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Exploration of Innovative Pathways for Generative AI Technology to Empower Smart English Teaching in Colleges and Universities

Yiwen Li*

Inner Mongolia University of Finance and Economics, Hohhot 010000, Inner Mongolia, China

**Author to whom correspondence should be addressed.*

Abstract: With the rapid development of artificial intelligence technology, generative artificial intelligence has gradually penetrated into all aspects of people's daily lives and has had a significant impact on people's lifestyles. Introducing generative artificial intelligence technology into college English teaching has become a key path to promoting college English teaching reform. Based on this, the author will elaborate on the connotation and objectives of intelligent English teaching in this paper, and propose corresponding teaching reform paths by combining the advantages of generative AI technology, hoping to provide some references and assistance for readers.

Keywords: Generative AI; College English; Smart teaching

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1. Introduction

Driven by the waves of globalization and informatization, English, as a universal international language, has become increasingly important. College English teaching, a key link in cultivating talents with international vision and cross-cultural communication skills, is facing unprecedented opportunities and challenges. The rapid development of artificial intelligence (AI) technology is profoundly reshaping the landscape of education. As a cutting-edge focus in the field of AI, generative AI technology, with its powerful capabilities in language generation, personalized interaction, and intelligent decision-making, has provided new opportunities for the innovative development of smart English teaching in colleges and universities [1].

2. Connotation and objectives of smart English teaching in colleges and universities

2.1. Connotation of smart English teaching in colleges and universities

Intelligent teaching integrates advanced digital means and builds an intelligent teaching environment with the help of technologies, such as big data, artificial intelligence, cloud computing and the Internet of Things. It breaks

the time and space limitations of traditional teaching, making English teaching more efficient and convenient. This teaching mode is student-centered, fully paying attention to each student's unique learning style, progress and goals. According to individual differences, it tailors learning plans and teaching content for students. Whether students with weak English foundations or those with specific oral expression needs, they can find suitable learning paths in the intelligent teaching system to stimulate learning interest and improve learning effects [2].

In the intelligent English teaching of colleges and universities, the collaboration between teachers and students, as well as among students, is fully highlighted. With the help of online teaching platforms, social media and other tools, all parties can achieve real-time communication and discussion. In English writing teaching, students can submit compositions through the online platform, and teachers and other classmates can give comments and modification suggestions. In group projects, students carry out remote collaboration through video conferences to complete English learning tasks together, which effectively cultivates students' teamwork and communication skills. At the same time, intelligent teaching adopts intelligent evaluation methods to comprehensively and objectively evaluate students' learning achievements. In addition to traditional exams and tests, it also comprehensively evaluates students' learning attitudes, abilities and effects by analyzing learning process data, such as learning time, homework completion, online interaction frequency, etc. It uses intelligent evaluation systems to conduct real-time and accurate evaluation of students' language skills, such as speaking and writing, and provides students with timely feedback and improvement suggestions [3].

2.2. Objectives of smart English teaching in colleges and universities

The main objectives of intelligent English teaching in colleges and universities currently are to improve teaching quality, cultivate students' comprehensive abilities, promote teaching innovation, and serve social development. In terms of improving teaching quality, intelligent teaching relies on intelligent technologies to achieve precise push and efficient utilization of teaching resources. It recommends learning materials of appropriate difficulty (such as English movies, news, etc.) based on students' learning progress and ability levels. Meanwhile, it uses intelligent tools to assist teachers in teaching design, making the teaching process smoother and efficient. Through big data and artificial intelligence technologies, it comprehensively and accurately evaluates students' learning outcomes, paying attention not only to exam scores but also to real-time monitoring of the learning process. The intelligent evaluation system meticulously assesses students' language skills such as speaking and writing, providing detailed feedback to teachers to help them adjust teaching strategies promptly [4].

