

Research on Empowering College English Intelligent Teaching Mode with Artificial Intelligence, Constructing Personalized Learning Path and Efficiency Evaluation

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ABSTRACT Under the dual drive of educational digital transformation and new liberal arts construction, college English teaching still faces inaccurate learning-state recognition, homogeneous content supply, weak supervision of learning processes, limited personalized guidance, and single evaluation methods. This study constructs an artificial-intelligence-enabled smart teaching model for college English by integrating big data analysis, natural language processing, knowledge graphs, adaptive learning, and intelligent evaluation. On the basis of learner profiling, precise diagnosis, path generation, smart teaching implementation, multidimensional evaluation, and iterative optimization, the model forms a closed loop of perception, intervention, feedback, and adjustment. A semester-long teaching experiment shows that the experimental group improved from a pre-test mean of 62.34 to a post-test mean of 78.56, substantially exceeding the control group's gain. The framework supports differentiated listening, speaking, reading, writing, and crosscultural communication training while improving teaching efficiency. For engineering-oriented smart classrooms, its data-driven learning path design also provides a methodological reference for wireless communication-supported learning environments and electromagnetic-compatible educational sensing systems.

INDEX TERMS artificial intelligence, college english, personalized learning path, wireless communication, intelligent evaluation

I. INTRODUCTION

A. RESEARCH BACKGROUND AND SIGNIFICANCE

WITH the continuous promotion of policies such as the Education Digitalization Strategy Action and the Higher Education Digitalization Development Action Plan, higher education has entered a new stage of deep integration of digitization, intelligence, and personalization. College English, as a core course of public foundation in universities, plays an important role in enhancing students' language application ability, crosscultural communication ability, and international competitiveness. In the post pandemic era and the context of globalization, college students' English learning presents significant differences in foundation, diverse learning objectives, fragmented learning habits, and personalized learning needs. The traditional classroom model of unified teaching, unified progress, and unified assessment is no longer suitable for the requirements of talent cultivation in the new era[1-3].

B. CURRENT RESEARCH STATUS AT HOME AND ABROAD

Domestic scholars have conducted extensive research on the combination of artificial intelligence and college English, mainly focusing on the construction of smart classrooms, the application of intelligent tools, blended online and offline teaching, and big data learning analysis. Existing research has affirmed the value of AI technology in improving teaching efficiency, enriching teaching resources, and optimizing learning experiences, but there are still significant limitations: firstly, research often focuses on the application of a single technological tool, lacking a systematic model that covers the entire teaching process; Secondly, the design of personalized learning paths is relatively vague and lacks a dynamic adaptation mechanism based on ability profiles; Thirdly, the evaluation of teaching effectiveness relies heavily on subjective satisfaction and lacks a scientific quantitative indicator system; Fourthly, the scale of empir-

ical research is relatively small, and there is insufficient continuous tracking and iterative optimization[4].

Overall, the intelligent teaching of college English empowered by artificial intelligence is still in the transitional stage from ‘isolated tool usage’ to ‘systemic process integration’ where AI dictates the core pedagogical workflow, and there is an urgent need to build a complete teaching system that is theoretically sound, logically clear, implementable, and assessable[5].

C. RESEARCH PURPOSE AND SIGNIFICANCE

1) Research Objective

1. Analyze the pain points and personalized learning needs of current college English teaching, and clarify the key links and value scenarios empowered by artificial intelligence.

2. Build an AI-driven intelligent teaching model for college English, forming a full-process, operable, and replicable implementation framework.

3. Design personalized learning paths based on learner profiles to achieve precise adaptation of teaching content, progress, methods, and tasks.

4. Establish a multidimensional, process-oriented, and value-added teaching effectiveness evaluation system to scientifically test the implementation effect of smart teaching models.

5. Propose implementation strategies for universities to promote AI+college English teaching reform, providing decision-making references for teaching practice[4].

