

The Construction and Practice of the “Human-Machine Collaboration” Teaching Model for College English Teachers in the AI Era

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Abstract: Against the backdrop of artificial intelligence deeply permeating the education field, college English teaching is faced with challenges. This study aims to construct and practice the “Human-Machine Collaboration” teaching model for college English teachers in the AI era, promoting the improvement of teaching quality.

Keywords: AI Era; College English Teachers; Human-Machine Collaboration; Teaching Model

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1. Introduction

In the era of the rapid development of artificial intelligence technology and its deep penetration into the education field, the innovation of teaching models has become a key proposition for the high-quality development of higher education. The “Human-Machine Collaboration” teaching model, as an important direction for the digital transformation of education, aims to integrate artificial intelligence technology with teachers’ professional wisdom to construct a complementary teaching ecosystem, promoting both teaching efficiency and the quality of talent cultivation.

Currently, college English teaching faces numerous challenges in dealing with AI technology. Some teachers have insufficient understanding of the educational application value of artificial intelligence and still adhere to traditional teaching models, failing to fully utilize the advantages of AI in language training, personalized learning support, and other aspects. Although some institutions have attempted AI-assisted teaching, due to the lack of systematic design and in-depth integration strategies, there are problems such as unclear positioning of human-machine functions and the absence of a collaboration mechanism. As a result, the combination of AI technology and English teaching remains at a superficial level, making it difficult to achieve real teaching innovation and quality breakthroughs.

Therefore, systematically conducting research on the construction and practice of the “Human-Machine Collaboration” teaching model for college English teachers in the AI era is of great practical significance. This study focuses on exploring effective paths for the in-depth integration of artificial intelligence and college English teaching. By clarifying the roles of humans and machines, optimizing the collaboration mechanism, and innovating the teaching process, a scientific and feasible “Human-Machine Collaboration” teaching model will be constructed. The research results will not only enrich the theoretical system of foreign language education technology, providing theoretical basis and practical examples for the reform of college English teaching in universities, but also help improve teachers’ digital literacy and teaching ability, promote the development of students’ comprehensive language application ability and autonomous learning ability, and lay a solid foundation for cultivating international talents who meet the needs of the AI era.

2. Concept Definition

2.1. Human-Machine Collaboration

“Human-Machine Collaboration” is a core concept in the transformation of educational paradigms in the era of artificial intelligence. Its essence is the interaction between human teachers and machines in various educational

environments to achieve common goals. In the educational field, human-machine collaboration goes beyond the superficial application of traditional “technology-assisted teaching” and emphasizes the symbiotic relationship between artificial intelligence and teachers in teaching decision-making, resource provision, learning support, and other aspects to optimize educational efficiency.

From the perspective of theoretical origin, the concept of human-machine collaboration stems from the intersection and integration of technical philosophy and educational theory. Instrumental rationality proposed by Max Weber in the early 20th century laid the foundation for its technological application, while Lev Vygotsky’s sociocultural theory revealed the possibility of human-machine collaboration from the perspective of cognitive development. Scholars have deepened the connotation of this concept from multiple dimensions: Gu Mingyuan pointed out that human-machine collaboration is essentially an innovative form of “intelligent technology empowering education”, forming a dynamic teaching decision-making mechanism through the combination of algorithm-driven data analysis and teachers’ professional judgment; Huang Ronghuai, et al. emphasized that its core feature lies in the “precise positioning of human-machine functions and collaborative effectiveness enhancement”, that is, artificial intelligence undertakes tasks such as data processing and personalized learning path planning, while teachers focus on emotional interaction, value guidance, and the cultivation of high-order thinking; Yi Kaiyu and Han Xibin further proposed from the practical level that human-machine collaboration requires the construction of a three-element subject structure of “teachers-students-technical tools” to achieve intelligent adaptation of teaching resources and precise intervention in the learning process.

In the field of educational application, human-machine collaboration shows unique technological adaptability. Artificial intelligence can achieve real-time collection and in-depth analysis of learning data, providing quantitative basis for teaching decision-making¹; while teachers make up for the limitations of algorithms in emotional understanding, moral judgment, and other aspects. This collaborative model of “machine intelligence + human wisdom” not only gives play to the efficiency and accuracy of artificial intelligence but also retains the humanistic and creative nature of educational activities.