In cultivating students' comprehensive abilities, intelligent teaching is committed to enhancing students' language proficiency, helping them master solid basic knowledge of vocabulary, grammar, listening, speaking, reading, and writing. The platform provides rich resources and practice questions, allowing students to carry out targeted learning and training, for example, practicing oral English with speech recognition technology or improving reading ability through online reading platforms. It focuses on cultivating autonomous learning abilities, encouraging students to actively participate in the learning process, learn self-management and supervision, independently choose learning contents and methods in an intelligent environment, and the intelligent system provides learning suggestions and feedback. It attaches importance to improving cross-cultural communication skills, enabling students to understand the culture, history, customs, etc., of different countries. Through simulating real cross-cultural communication scenarios (such as international business negotiations and cultural exchange activities), students can experience cultural differences.

Additionally, international teaching resources can be introduced, such as lectures by foreign experts and exchanges and interactions with foreign students. In promoting teaching innovation, intelligent teaching explores

and applies new teaching models, such as flipped classrooms, project-based learning, blended learning, etc., and the platform provides technical support and practical space for these models. At the same time, it promotes teachers' professional development, providing training and learning opportunities for teachers to help them master advanced information technologies and teaching methods, encouraging teachers to explore and practice new teaching concepts and methods, and using the platform for teaching reflection and experience sharing to promote teachers' communication and cooperation [5].

3. Application value of generative AI technology in smart English teaching at colleges and universities

3.1. Enriching teaching resources and personalized learning

Generative AI technology, with its powerful generative capabilities, has broken the limitations of traditional teaching resources in terms of quantity, type, and update speed. In the past, English teaching resources in colleges and universities were often limited to textbooks, a few auxiliary teaching materials, and teaching materials accumulated by teachers individually. These resources were not only limited in quantity but also slow to update, making it difficult to keep up with the pace of social development and language changes. However, generative AI technology can quickly generate massive teaching resources according to different teaching themes, language points, and difficulty levels. For example, for English writing teaching, it can generate composition topics, model essays, and detailed writing guidance of various genres, themes, and difficulty levels. For English reading teaching, it can generate reading materials covering different fields and diverse styles, including news reports, scientific and technological articles, literary works, etc. These resources are not only rich in quantity but also diverse in forms, including text, audio, video, etc., which can meet the needs of students with different learning styles [6].

In traditional teaching, it is difficult for teachers to cater to the individual differences of each student, and they can only adopt a unified teaching process and methods, resulting in some students being "under-challenged" while others "falling behind." Through in-depth analysis of students' learning data, such as learning progress, knowledge mastery, learning habits, interests, etc., generative AI technology can accurately understand the strengths and weaknesses of each student. Based on these analysis results, it can tailor personalized learning plans and content for each student. For example, for students with weak English foundations, AI will generate more basic vocabulary, grammar exercises, and simple and easy-to-understand reading materials to help them solidify their foundations; for students with a certain foundation and interested in business English, AI will provide learning resources related to business English vocabulary, expressions, cases, and simulated business negotiation scenarios, etc., to help them improve their professional English abilities.

3.2. Intelligent assessment and feedback

Intelligent assessment and feedback are crucial links in the teaching process, directly related to students' learning effects and teachers' teaching quality. Traditional teaching assessment methods often rely on teachers' personal experience and subjective judgment, which is not only time-consuming and laborious but also difficult to be comprehensive, objective, and immediate. The introduction of generative AI technology has completely changed this situation [7]. It can quickly and accurately analyze students' learning outcomes, such as homework, test papers, and oral expressions, and provide multi-dimensional assessment reports, including detailed feedback on grammatical errors, vocabulary usage, logical structure, pronunciation accuracy, and other aspects. This instant

and personalized feedback mechanism enables students to understand their learning situation for the first time, adjust their learning strategies in a timely manner, and improve their learning efficiency.

