

Construction of Ecological model of English Experimental Teaching in Universities based on Generative Artificial Intelligence Technology

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Abstract:

Introduction: In the current era of continuous development of modern technologies, educational work should keep up with the trend of the times. New technologies should be introduced and applied to practical educational work to create personalized classrooms. While attracting students' attention, it can also enrich the content of classroom teaching and improve the quality and efficiency of learning. In view of the actual situation of classroom teaching, an ecological model of English experimental teaching should be constructed, with generative artificial intelligence technology applied to it, so as to create brand-new English classrooms and focus on cultivating students' autonomous learning ability and exploratory learning ability.

Objectives: Generative artificial intelligence technology has certain reasoning logic and creative thinking, and it can simulate the way humans think. In the construction of college English classrooms, this technology can be utilized for teaching design, personalized tutoring and so on to achieve the expected teaching results and prompt students to gradually improve the construction of their personal language systems during the process of classroom learning.

Methods: Literature analysis method: Through the systematic sorting and analysis of relevant research literature at home and abroad, the application status, advantages and disadvantages of generative AI in personalized language learning path design are summarized. Key reference journals, academic conference papers and practical cases, to provide theoretical support and research perspectives for this topic; Investigation and research method: adopt the form of questionnaire and interview to collect the experience and suggestions of students and teachers on the use of generative AI-assisted learning path, evaluate the actual effect of the method from both quantitative and qualitative aspects, and optimize the research plan accordingly; Action research method: Taking the actual teaching situation as the research scenario, the generative AI technology is applied to different types of courses, through continuous observation and adjustment, record the key links and results in the improvement process, to provide practical basis for the promotion and application of the project results; Ecological model construction strategy of English experimental teaching in universities based on generative artificial intelligence technology.

Results: During the process of technology application, it empowers the development of foreign language education, realizes personalized learning, and effectively improves the quality and efficiency of learning. The AI system can track the learning progress of each student in real time, flexibly adjust the difficulty of courses and exercises, break the limitations of traditional education, and better meet the actual needs of different students; students can improve their oral communication abilities through real conversations when they practice after class, which also alleviates the work pressure on teachers.

Conclusions: In order to better promote the development of English teaching, currently, generative artificial intelligence technology is applied to English classroom teaching. An experimental teaching ecological model is constructed, a blended learning plan is designed, an intelligent tutoring system is introduced, the construction of the teacher-student interaction platform is strengthened, and students' autonomous learning abilities are cultivated, so as to achieve the expected teaching results.

Keywords: college English; generative artificial intelligence technology; classroom teaching; subject teaching

1 INTRODUCTION

In recent years, the application of generative artificial intelligence (Generative AI) in the field of education has attracted wide attention from scholars at home and abroad. In China, Huang Huiyan (2024) points out through research that generative AI can generate highly personalized English learning content by analyzing students learning trajectory and language acquisition characteristics, which has significant advantages in improving learning efficiency and reducing learning cost[1]. However, the study has not detailed the convergence of quality control of AI generated content with actual teaching objectives. Fu Xiaoyan

(2024) proposed the generative inquiry learning model, which emphasizes that the interactivity and feedback of generative AI can stimulate students interest in language learning and help them form their independent learning ability[2]. However, the practical operation and effectiveness of this model in large-scale application still need further verification.

The research of Kong Lei (2024) explored the specific application of generative AI in foreign language teaching, indicating that generative AI can significantly enhance students critical thinking ability and comprehensive language application ability[3]. This study is based on case teaching and, although somewhat representative, its conclusions are still limited to specific curriculum and situations and lack support from broader empirical data.

Foreign research has initially formed a certain theoretical system and application framework in this field. Boboceca et al. (2024) proposed an adaptive learning flow architecture to transform traditional courses into personalized learning paths[4]. This research emphasizes the potential of generative AI to dynamically adjust the teaching content and teaching rhythm, and provides inspiration for exploring the intelligent adjustment of English learning path in colleges and universities. However, the study mainly focused on the technical implementation of the curriculum framework and failed to deeply explore the interactive mechanisms between specific learning behavior and path adjustment.

In general, although domestic and foreign studies have made important progress in the generative AI power for personalized learning, there are still some common problems worth further discussion. On the one hand, although foreign research focuses on the design of technical framework, the fine-grained analysis of learners needs is still insufficient; on the other hand, domestic research focuses on the preliminary exploration of application level, and the adaptability, quality control and practice promotion of AI generated content are still not systematic and scientific.

2 METHODS

2.1 Literature analysis method

Through the systematic sorting and analysis of relevant research literature at home and abroad, the application status, advantages and disadvantages of generative AI in personalized language learning path design are summarized. Key reference journals, academic conference papers and practical cases, to provide theoretical support and research perspectives for this topic.

2.2 Investigation and research method

Adopt the form of questionnaire and interview to collect the experience and suggestions of students and teachers on the use of generative AI-assisted learning path, evaluate the actual effect of the method from both quantitative and qualitative aspects, and optimize the research plan accordingly.

