as learning subjects, enhance the personalization, precision, and efficiency of English language instruction, strengthen the effectiveness of curriculum-based ideological-political education, comprehensively cultivate students' comprehensive competencies and innovative capabilities, and effectively compensate for the shortcomings of traditional teaching models. In subsequent research, efforts will continue to deepen the study of human-machine collaborative teaching mechanisms, continuously optimize the details of the teaching model, refine the digital-intelligence instructional evaluation system, deepen the integrated fusion of technology and pedagogy, and persistently promote the reform and innovation of college English curriculum, thereby providing more solid support for the cultivation of interdisciplinary foreign language talents in higher education institutions in the new era.

Acknowledgement

This paper is a phased achievement of the 2025 Education and Teaching Reform Research Project of Jingdezhen Ceramic University entitled "Research on the Construction and Application of a Multi-dimensional College English Teaching Model Empowered by Generative Artificial Intelligence".

References

- [1] Cheng Rong. Research on the Pathway of Generative AI Empowering Human-Machine Collaborative Teaching in College English [J]. *Journal of Hubei Open Vocational College*, 2026(05): 142-144.
- [2] Guo Cong, Xin Jing. Construction and Practical Exploration of Digital-Intelligence English Teaching Models in Higher Education [J]. *Journal of Shanghai Jiao Tong University (Educational Science Edition)*, 2025(05): 97-103.
- [3] Wang Cui. Construction of a Ternary Collaborative Talent Cultivation System for College English in the Context of Digital-Intelligence Empowerment [J]. *Henan Education (Higher Education Edition)*, 2026(06): 36-39.
- [4] Ministry of Education. College English Teaching Guidelines (2020 Edition) [Z]. 2020.
- [5] Yu Liang, Zhang Xuemei. Research on the Reconstruction of Blended Teaching Models in College English from the Perspective of Human-Machine Collaboration [J]. *Technology Enhanced Foreign Language Education*, 2025(02): 45-51.