Generative AI technology can also dynamically adjust assessment criteria and difficulty based on students' learning progress and performance, ensuring the pertinence and effectiveness of assessments. For example, AI can provide more basic grammar and vocabulary exercises for students with weaker foundations and reduce assessment difficulty; for students with better foundations, it can offer more challenging reading materials and writing tasks while improving assessment standards. This hierarchical assessment approach helps stimulate students' learning interest and motivation, promoting their all-round development. Generative AI technology provides teachers with rich teaching feedback data to help them better understand students' learning situations and needs, and optimize teaching plans [8]. By analyzing multi-faceted information such as students' homework data, classroom performance, and online learning behaviors, AI can generate detailed student learning profiles, revealing their learning habits, interests, difficulties, and error-prone points. These data not only help teachers formulate more personalized teaching plans but also provide a basis for improving teaching methods and strategies, thereby enhancing teaching quality and effectiveness [9].

4. Effective pathways for generative AI technology to empower smart English teaching in colleges and universities

4.1. Personalized learning path planning

The core of personalized learning path planning lies in tailoring the most suitable learning plans and resources according to each student's unique needs, interests, ability levels, and learning styles, so as to improve learning effects and the learning experience. Generative AI technology can construct accurate student profiles by analyzing multi-dimensional information of students' learning data, including historical grades, learning speed, error patterns, interaction frequency, etc. This profile not only reflects the current level of students but also predicts their potential learning difficulties and development directions. Based on such profiles, the AI system can plan a personalized learning path for students, from consolidating basic vocabulary to mastering complex grammar, from practicing daily conversations to improving academic writing, each step closely fits the actual needs of students [10].

In the specific implementation process, generative AI can recommend customized learning resources for students, such as workbooks targeting specific grammatical points, reading materials matching students' interests, and film and television resources for improving listening. Meanwhile, AI can dynamically adjust the learning path based on students' learning progress and feedback, ensuring that students always challenge themselves at a difficulty level suitable for them and avoiding the decline in learning motivation or frustration caused by overly simple or difficult learning content [11]. For example, Qisu English AI private tutor can comprehensively understand the English proficiency of each student through a series of scientific tests and evaluations. Based on these detailed evaluation results, the AI private tutor can quickly generate an exclusive learning plan for students. For students with weak vocabulary, the AI private tutor will formulate a gradual word memory plan, reasonably arrange the daily word learning amount and review time according to Ebbinghaus' forgetting curve, and at the same time use Qisu English's unique mind-map story vocabulary method to create personalized word memory stories for students, improving the efficiency and fun of word learning. In terms of grammar learning, the AI private tutor will push special grammar explanation videos and exercises according to students' grammatical weak points, and provide detailed analysis and feedback. In addition, in aspects such as listening and speaking

training and the improvement of reading and writing abilities, the AI private tutor can also provide personalized guidance and support.

4.2. Intelligent teaching resource generation and recommendation

Generative AI technology can quickly generate diversified teaching resources according to teaching needs and students' learning characteristics. These resources include, but are not limited to English dialogues, short essays, practice questions, grammar explanations, cultural background introductions, etc. An AI system can generate corresponding teaching materials based on specific teaching objectives, such as improving oral expression ability, enhancing reading comprehension ability, or mastering specific grammar points. For example, to train students' listening skills, AI can generate English dialogue audio with different accents, speech rates, and scenarios; to improve students' writing ability, AI can create English model essays of various genres and themes for students to reference and learn from [12].

In terms of intelligent recommendation, generative AI technology can accurately recommend suitable learning resources for students by analyzing their learning data, such as learning progress, interest preferences, ability levels, etc. This personalized recommendation not only improves the utilization rate of resources but also ensures that each student can obtain learning materials that match their needs. For example, for students with weaker foundations, AI may recommend more basic grammar exercises and vocabulary learning materials; for students interested in literature, AI may push classic English literary works and relevant appreciation articles.

In addition, generative AI technology can dynamically adjust the recommendation strategy of teaching resources based on students' learning feedback and performance. If students frequently make mistakes in a certain grammar point, AI will identify this difficulty and recommend more practice and explanation materials for that grammar point. This dynamic adjustment mechanism ensures the timeliness and pertinence of teaching resources, helps students overcome learning obstacles in a timely manner, and improves learning effects [13].