2.3 Action research method

Taking the actual teaching situation as the research scenario, the generative AI technology is applied to different types of courses, through continuous observation and adjustment, record the key links and results in the improvement process, to provide practical basis for the promotion and application of the project results.

2.4 Reform plan design

Ecological model construction strategy of English experimental teaching in universities based on generative artificial intelligence technology

2.4.1 Design of a mixed learning scheme

In the current English classroom teaching, the new technology is applied to it to build the ecological mode of English experimental teaching in colleges and universities, to optimize and improve the problems existing in the process of English learning, so as to improve the teaching quality and stimulate students interest in English learning[5]. First of all, the paper analyzes the problems existing in the traditional teaching classroom, designs mixed learning programs, effectively integrate online and offline resources, assist teachers to improve the design of teaching programs, and provide corresponding materials for students after-school learning[6]. For example, some students are faced with many difficulties in grammar learning, and the teachers arrange weekly face-to-face courses according to the actual situation of the students in the class to systematically explain the basic concepts and rules of grammar, so as to help the students break through the current predicament. The learning materials provided by the online platform can help students to review and preview after class, gradually strengthen their own weaknesses, and quickly improve their personal comprehensive quality.

2.4.2 Introducing the intelligent tutoring system

Different students have different abilities and talents in English learning, which cannot meet the expected requirements only through unified teaching, which is necessary to pay great attention to it at present. In the application of generative artificial intelligence technology, it promotes the development of personalized learning, and can automatically generate suitable learning plans and exercises according to the actual situation of different students[7]. For example, students in the aspect of grammar knowledge learning faces more difficult problems, difficult according to different context temporal conversion, system comprehensive analysis of students learning situation, tailored a set of exercises for temporal conversion, repeatedly consolidate after class, gradually improve the difficulty of the practice, until the students can master the temporal conversion skills. In addition, based on the online platform teachers released corresponding assignments, and students submitted to the background after complete the task, the system automatically gives feedback report, detailed mark the error of the homework, according to the knowledge, Suggestions for improvement, to help students master the knowledge content is easy to make mistakes.

2.4.3 Strengthen the construction of an interactive platform between teachers and students

The interaction and communication in the classroom plays a vital role in creating a strong learning atmosphere and improving students enthusiasm. At present, generative artificial intelligence technology is used to build a platform for interaction between teachers and students. When they encounter any difficulties in learning, they can communicate on the platform in time. Teachers can give guidance according to the questions raised by students to help students break through difficulties[8]. Secondly, it can also give two-way feedback on the teacher-student interaction platform. After class, students can score the class according to their own knowledge or experience in class and give corresponding suggestions. Teachers can adjust their teaching methods according to the feedback given by students, so as to improve their own teaching methods and make the relationship between them more harmonious. Considering that some students still have many problems in the process of classroom learning, virtual offices can be held now. During the specified time period, teachers receive online students to provide one-to-one guidance and help, which makes the learning more flexible and meets the personalized needs of individuals.

2.4.4 Cultivate the ability of independent learning

In the process of English learning, the cultivation of independent learning ability is very important. It is far from enough to rely only on the knowledge content in books. Students also need to go deep into life, learn new knowledge from life, and gradually improve their personal application ability. Therefore, in the construction of college English experiment teaching ecological model, using generative artificial intelligence technology, according to the actual situation of different students, clear division of each stages of learning goals, and these goals into small steps, real-time tracking students learning progress and learning results of each stage, comprehensive analysis of these data, constantly optimize the learning plan, so as to cultivate students good independent consciousness. In addition, in daily teaching, in addition to the basic language knowledge, teachers should also according to the actual situation of different students, guide students with practical learning skills, repeatedly consolidate important knowledge, gradually improve the construction of personal knowledge structure system, have good learning ability, lay the foundation for the subsequent growth. Figure 1 shows the framework diagram of generative AI technology.