In conclusion, human-machine collaboration is an innovative form of the in-depth integration of artificial intelligence and education, with its core being the construction of an educational ecosystem where human and machine functions complement each other and enhance collaboration. Through the organic combination of technological empowerment and teachers’ professional capabilities, the teaching process can be made intelligent, personalized, and humanized, providing technical support and theoretical guidance for the high-quality development of education in the new era.

2.2. College English Teaching Model

The college English teaching model refers to a systematic teaching paradigm constructed in the context of higher education, based on the laws of language learning and talent cultivation objectives, covering the organic combination of elements such as teaching objectives, content, methods, and evaluation. Its essence is to achieve multi-dimensional educational objectives of language knowledge imparting, skill cultivation, cultural literacy improvement, and critical thinking development through teaching design and implementation

In terms of theoretical evolution, the college English teaching model has undergone a paradigm shift from the traditional “teacher-centered” to the modern “student-centered” model. The “input-practice-feedback” model dominated by behaviorist theory emphasizes the mechanical training of language skills; cognitive constructivism advocates promoting learners to actively construct knowledge through task-driven and situation²; the sociocultural theory further places language learning in a social interaction context, highlighting the importance of collaborative learning and cultural practice³. Currently, with the advancement of educational informatization, new paradigms such as the blended teaching model and the Output-Oriented Approach (POA) have emerged continuously, promoting the development of college English teaching towards diversification and intelligence.

At the level of teaching elements, the college English teaching model shows systematic characteristics: teaching objectives emphasize the coordinated development of language ability, cross-cultural communication ability, and critical thinking ability; teaching content breaks through the limitations of traditional textbooks, strengthens the internal

connection of subject knowledge, and highlights the essence of the subject; teaching methods integrate multiple strategies such as task-based teaching, cooperative learning, and project-based learning; teaching evaluation adopts a combination of formative evaluation and summative evaluation to construct a diversified evaluation system⁴. This systematic design aims to meet the complex needs of the new era for international talents and cultivate high-quality talents with a global vision, cultural confidence, and innovation ability.

It is worth noting that the AI era brings new opportunities for the innovation of college English teaching models. The application of artificial intelligence technology in intelligent speech evaluation, personalized learning recommendation, learning process monitoring, and other aspects has effectively solved the problems of insufficient personalization and lagging feedback in traditional teaching. However, existing studies also point out that the application of technology needs to avoid the misunderstanding that formal innovation is greater than substantial change, emphasizing that it should be based on the nature of language learning and construct a new teaching model that conforms to educational laws with technological empowerment. As Yang Yonglin⁵ emphasized, the innovation of college English teaching models needs to follow the principle of “technology as a tool, education as the foundation” and achieve intelligent upgrading while maintaining humanistic characteristics.

In conclusion, the college English teaching model is the core carrier for achieving language education objectives in the higher education system. Its development needs to follow the laws of language learning and conform to the needs of the times. In the AI era, constructing a new “Human-Machine Collaboration” teaching model is not only an inevitable choice to deal with technological changes but also an important path to promote the high-quality development of college English teaching.

3. Research Design

3.1. Research Subjects

This study selects college English teachers and students from three different-level universities (comprehensive, science and engineering, and language universities) in China as the research subjects. Among them, a total of 120 teachers participated in the questionnaire survey, covering young teachers with 1-5 years of teaching experience, backbone teachers with 6-15 years of teaching experience, and senior teachers with more than 15 years of teaching experience; the student sample includes 18 natural classes from the first to the third year of university, approximately 900 students. The subjects participating in the teaching experiment are two parallel classes (45 students in each of the experimental class and the control class) of a certain university. The experimental class conducts the practice of the “Human-Machine Collaboration” teaching model, and the control class continues to use the traditional teaching model. In addition, in-depth interviews were conducted with 15 teachers and 30 students to obtain qualitative research data.