4.3. Intelligent assessment and instant feedback

Generative AI technology, with its powerful natural language processing and data analysis capabilities, can conduct comprehensive and multi-dimensional intelligent assessments of students' English learning outcomes. This assessment not only covers traditional aspects such as grammar, vocabulary, listening, speaking, reading, and writing, but also deeply analyzes students' learning habits, thinking patterns, and potential learning difficulties. For example, in a speaking assessment, AI can accurately identify students' pronunciation, intonation, fluency, and the accuracy of language use, and provide detailed improvement suggestions; in writing assessment, AI can analyze the structure, logic, coherence, and the richness and accuracy of vocabulary in the article to help students improve their writing level.

Instant feedback is another major advantage of generative AI technology in intelligent assessment. Traditional teaching assessments often suffer from the problem of delayed feedback, and students may need to wait a long time to understand their learning situation. Generative AI technology, however, can immediately provide assessment results and feedback suggestions as soon as students complete their learning tasks. This instant feedback mechanism helps students promptly understand their learning status, identify existing problems, and adjust their learning strategies. At the same time, teachers can also timely adjust teaching content and methods based on the feedback provided by AI to achieve more precise teaching [14].

Generative AI technology's application in intelligent assessment and instant feedback promotes the transparency and interactivity of the teaching process. Students can view their learning records and assessment

results at any time to understand their learning trajectory and progress. Meanwhile, they can interact with AI, ask questions, and seek help to obtain more personalized learning support. This transparent and interactive teaching process helps enhance students' learning motivation and autonomous learning ability.

4.4. Collaborative teaching between teachers and AI

As the leaders of teaching, the roles of teachers have significantly changed with the assistance of AI technology. With the help of AI, teachers are no longer just knowledge transmitters but have transformed into guides and supporters of the learning process. They can use generative AI technologies, such as intelligent teaching systems and virtual language partners, to create a richer and more diverse learning environment for students. In these environments, AI can undertake some repetitive and mechanical teaching tasks, such as grammar explanations and vocabulary exercises, thus freeing up teachers' time and energy to enable them to focus more on students' personalized needs, emotional support, and the cultivation of higher-order thinking skills.

Take personalized writing guidance as an example: Teachers can first ask students to submit a first draft of an English composition. Generative AI technology is then used to conduct an intelligent analysis of the composition. The AI will meticulously check for grammatical errors, spelling mistakes, and areas of unclear expression or logical incoherence. Furthermore, it can deeply analyze the composition's theme, structure, and overall logic, providing teachers with a detailed feedback report that highlights the composition's strengths and weaknesses, as well as specific directions for improvement. Based on the AI-generated feedback, teachers can provide personalized guidance and revisions for students' compositions. They can offer specific suggestions tailored to students' individual issues, such as how to adjust sentence structures, select more appropriate vocabulary, or enhance the logic of arguments. Through this personalized guidance, students can not only identify the shortcomings in their writing but also gradually improve their writing skills with the teacher's help. This entire process fully demonstrates the unique value of generative AI technology in smart college English teaching, namely, by analyzing students' writing works, it provides precise feedback and suggestions to help teachers achieve more personalized and efficient instruction [15].

5. Conclusion

In summary, generative AI technology has brought unprecedented transformation and opportunities to smart English teaching in colleges and universities. It not only enriches teaching resources and enables personalized learning path planning but also significantly enhances teaching effectiveness and learning experiences through intelligent assessment and instant feedback mechanisms. To this end, teachers should continue to deeply explore the application pathways of generative AI technology in smart college English teaching, innovate teaching methods and approaches, and promote the advancement of smart college English teaching toward a more efficient, personalized, and intelligent new stage. This will lay a solid foundation for cultivating high-quality talents with an international vision and cross-cultural communication capabilities.

Disclosure statement

The author declares no conflict of interest.

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