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Impacts, Challenges, and Applications: A Study on College English Teaching in the Context of Generative Artificial Intelligence

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Abstract: *As an important branch in the field of Artificial Intelligence, Generative artificial intelligence (Generative AI) has the remarkable characteristics of surpassing traditional interactive artificial intelligence. Its application in the field of education has attracted wide attention and discussion. This paper reviews the development of GAI, discusses its possible impact on college English education, analyses the opportunities and challenges of the application of generative AI in college English teaching, and puts forward the possible application path of generative AI in college English teaching.*

Keywords: *Generative AI; College English teaching; Challenge; Application*

1. Introduction

In recent years, the rapid development of generative AI technology is gradually penetrating and reshaping all walks of life, and the field of education is no exception. For college English teaching, generative AI technology has shown great application potential and brought profound changes to traditional English teaching. These technologies not only enrich the teaching means, but also improve the teaching efficiency. At the same time, there are a series of challenges. At present, the research on generative AI and college English courses is still in its infancy, and there are many possibilities worth exploring. Therefore, this paper focuses on the impact and value of generative AI in college English teaching, discusses its possible implementation methods in teaching, and promotes its better service to college English teaching practice.

2. Overview of Generative Artificial Intelligence Technology

In 1956, at the Dartmouth Conference in the United States, computer scientist and cognitive scientist John McCarthy first proposed the concept of "Artificial Intelligence", marked the birth of the discipline of artificial intelligence. McCarthy's proposed "artificial intelligence" is different from the previous interactive artificial intelligence, and it aims to express "true" intelligence, in which machines can do all sorts of things that the human mind can do, including reasoning, association, prediction, planning, and perception. The conference attracted the attention of many scholars, stimulated the great enthusiasm of the research community for the field of artificial intelligence, and promoted the rapid development of the field of artificial intelligence.

In the 1980s and 1990s, natural language processing (NLP) as a key field of AI began to gain momentum. Researchers developed more advanced techniques to analyze text, paving the way for applications such as machine translation and speech recognition. Following the rapid development of statistical methods, image generation, and deep learning algorithms, generative AI entered its mature stage in the 21st century, especially with the birth of the deep learning model, generative adversarial network (GAN), which has achieved significant results in various fields such as image generation, video generation, and text generation. In recent years, the pre-trained generative model GPT (Generative Pre-trained Transformer), represented by large language models (LLM), has become a major breakthrough in the field of generative AI. GPT series models have demonstrated strong generation capabilities and generality through large-scale pre-training, and have advanced the development and application of generative AI in various natural language processing tasks. These models have achieved significant

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results not only in text generation, intelligent answering, and dialogue systems, but also have sparked widespread attention and in-depth research into generative AI.

In November 2022, the American AI research lab Open AI released the generative interactive tool Chat GPT, which generated widespread attention and discussion globally. There was a rapid increase in users, showcasing its broad application prospects and potential. Subsequently, major tech giants launched their own large-scale generative AI models, such as Google's Gemini, xAI's Grok, Anthropic's Claude, Hugging Face's Llama, and 360 Company's 360 Zhi Nao, iFLYTEK's IFLYTEK Spark, Baidu's ERNIE Bot, and Alibaba's Tong Yi Qian Wen, etc. These large models have played important roles in multiple fields, driving the popularization and application of AI technology.

3. The Impact of Generative Artificial Intelligence on College English Education

3.1 The Transformation and Reshaping of Teaching Objectives

College English, as a compulsory fundamental course for college students, is the important part of higher education. College English curriculum is a teaching system guided by foreign language teaching theories and aimed at cultivating students' comprehensive English application abilities such as listening, speaking, reading, writing and translating. The training goal of the course is to enable students to master English language skills for cross-cultural communication, in order to meet the needs of social development.

In the era of AI, the goal of college English teaching should be converted to digitalization and intelligence. Generative AI technology can collect data around the specific situation of students' learning through a machine learning model with a complex structure, and use big data to provide learning analysis for teachers, so that teachers can timely understand the learning situation of students, and adjust teaching methods accordingly, making teaching more flexible. On the other hand, Generative AI improves the efficiency of personalized teaching and learning, which can customize suitable learning materials and learning progress according to students' different learning ability and interests, and realize intensive teaching according to different students' learning difficulties. Therefore, in the era of AI, college English courses should pay more attention to students' personalized learning, guide students to understand their own learning situation, and strengthen their independent learning ability.