2) Theoretical significance

Enrich the application of artificial intelligence education and the theoretical system of college English teaching, expand the research boundaries of intelligent teaching, personalized learning, learning analysis, etc; Constructing an integrated theoretical framework of “technology teaching learning evaluation” to provide theoretical support for the digital transformation of foreign language education in the context of the new liberal arts.

3) Practical significance

Assist university teachers in accurately grasping the learning situation, optimizing teaching design, and reducing the burden of repetitive work; Provide students with an adaptive, highly interactive, and real-time feedback learning environment to enhance their ability for self-directed learning and comprehensive English application; Promote the transition of college English teaching from standardization to personalization, from experience driven to data-driven, from closed classroom to open scenario, and help improve the quality of talent cultivation in universities[5].

D. RESEARCH CONTENT AND METHODS

1) Research Content

1. Research and analysis on the current situation of college English teaching, learner characteristics, and personalized needs.

2. The technical support system and mechanism of artificial intelligence empowering college English teaching.

3. Construction and operation logic of AI-driven intelligent teaching mode for college English.

4. Personalized learning path design and dynamic adjustment mechanism based on learner profiles[6].

5. Construction and empirical testing of teaching effectiveness evaluation index system.

6. Implementation guarantee and optimization strategies for empowering college English teaching with artificial intelligence.

2) Research Methods

1. Literature research method: Sort out relevant literature on artificial intelligence, intelligent teaching, personalized learning, and college English teaching reform to lay a theoretical foundation.

2. Questionnaire survey method: Conduct a questionnaire survey for college teachers and students to analyze teaching pain points, learning needs, and technology acceptance.

3. Interview method: Conduct in-depth interviews with college English teachers, teaching managers, and educational technology experts to obtain practical suggestions.

4. Teaching experiment method: Set up an experimental group and a control group, conduct a semester-long teaching experiment, and compare learning outcomes and behavioral differences.

5. Data analysis method: SPSS was used for statistical analysis to examine differences in indicators such as academic performance, learning engagement, and ability improvement.

6. Case study method: Combining specific university practice cases, analyze the implementation path and actual effects of the model.

E. RESEARCH TECHNOLOGY ROUTE AND INNOVATION POINTS

1) Technical roadmap

Theoretical research → Current situation investigation → Demand analysis → Technical system sorting → Construction of smart teaching mode → Personalized learning path design → Establishment of effectiveness evaluation system → Empirical teaching experiment → Data analysis → Conclusion and strategy[7].

2) Innovation points

1. Build a fully closed-loop AI-enabled intelligent teaching model for college English, achieving the integration of teaching, learning, feedback, evaluation, and iteration.

2. Design dynamic adaptive learning paths based on multidimensional learner profiles, breaking through the limitations of traditional unified teaching models.

3. Establish a multidimensional effectiveness evaluation system that combines “process+result, subjective+objective, and ability+literacy” to enhance the scientific nature of the evaluation.

4. Form a feasible, scalable, and quantifiable implementation path to provide a practical paradigm for universities to promote AI English teaching on a large scale.

II. RELEVANT THEORETICAL FOUNDATION AND CORE TECHNICAL SUPPORT

A. RELEVANT THEORETICAL BASIS

1) Constructivist Learning Theory

Constructivism emphasizes that learning is a process in which learners actively construct the meaning of knowledge, rather than passively accepting it. AI intelligent teaching guides students to independently construct language knowledge and application abilities through scenario creation, resource push, interactive exploration, and collaborative communication, which conforms to the inherent logic of personalized learning[8].

2) Personalized Learning Theory

Personalized learning takes student differences as the starting point and implements differentiated teaching in terms of learning objectives, content, progress, and methods. Artificial intelligence achieves personalized learning theory through precise diagnosis and dynamic adaptation, realizing “one person, one policy” learning path planning, which is a modern practice of personalized learning theory.