3.2. Research Questions

- (1) What is the current application status of the “Human-Machine Collaboration” teaching model in college English teaching? What are the problems in teachers’ and students’ cognition, attitudes, and practices regarding this model?
- (2) Can the “Human-Machine Collaboration” teaching model effectively improve students’ comprehensive English application ability (including listening, speaking, reading, writing, translation, and cross-cultural communication abilities)?
- (3) What impact does the “Human-Machine Collaboration” teaching model have on teachers’ teaching ability, role positioning, and professional development?
- (4) How to construct a scientific and feasible “Human-Machine Collaboration” teaching model?

3.3. Research Methods

Literature research method: Systematically comb through domestic and foreign literature on human-machine collaboration and the integration of educational technology to construct a theoretical framework.

Questionnaire survey method: Design questionnaires for teachers and students to investigate the application status, cognitive attitudes, and needs of the “Human-Machine Collaboration” teaching model.

Experimental research method: Through the teaching experiments of the experimental class and the control class,

compare and analyze the differences in teaching effects between the “Human-Machine Collaboration” teaching model and the traditional teaching model.

Interview method: Conduct semi-structured interviews with teachers and students to deeply understand the problems and improvement suggestions in teaching practice.

Classroom observation method: Conduct video observations of the experimental class to analyze the specific implementation process of human-machine collaboration teaching and the interaction mode between teachers and students.

3.4. Research Results

(1) Application Status and Problems of the “Human-Machine Collaboration” Teaching Model

The survey shows that only 32% of teachers use AI technology regularly in teaching, and 68% of teachers still mainly rely on traditional teaching methods. Classroom observation found that AI technology is mostly applied to listening training (accounting for 45%) and homework correction (30%), with low participation in core links such as teaching design and classroom interaction. Interviews show that there is a deviation in teachers’ cognition of AI technology. 47% of teachers believe that “AI is only used as an auxiliary tool” and do not regard it as a collaborative teaching subject; among students, 53% of students report that AI learning resources “lack emotional interaction” and their enthusiasm for use is not high.

(2) Effectiveness Verification of the “Human-Machine Collaboration” Teaching Model

Experimental data shows that the average score of students in the experimental class in the comprehensive English ability test is 12.3% higher than that of the control class. It performs particularly prominently in improving the fluency of oral expression (+15.7%) and the rigor of writing logic (+13.9%). However, in the cross-cultural thinking ability test, there is no significant difference between the experimental class and the control class ($p>0.05$), indicating that human-machine collaboration still needs to be optimized in the cultivation of high-order thinking.

(3) Challenges in Teachers’ Role and Ability Transformation

The study found that teachers face multiple challenges in human-machine collaboration teaching: insufficient technical application ability (62% of teachers lack in-depth usage skills of AI tools), the human-machine collaboration mechanism for teaching decision-making has not been established (78% of the classrooms are still dominated by teachers’ decisions), and the emotional interaction between teachers and students has weakened. In addition, teachers generally lack training for human-machine collaboration teaching, and 68% of teachers said that they “have not received relevant systematic training”.

(4) Construction Path of the “Human-Machine Collaboration” Teaching Model

Based on the research results, the “Four-Dimensional Collaboration” teaching model was constructed: Functional collaboration: AI is responsible for data processing and personalized learning path planning, and teachers dominate teaching design and emotional interaction; Resource collaboration: Integrate the dynamic corpus generated by AI and the humanistic resources developed by teachers; Decision-making collaboration: Establish a dual-track decision-making mechanism of “AI data analysis-teachers’ professional judgment”; Evaluation Collaboration: Establish a hybrid assessment framework integrating AI-powered intelligent scoring with teachers’ qualitative evaluations.

4. Research Implications

4.1. Implications for Educators

(1) Re-configuring Pedagogical Competency and Facilitating Role Transition

Educators are urged to evolve from traditional “knowledge disseminators” to “intelligent instructional designers”. This transformation entails three key dimensions: Enhancing digital literacy and mastering advanced AI applications, such as leveraging natural language processing algorithms to systematically analyze patterns of students’ linguistic errors; Strengthening instructional design capabilities by integrating AI-generated personalized learning trajectories with established educational objectives; Prioritizing affective education, maintaining the humanistic dimension of teaching within human-machine collaborative contexts, and compensating for AI’s limitations in emotional interaction through

methods including group discussions and individualized tutoring.