Of course, the premise of achieving digital, intelligent and personalized teaching goals is that teachers and students can understand and master the relevant technologies of AI. Therefore, it is also an important teaching goal to cultivate teachers and students' information literacy and improve their ability to use AI technology. Information technology education can be incorporated into the core curriculum, or combined with college English courses in forms of workshops, case studies and other methods, so that students can master the information technology of English learning, and learn to use generative AI and other technologies to analyze and solve problems.

3.2 Reform and Innovation of Teaching Methods

Generative AI can automatically generate text, images, audio and other types of teaching content through deep learning models, bringing unprecedented innovation to teaching methods. First of all, it can assist teachers in teaching and help teachers efficiently complete the teaching work such as answering students' questions, correcting students' homework, analyzing teaching effect and so on, which used to consume a lot of energy and time. For example, in college English writing teaching, teachers need to complete spelling correction, grammar checking, sentence optimization, logic adjustment and other tutoring work. The generative AI model can analyze students' compositions, complete teachers' correction tasks efficiently, and put forward suggestions and methods to improve writing.

In addition, since AI technology gives learning a highly personalized feature, teachers should pay more attention to encouraging students to conduct independent learning and inquiry learning. Generative AI can expand the space of education and learning to almost any place, and students' autonomous learning ability determines whether they can effectively use AI technology to improve their self-ability at any time. For example, ChatGPT can give learners timely and personalized feedback, promote meaning negotiation, and prompt learners to reflect on language input, so that students can adjust the structure of discourse, and finally achieve formal negotiation to improve the level of language acquisition [6]. Teachers can recommend personalized learning paths for students according to their English level. From basic vocabulary and grammar to advanced reading, writing and translation, through the

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introduction of an adaptive learning system, every student can understand what they need to make up, so as to stimulate students' interest in learning and improve their independent learning ability.

3.3 Enrichment and Optimization of Teaching Materials

For language courses, teaching materials such as video, audio, pictures, cases and texts are the necessary conditions to build cross-cultural communication scenes and create practical language application situations. The existing teaching materials retrieval mechanism is limited in breadth and depth due to the influence of time, media, information and other factors. Based on large-scale data algorithms and technologies, generative AI can immediately collect and integrate required teaching materials from massive information resources, and through analysis and screening, remove repetitive and inefficient teaching resources and retain high-quality data source channels, which greatly shortens the time for data collection and greatly improves the efficiency and quality of teaching resource arrangement. At the same time, generative AI can also track and update data in real time to ensure the timeliness and accuracy of information. More importantly, generative AI has diversified forms of expression such as text, pictures, videos and animations, and can efficiently and automatically generate cross-domain and multi-modal teaching resources according to the needs of teaching situations, so as to meet the teaching needs under different conditions and make teaching more effective and vivid.

The personalization of teaching materials is another important feature of generative AI data search. Big data models can lock users' needs and preferences through algorithms, and accurately collect and push them to help users find more valuable information. In this way, teachers can use generative AI to generate personalized teaching paths according to their own teaching strengths, avoiding the traditional one-size-fits-all method of teaching and providing students with more diversified learning resources. At the same time, generative AI can also analyze teaching content, evaluate and detect the effect of student learning, and assist teachers in preparing lessons, so as to further stimulate teachers' innovative thinking and develop new high-quality teaching resources.

4. Challenges in the Application of Generative AI in College English Teaching

4.1 Teachers' Ability Improvement and Role Transformation

As a new technology, generative AI requires users to have certain digital literacy, including computer technology, network application, algorithm understanding, data analysis and processing. Teachers need to have a deeper understanding of the basic principles and application scenarios of these technologies in order to be able to effectively integrate them into teaching practice, which is a difficult challenge for English teachers with liberal arts background. Moreover, the rapid iteration and update of AI technology requires that college English teachers must have a continuous learning attitude, constantly improve their ability to apply technology, update the teaching concepts and methods combined with AI and English teaching, and constantly adjust and optimize.