3) Mastering Learning Theory

Bloom’s Mastery Learning Theory proposes that as long as sufficient time and appropriate teaching are provided, the vast majority of students can master the learning content. The AI system ensures that students achieve expected learning goals not through rote drills, but through adaptive reinforcement. By automating the identification of specific knowledge gaps, the system replaces manual ‘repetitive work’ with targeted, high-intensity intervals of practice. This distinguishes productive mastery from digital fatigue by ensuring that once a threshold is met, the system immediately pivots to new challenges.

4) Learning Analysis Theory

Learning analytics utilizes big data and artificial intelligence technology to measure, collect, and analyze learner data, achieving visualization of the learning process, precise problem-solving, and timely intervention, providing data basis for smart teaching decision-making and personalized path adjustment.

B. CORE TECHNOLOGY SUPPORT FOR ARTIFICIAL INTELLIGENCE

Realize intelligent speech recognition, speech synthesis, machine translation, text similarity calculation, grammar correction, semantic understanding, writing scoring, oral evaluation and other functions, supporting intelligent training and instant feedback of English listening, speaking, reading and writing skills. Build a knowledge graph of college English vocabulary, grammar, discourse, culture, cross-cultural

communication, etc., clearly presenting the correlation and logical structure of knowledge points, supporting knowledge point discovery, path planning, and associative learning.

Based on project response theory (IRT), Bayesian networks, and deep learning algorithms, dynamically evaluate students’ ability levels, intelligently adjust the difficulty, question types, quantity, and learning order of learning content, and achieve real-time optimization of learning paths[9-10].

Realize automatic correction of objective questions, intelligent scoring of subjective questions, analysis of ability dimensions, and generation of learning reports, providing real-time, accurate, and constructive feedback to enhance evaluation efficiency and guidance value[11].

Create immersive foreign language communication scenarios, such as simulated meetings, shopping, interviews, speeches, etc., to enhance oral proficiency and cross-cultural communication experience, as shown in Table 1.

TABLE 1. AI-Enabled College English Intelligent Teaching Effectiveness Evaluation System

First-level Indicators	Second-level Indicators	Weight	Measurement Method
Learning Achievement	Comprehensive score, listening, reading, writing, speaking	0.32	Formal pre-test and post-test
Learning Engagement	Learning duration, task completion rate, interaction frequency, self-practice times	0.24	Platform behavior statistics
Learning Ability Development	Autonomous learning ability, critical thinking, cross-cultural communication	0.20	Rubric scoring & expert evaluation
Teaching Satisfaction	Student satisfaction, teaching effectiveness perception	0.12	Questionnaire survey
Teaching Efficiency	Feedback speed, resource utilization, intervention effect	0.12	Statistical analysis

III. ANALYSIS OF THE CURRENT SITUATION OF COLLEGE ENGLISH TEACHING AND PERSONALIZED LEARNING NEEDS

A. SURVEY ON THE CURRENT STATUS OF COLLEGE ENGLISH TEACHING

This study conducted a questionnaire survey and interviews with students from different majors and English teachers from multiple universities. A total of 1862 valid student questionnaires and 124 teacher questionnaires were collected. Based on classroom observation and teaching data analysis, the current teaching situation is summarized as follows[12].

This study was approved by the Ethics Committee of Shanxi Conservancy Technical Institute, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

1) Significant differences in students' English foundation

When students enroll, there are huge differences in vocabulary, grammar foundation, listening level, and oral expression ability. The ability stratification within the same class is obvious, and unified teaching is difficult to cater to students from both ends. Students with weak foundations cannot keep up with the pace and develop a disinterest in learning; Students with a good foundation feel that the content is simple and lacks motivation to learn.

2) Homogenization of teaching content supply

Textbooks, courseware, assignments, and tests are highly unified, lacking differentiated content for different majors, levels, and learning objectives. The insufficient supply of expanded content such as academic English, vocational English, and cross-cultural communication makes it difficult to meet the future development needs of students.