(2) Optimizing Human-Machine Synergy and Innovating Instructional Processes

A “three-phase collaborative” instructional framework is proposed: Pre-class, AI conducts in-depth analysis of students’ learning data, enabling educators to refine instructional designs accordingly; In-class, real-time monitoring by AI provides immediate feedback on students’ learning dynamics, allowing teachers to adapt teaching strategies in a timely manner; Post-class, AI generates customized learning reports, which serve as the basis for teachers to deliver targeted tutoring. For instance, in writing instruction, AI first performs grammatical correction and logical analysis, while teachers then focus on guiding students in developing content depth and enhancing ideological expression.

(3) Strengthening Professional Development Support and Augmenting Collaborative Proficiency

Higher education institutions should institute a comprehensive “technical training - reflective practice - collaborative innovation” teacher development system. This initiative involves: Offering specialized training programs on AI applications in education, covering topics such as machine learning principles and educational data mining; Encouraging educators to engage in research on human-machine collaborative teaching through collaborative platforms like workshops and research consortia; Incorporating human-machine collaborative teaching competencies into teacher evaluation systems to foster continuous instructional innovation.

4.2. Implications for Learners

(1) Shifting Learning Paradigms and Adapting to Intelligent Learning Ecosystems

Students are advised to transition from passive recipients of knowledge to active participants in the learning process. This entails: Utilizing AI-powered learning tools to formulate personalized study plans, such as adjusting vocabulary acquisition schedules via intelligent vocabulary learning software; Actively engaging in human-machine interactive activities, including initiating inquiries and self-correcting pronunciation during AI-assisted oral practice sessions; Cultivating digital literacy skills to critically assess AI-generated learning resources and avoid over-reliance.

(2) Elevating Autonomous Learning Capabilities and Enhancing Collaborative Efficacy

An “autonomous-collaborative” learning model is recommended, comprising: Leveraging AI-generated learning analytic reports to identify individual learning gaps; Employing AI tools to conduct cross-cultural case analyses and data visualization projects within collaborative learning settings; Documenting learning experiences and reflections through journals to facilitate meta-cognitive development.

(3) Reinforcing Human-Machine Collaboration Awareness and Cultivating Holistic Literacy

Learners should perceive AI as a complementary learning partner rather than a replacement. This involves: Actively seeking synergistic human-machine partnerships when undertaking complex tasks, such as using AI for data collection while conducting in-depth analysis independently; Participating in human-machine collaborative projects, such as developing English learning mini-applications and creating multi-modal educational resources, to enhance innovative and interdisciplinary competencies.

5. Conclusion

This study has systematically investigated the construction and implementation of the “Human-Machine Collaborative” teaching model for college English instruction in the AI era through theoretical construction and empirical analysis. Findings confirm that current applications of human-machine collaboration in college English teaching remain superficial, characterized by incomplete collaborative mechanisms. Nevertheless, the model has demonstrated significant efficacy in improving students’ linguistic proficiency and optimizing instructional processes. The proposed “Four-Dimensional Collaborative” teaching model effectively integrates the strengths of artificial intelligence and educators’ expertise, facilitating a paradigm shift from experience-based teaching to a data- and wisdom-driven educational approach.

Notwithstanding these contributions, several limitations merit attention. First, the research sample is limited to select domestic institutions, failing to account for variations across different geographical regions and institutional tiers. Second, the relatively short experimental duration precludes comprehensive assessment of the long-term impacts of the

human-machine collaborative teaching model. Third, ethical considerations associated with human-machine collaboration, including data privacy and algorithmic bias, remain under-explored. Future research endeavors should aim to expand the sample scope through cross-national and cross-institutional comparative studies, extend the experimental timeline for longitudinal analysis, and adopt a multidisciplinary approach integrating education, computer science, and cognitive science to further explore ethical guidelines and technical refinements for human-machine collaborative teaching. Through sustained research and innovative practice, the development of a more sophisticated human-machine collaborative teaching ecosystem is promising, thereby providing robust support for cultivating globally competent professionals in the AI-driven era.

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