Under the conditions of generative AI, the role of teacher also becomes diversified and complicated. Teachers are no longer the transmitters of knowledge but become the guides of knowledge. Teachers should actively adapt to the student-centered teaching mode and have capability of English teaching design and classroom management. Besides, because AI brings more efficient and personalized learning methods to students, teachers also need to have certain resource management and integration capabilities, so as to provide personalized learning resources and learning feedback for students, and generate personalized teaching methods and concepts. At the same time, teachers should also pay attention to guiding students to use AI correctly and efficiently, providing timely feedback and guidance, cultivating students' critical thinking, and developing students' independent thinking ability.

4.2 Teaching Quality Evaluation System Needs to be Updated Urgently

The traditional college English teaching quality evaluation system often adopts terminal evaluation methods, such as various standardized tests represented by CET-4 and CET-6, focusing on the evaluation of students' final learning results. In the evaluation system, teachers are often the main body of evaluation, and students have little participation in the evaluation process, and even have no opportunity to participate in the formulation of evaluation standards and the evaluation process. At the same time, due to the relatively low efficiency of manual homework correction and grading, and the evaluation results may be affected by subjective factors, which will lead to certain deviations in the evaluation results. In

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addition, the traditional college English teaching evaluation system is relatively simple in content, mainly focusing on students' mastery of language knowledge, such as vocabulary, grammar, sentence patterns and basic language skills, such as listening, speaking, reading, writing and translating, etc. It is comparatively difficult to assess comprehensive English application capability, such as reading comprehension ability, writing translation ability, listening and speaking ability.

In this regard, AI technology makes the subject of teaching evaluation more diversified. The big data processing system provides convenient conditions for the realization of a more comprehensive teaching evaluation. It can fulfill multiple roles as teachers, students, and experts, and conduct multidimensional comprehensive evaluations across various occasions such as in-class and after-class settings. The evaluation results are more objective and authentic. Furthermore, compared to traditional evaluation systems, the AI-based teaching evaluation system is more diversified. At the same time, compared with the traditional one, the AI teaching evaluation system is more abundant. It can not only pay attention to students' language application ability, but also complete the evaluation of students' communicative ability, emotional attitude and other aspects. For example, generative AI can assess students' pronunciation accuracy, the logic of spoken expressions, and the proper use of communication strategies. These evaluation results can be immediately presented in various forms such as charts or reports, which can intuitively and accurately reflect the teaching situation, and also facilitate teachers and students to better understand the direction of improvement. Learners need to develop their ability to judge the quality of the processes they use with generative AI, and generative AI can also be a partner in the development of human evaluative judgement capability [3].

4.3 The Cultivation of Students' Self-control Abilities Needs to be Strengthened

Self-control refers to the comprehensive ability of an individual to consciously control and regulate their behavior and persevere in achieving their goals without external supervision. The cultivation of self-control abilities is an important objective in the basic education stage. But in higher education, the emphasis on students' self-control abilities is aimed at overcoming the excessive dependence on technology brought about by information overload in the age of AI. As mentioned earlier, generative AI can produce a vast amount of English learning materials such as texts, images, audio, and video. Faced with numerous sources of information, students need to invest time and effort in screening and verifying them, which poses a certain challenge to their attention and self-control. On the other hand, with the rapid development of generative AI technology, students may increasingly rely on AI technology to complete various academic tasks, especially textual work such as English writing, reading, and translation. When encountering learning problems, students may be more inclined to directly seek help from AI tools, weakening their self-reflection abilities and making them less willing to face the difficulties and challenges that arise in learning.

In view of this, college English teaching should focus on helping students clarify their specific goals for English learning, such as improving pronunciation and intonation, expanding vocabulary, enhancing reading comprehension, or enhancing listening skills. Based on these specific English learning goals, teachers can assist students in setting concrete learning tasks and time arrangements, enabling students to improve their self-control abilities when confronted with the vast information sources provided by AI, manage their time well, and enhance their learning efficiency.