3) Insufficient classroom interaction and oral training

The class size is relatively large, the classroom time is limited, there are few opportunities for oral training, and students have a low willingness to speak up; Teachers find it difficult to provide detailed guidance on each student's pronunciation, fluency, and accuracy, and the phenomenon of mute English is still prominent[13-14].

4) Low efficiency of writing feedback

Writing homework grading takes a long time and the feedback is vague, mostly based on scores, lacking specific grammar errors, logical structures, and suggestions for expression optimization, making it difficult for students to make targeted improvements.

5) Lack of supervision and guidance in the learning process

Students have a high proportion of self-directed learning time, but lack planning and supervision; Teachers are unable to monitor learning progress and difficulties in real-time, making it difficult to intervene in a timely manner, resulting in low efficiency in self-directed learning[15].

6) Single teaching evaluation method

The final written test score is the main focus, with a relatively low proportion of regular scores and strong subjectivity; Neglecting listening, speaking, application abilities, and learning process performance makes it difficult for evaluation results to fully reflect students' true language abilities.

B. ANALYSIS OF PERSONALIZED ENGLISH LEARNING NEEDS OF COLLEGE STUDENTS

1) Personalized Learning Content Requirements

Students hope to receive targeted reinforcement based on their weak modules. For example, those with weak listening skills hope to receive intensive listening training, while those with weak writing skills hope to receive guidance on sentence structure and logic; Science and engineering students

have a greater demand for academic English, while business students have a greater need for business English[16].

2) Personalized Learning Progress Requirements

Students with different foundations hope that their learning pace can be adjusted independently, allowing for fast forward, repetition, review, and reinforcement training to avoid the coexistence of "not having enough to eat" and "not keeping up".

3) Personalized Learning Needs

Visual, auditory, and kinesthetic learners prefer different learning forms such as video, audio, interactive dialogue, situational simulation, and question bank training, hoping that the learning methods are more in line with their own habits[17].

4) Personalized Feedback and Tutoring Needs

I hope to receive immediate, accurate, and specific feedback, rather than vague comments; I hope to receive intelligent Q&A or teacher directed guidance when encountering difficulties.

5) Personalized Requirements for Evaluation Methods

Hope the evaluation focuses on the degree of progress and ability improvement, rather than just the final score; I hope that the comprehensive abilities of listening, speaking, reading, and writing, as well as the learning process, will be included in the evaluation system[18].

C. THE VALUE MECHANISM OF EMPOWERING COLLEGE ENGLISH TEACHING WITH ARTIFICIAL INTELLIGENCE

1. Accurate diagnosis of academic situation: replacing traditional empirical judgment and achieving multidimensional ability quantification evaluation.

2. Differentiated resource supply: Push adaptive content according to individual needs to achieve personalized teaching.

3. Efficient instant feedback: significantly shorten the correction cycle and improve the targeted guidance.

4. Immersive interactive training: Expand spoken language and application scenarios to improve language proficiency.

5. Automated Intervention and Regulatory Mechanisms: Instead of relying solely on student initiative, the system actively mitigates the 'lack of planning' through algorithmic supervision. This includes automated task-scaffolding, push-notifications for deadline management, and real-time intervention alerts for teachers when student engagement drops below a specific threshold, thereby transforming external digital supervision into consistent learning habits.

6. Scientific teaching decision-making: data-driven teaching adjustment to enhance overall teaching efficiency.

IV. ARTIFICIAL INTELLIGENCE EMPOWERS THE CONSTRUCTION OF INTELLIGENT TEACHING MODE FOR COLLEGE ENGLISH

A. PRINCIPLES OF PATTERN CONSTRUCTION

Highlighting the student-centered position, designing teaching processes around learners' needs, abilities, and progress, and achieving a shift from "what to teach" to "what to learn, how to learn, and how to learn"[19-20]. AI technology serves teaching objectives rather than showing off skills, focusing on solving teaching pain points and improving teaching efficiency and learning outcomes.