5. The Possibility of the Application of Generative AI in College English Teaching

Nowadays, the application of generative AI in college English teaching is gradually unfolding, and major universities have started the research on "AI enabled English teaching", which has greatly enriched the teaching means and resources of college English. The following are some possible applications of generative AI in college English teaching.

5.1 Simulated Cross-Cultural Communication and Language Application Practice

Generative AI can create realistic language learning scenarios, enabling learners to engage in dialogue within virtual settings. The conversational nature of AI bots based on Large Language Models (LLMs) makes them a good fit to provide a low-stakes, personal, adaptive language tutor that international students could use to improve their written or spoken English [4]. For instance, students can converse orally with virtual characters from literary works or historical figures, thereby gaining a deeper understanding of the cultures and social customs of English-speaking countries, avoiding

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misunderstandings and cultural conflicts in communication. Generative AI can correct learners' pronunciation and grammatical errors in real-time and provide advice on cross-cultural communication, allowing students to master authentic English in immersive experiences. Moreover, generative AI can switch cultural communication scenarios according to learners' needs, enabling students to comprehend cultural backgrounds comprehensively from various aspects such as festivals, cuisine, customs, and etiquette, thereby improving their cross-cultural communication skills.

5.2 Writing Assistance and Correction

College English courses can incorporate generative AI applications in writing classes to correct students' vocabulary and grammatical errors in their writing and provide revision suggestions. For example, AI can identify grammatical errors in students' essays in real-time and propose modifications by analyzing sentence structure and contextual context. With the support of machine learning and deep learning technologies, generative AI has analyzed vast amounts of text data to understand how vocabulary is used in different contexts, thereby recommending appropriate writing vocabulary to users based on the context. In addition, generative AI can also provide English learners with suggestions on writing sentence patterns and structures. By analyzing numerous excellent English essays, AI can grasp high-quality article structures and layouts and provide learners with optimization suggestions, promoting clear expression of learners' logical thinking.

5.3 Intelligent Assessment and Feedback

In necessary circumstances, generative AI can automatically process and analyze students' exam answers, even for subjective question types such as essays and translations, enabling rapid and accurate marking and grading, which improves teachers' marking efficiency. More importantly, AI can conduct detailed analysis of students' exam data to identify their weak links in course learning, providing targeted teaching suggestions for teachers' subsequent instruction. In creating test references, generative AI can also generate personalized unit tests to focus on training students in their areas of deficiency, enhancing students' learning motivation and engagement. Additionally, generative AI is capable of providing detailed explanations and suggestions for students' answers, helping them deeply understand the causes of their errors, identify their weak spots in English learning to consolidate their English knowledge.

5.4 Personalized Learning and Assessment

By analyzing students' learning data and interests, generative AI can generate reading materials, grammar exercises, and writing guidance tailored to students' actual needs. These resources cover various forms such as text, images, videos, and audios, as well as diverse content including English original works, English news, and academic articles, catering to different levels of learning requirements. Research shows that AI has become a personalized companion assistant for students, "more than half of college students will consult generative AI about life knowledge, society, history, geography, culture and other issues." [2] In terms of testing, AI can generate personalized test questions, conducting targeted testing and assessment based on students' learning progress. Meanwhile, it tracks students' learning progress in real-time and analyzes learning data to assess learning efficiency, providing students with more precise learning suggestions. Teachers can also collect information on students' interests, proficiency levels, learning styles, and other academic information difficult to obtain through traditional teaching methods by means of surveys and data analysis. This information serves as a support for AI to generate personalized learning plans.

6. Conclusion

A research shows that when contemplating the future utility of AI systems in education a significant 76% of students demonstrated strong agreement [1]. In summary, generative AI brings new opportunities and challenges to college English education. Empowering teaching with AI represents the direction and vision for future reforms in college English teaching. AI technology is rapidly changing the practice of education and teaching, how to effectively use intelligent technology to empower teaching, achieve personalized adaptive learning, optimize education management and so on to become an urgent problem for educators in the field of education [5]. Currently, the application of AI technology is still in the stage of continuous exploration and discussion, with many possibilities worth exploring. College English curriculum reform should approach the opportunities and challenges brought by technological innovation

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with a developmental perspective and an open mindset, striving to achieve higher efficiency and better outcomes in English teaching supported by technology.

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