Implement differentiated path design based on learner profiles to achieve accurate matching of content, difficulty, progress, tasks, and evaluation.

Build a Human-AI collaborative closed-loop system of 'perception-diagnosis-design-implementation-feedback-evaluation-iteration.' In this framework, the 'closed-loop' is achieved through the integration of AI for objective skill-training and teacher intervention for higher-order critical expression. AI does not act as a total replacement for traditional instruction but as an efficiency-optimizer that clears structural bottlenecks, allowing human instructors to focus specifically on the complex emotional and critical thinking domains where AI currently faces limitations.

The pattern structure is clear, the process is standardized, and the tools are mature, suitable for widespread implementation in universities.

B. OVERALL FRAMEWORK OF SMART TEACHING MODE

This article constructs a six module closed-loop AI intelligent teaching model for college English, including:

1. Intelligent learning emotional knowledge module
2. Precise learning diagnostic module
3. Personalized learning path generation module
4. Smart teaching implementation module
5. Multivariate dynamic evaluation module
6. Mode iteration optimization module

C. OPERATING MECHANISM OF EACH MODULE

1) Learner Affective and Cognitive Profiling Module

By collecting information through multiple channels such as pre class tests, platform behavior data, historical grades, learning style questionnaires, and classroom interaction data, a dynamically updated learner profile is formed, covering:

Basic level: major, grade, admission score, vocabulary

Ability level: Listening, Reading, Writing, Speaking, Grammar, Translation

Behavioral layer: learning duration, frequency, completion rate, focus

Style layer: visual/auditory/kinesthetic, deep learning/fragmented learning

Requirement layer: Objectives such as grading, academic, employment, interests, etc

2) Precise Learning Diagnosis Module

Based on knowledge graph and AI algorithms, quantitatively evaluate students' abilities, identify weak knowledge points and ability shortcomings, generate personal learning situation diagnosis reports, clarify strengths, weaknesses, priority for improvement, and potential obstacles.

3) Personalized Learning Path Generation Module

The system automatically generates personalized learning paths based on diagnostic results using a hierarchical decision logic: Linguistic ability profiles (vocabulary/grammar) serve as the primary constraints for content difficulty, while learning styles (visual/auditory) act as secondary parameters for media selection. In cases of conflict, the system prioritizes remedial linguistic milestones over stylistic preferences to ensure foundational mastery, including:

Learning objectives: graded objectives and stage objectives

Learning content: knowledge points, materials, question types, and expanded resources

Learning order: from easy to difficult, from basic to applied

Learning progress: Daily/weekly task volume

Training method: Combination ratio of listening, speaking, reading, and writing

Evaluation Node: Periodic Testing Arrangement

4) Smart Teaching Implementation Module

Integrating online and offline blended learning, including:

Before class: AI pushes preview content and completes pre-testing

In class: The teacher provides precise explanations based on data, organizes AI interactive oral training, and group collaboration tasks

After class: intelligent homework, adaptive exercises, oral conversations, writing polishing, and Q&A tutoring

5) Multivariate dynamic evaluation module

Including process evaluation, stage evaluation, terminal evaluation, and capability enhancement evaluation, achieving multi-dimensional, multi angle, and multi subject comprehensive evaluation.

6) Mode iteration optimization module

Based on the evaluation results and learning data, continuously adjust path parameters, teaching strategies, and resource libraries to achieve continuous optimization of teaching modes.

D. MODE OPERATION PROCESS

1. Data Collection → 2. Learner Profile Construction → 3. Ability Diagnosis → 4. Personalized Path Generation → 5. Blended Teaching Implementation → 6. Intelligent Practice and Feedback → 7. Periodic Evaluation →

8. Dynamic Path Adjustment → 9. Comprehensive Efficiency Evaluation → 10. System Iterative Optimization, as shown in Table 2.

TABLE 2. Comparison of English Pre-test and Post-test Scores Between Two Groups

Group	Number	Pre-test Mean	Post-test Mean	Mean Gain	Sig. (P-value)
Experimental Group	45	62.34	78.56	16.22	< 0.05
Control Group	43	61.89	67.43	5.54	> 0.05

V. PERSONALIZED LEARNING PATH DESIGN BASED ON LEARNER PROFILE

A. LEARNER CLASSIFICATION CRITERIA

According to their ability level, learning objectives, and learning styles, students are divided into four categories:

1. Basic improvement type: Weak English foundation, focusing on improving vocabulary, grammar, and basic listening and speaking abilities.

2. Medium consolidation type: Moderate foundation, requiring strengthened reading, writing, and exam taking skills.

3. Advanced Expansion Type: With a solid foundation, focusing on oral communication, translation, academic English, and cross-cultural competence.

4. Special objective type: Clear objectives include CET-4 and CET-6, postgraduate entrance examination, IELTS and TOEFL, and vocational application.

B. PERSONALIZED LEARNING PATH DESIGN

1) Basic Enhancement Path

Key points: vocabulary, basic grammar, simple listening, short sentence reading aloud

Method: Low difficulty high-frequency training, voice following, example sentence memorization

Assessment: Basic questions are the main focus, emphasizing accuracy and progress

2) Medium level consolidation path

Key points: Reading comprehension, writing framework, long and difficult sentences, listening comprehension of texts

Method: Specialized training on question types, logical analysis, and timed exercises

Assessment: Comprehensive question types, emphasizing problem-solving efficiency and mastery of methods

3) High order extended path

Key points: academic reading, argumentative writing, oral communication, translation skills

Method: Immersive dialogue, literature reading, critical expression

Assessment: Open ended questions, emphasizing fluency, accuracy, and logicity

4) Special target type path

Key points: CET-4 and CET-6/postgraduate entrance examination/IELTS and TOEFL core test points, real question training, answering strategies

Method: Real test simulation, high-frequency test point reinforcement, mock exam review

Assessment: Highly simulated exam to enhance test taking ability

VI. ARTIFICIAL INTELLIGENCE EMPOWERS THE EVALUATION SYSTEM FOR THE EFFECTIVENESS OF COLLEGE ENGLISH TEACHING

A. PRINCIPLES FOR BUILDING EVALUATION SYSTEM

Scientificity: Objective and measurable indicators, reasonable statistical methods

Comprehensiveness: covering results, processes, abilities, and literacy

Multidimensional: Combining quantitative and qualitative, subjective and objective approaches

Developmental: Focus on ability enhancement and long-term growth

B. FIRST LEVEL PERFORMANCE EVALUATION INDICATORS

1. Learning effectiveness indicators

2. Learning behavior and engagement indicators

3. Learning ability development indicators

4. Teaching satisfaction indicators

5. Teaching efficiency indicators

C. SECONDARY INDICATORS AND QUANTITATIVE STANDARDS

The relevant indicators are shown in Table 3 below.

TABLE 3. Comparison of Learning Behavior Indicators Between Two Groups

Indicator	Experimental Group	Control Group	Improvement Rate
Average daily learning time	42.6 min	23.8 min	+79.0%
Task completion rate	92.3%	68.5%	+34.7%
Interactive frequency	11.8 times/week	4.2 times/week	+181.0%
Autonomous practice times	5.6 times/week	2.1 times/week	+166.7%

D. EVALUATION METHOD

1. Quantitative evaluation: performance analysis, learning data statistics, SPSS difference test

2. Qualitative evaluation: interviews, classroom observations, learning reflections, and analysis of works

3. Value added evaluation: Comparing pre- and post-test scores to determine the extent of improvement in computational ability

4. Comprehensive evaluation: Analytic Hierarchy Process (AHP) determines weights and forms a comprehensive score

VII. EMPIRICAL RESEARCH AND RESULT ANALYSIS

A. EXPERIMENTAL DESIGN

This study selected two parallel English teaching classes at a certain university as the research objects. The experimental

group of 45 people adopted the intelligent teaching mode empowered by artificial intelligence, while the control group of 43 people adopted the traditional lecture teaching mode. The experimental period was one semester. The two groups of students maintained consistency in their English scores, major composition, total class hours, textbook versions, and teaching staff, effectively controlling for irrelevant variable interference and ensuring comparability of experimental results. The study adopted a pre-test post-test controlled experimental design, combined with learning behavior big data, satisfaction questionnaires, and in-depth interviews, to conduct multidimensional verification of teaching effectiveness, as shown in Table 4.

TABLE 4. Student Satisfaction Comparison of Different Teaching Modes

Dimension	Experimental Group (%)	Control Group (%)
Personalization of content	89.6	41.5
Timeliness of feedback	92.1	37.2
Oral interaction experience	87.8	33.6
Fairness of evaluation	85.3	48.9
Overall teaching experience	88.4	45.7

B. EXPERIMENTAL CONTROL VARIABLES

The experimental data mainly includes four categories: first, standardized English scores for pre-test and post-test, which are used to compare the effectiveness of comprehensive language ability improvement; The second is the learning behavior data collected by the AI teaching platform, including learning duration, task completion rate, interaction frequency, and number of autonomous exercises; The third is the course satisfaction questionnaire, which conducts quantitative evaluations from dimensions such as teaching adaptability, feedback timeliness, and smooth experience; The fourth is semi-structured interview data between

teachers and students, used to explore real problems and improvement needs in teaching practice. To ensure the scientific validity of the high improvement rates shown in Table 3, the study differentiates between the inherent effectiveness of the AI model and the ‘Hawthorne Effect.’ While initial spikes in interaction frequency (+181.0%) might reflect student novelty or the awareness of being monitored, the stability of these metrics over a full semester suggests that the AI-driven personalized feedback mechanisms provided sustained value beyond mere behavioral adjustments due to observation.

VIII. CONCLUSION AND PROSPECT

A. RESEARCH CONCLUSION

1. There is a clear problem of homogenization and inefficiency in current university English teaching, with a strong demand for personalization. Artificial intelligence has significant empowering value.
2. The six module closed-loop intelligent teaching mode constructed has complete logic and smooth operation, which can achieve full-process intelligence and personalization.

3. Differentiated learning paths based on learner profiles can effectively match students’ abilities and needs, and enhance learning targeting.
4. Empirical evidence shows that the AI intelligent teaching model can significantly improve academic performance, learning engagement, language application ability, and teaching satisfaction.
5. The proposed implementation strategies can provide practical guidance for universities to promote AI+college English reform.

B. INSUFFICIENT RESEARCH

1. The experimental sample range is limited, and long-term effects still need to be tracked.
2. Some complex emotional interactions and higher-order thinking training still require deep teacher involvement, and AI is difficult to completely replace them.
3. The adaptability of different majors and levels of universities still needs further refinement.

C. FUTURE PROSPECTS

In the future, new generation AI technologies such as Large Language Models (LLMs), virtual digital humans, and metaverse classrooms can be further combined to build a more immersive, interactive, and intelligent foreign language learning ecosystem; Promote the deep integration of AI technology with curriculum ideology, cross-cultural education, and vocational English; Establish an AI English teaching resource sharing mechanism for inter-school collaboration to achieve higher levels and higher quality of intelligent English education in universities.

AUTHOR CONTRIBUTIONS

Conceptualization –Jiao Shi and Jianping Lan; methodology – Jiao Shi and Jianping Lan; investigation – Jiao Shi and Jianping Lan; writing-original draft preparation – Jiao Shi and Jianping Lan. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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