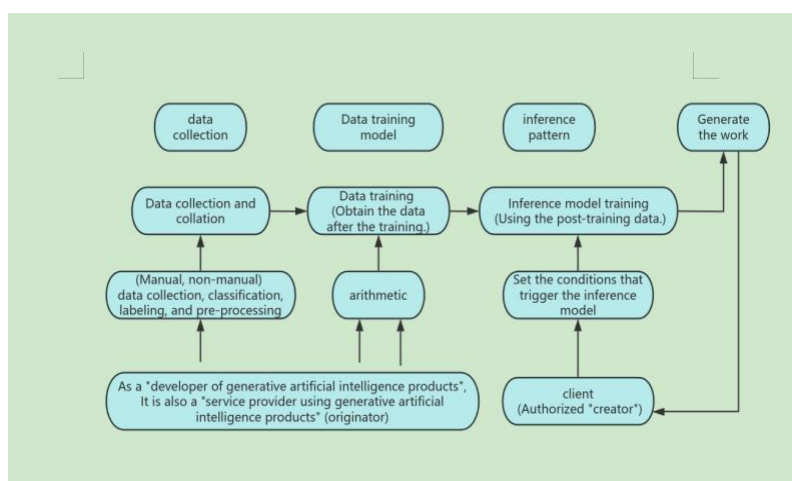


Figure 1 Framework Diagram of Generative Artificial Intelligence Technology

3 RESULTS

3.1 Realize personalized learning

Generative artificial intelligence (GAI) is becoming a breakthrough technology tool in education[9]. In the process of technology application, it enables the development of foreign language education, realizes personalized learning, and effectively improves the quality and efficiency of learning[10]. College English is quite strict for students, the traditional teaching system cannot stimulate students interest, and classroom teaching atmosphere is not rich, leading to the overall efficiency, and in the application of artificial intelligence technology, according to the actual situation of different students, dynamic adjustment and generate personalized learning materials, assist students to study after class, constantly strengthen the basic knowledge of cognition and understanding. For example, for students with weak foundation, they should push relevant vocabulary materials or grammar practice materials, and gradually strengthen their own weaknesses in the process of after-class practice. For students with relatively weak listening ability, provide suitable audio materials and repeated practice to improve their listening ability. Due to the differences in the progress of different students in English learning, the AI system can track the learning progress of each student in real time, flexibly adjust the difficulty of the course and the practice difficulty, break the restrictions of traditional education, and better meet the actual needs of different students. Diagram of the generative artificial intelligence model can be seen in Figure 2.

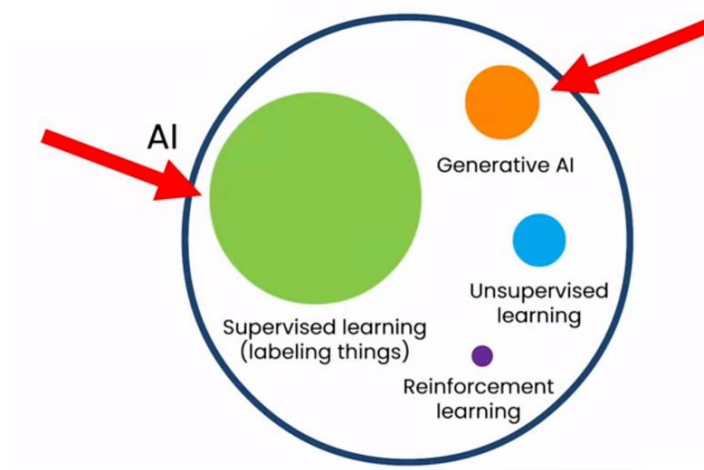


Figure 2 Diagram of the Generative Artificial Intelligence Model

3.2 Improve the classroom interactivity

As an important driving force for the new round of scientific and technological revolution and industrial transformation, the development and application and expansion of artificial intelligence technology is pressing the "fast forward button"[11]. In the current education work, the close combination of technology and subject teaching can achieve the expected results. As a key subject, in the process of classroom teaching reform, the increasing integration of artificial intelligence technology and English teaching can quickly improve the efficiency and effect of English teaching[12]. In the traditional English classroom teaching, the interaction between teachers and students is not much, which leads to teachers lack of understanding of the difficult problems faced by students in the learning process, and the number of students in the class is large, so teachers cannot pay attention to the learning situation of each student. In the application process of technology, natural language processing technology is used to create virtual language partners, so that students can improve their oral communication ability through real dialogue and communication when practicing after class, and reduce the work pressure of teachers. In addition, in order to stimulate students interest in learning, gamification elements can also be added in the process of technology application to attract students attention, create appropriate situations, learn in the appropriate context, deepen the cognition and understanding of knowledge, and improve the ability to apply knowledge.

3.3 Enrich teaching resources

The emergence of generative artificial intelligence provides a new idea for English teaching in colleges and universities, and breaks through the limitation of traditional teaching[13]. In the process of classroom teaching, teachers have deeply studied interactive 3D creation tools, personalized learning platforms, neural language chat robots and other applications, to build an

immersive and personalized English learning environment, and improve the efficiency of teaching[14].The past English classroom teaching content mainly on the teaching material is given priority to, and the current development speed, students learning needs have differences, teachers only through a single material for classroom teaching, unable to fully expand personal knowledge vision, behind the English culture and social development is not enough to understand. At present, with the help of generative AI technology, vivid and interesting teaching videos are made to lead students to deeply understand the cultural history behind English, so as to enrich the content of classroom learning. In addition, it can also use AI to screen all kinds of educational materials on the Internet and organize them into learning materials suitable for students to assist teachers to improve the design of teaching programs and provide supplementary materials for students after-school learning.

4 DISCUSSION

4.1 Lack of innovative teaching methods

The current English classroom teaching in colleges and universities mainly focuses on classroom explanation, which involves the basic vocabulary and grammar knowledge. Students are required to bring it into dialogues and articles to have an in-depth understanding of the application of these knowledge. But many students in the process of grammar learning, faced with more difficult problems, teachers need to spend a lot of time and energy, help students to explain the grammar of the rules involved, students mechanized memory, these notes to effectively applied to actual life, it also leads to personal English level is difficult. In addition, the large number of students in the class, which cannot meet the personalized needs of students. For example, students who master grammar rules will appear tedious when the teacher explains the same knowledge point repeatedly. However, students with weak foundation gradually lose the confidence in learning because they cannot keep up with the pace and rhythm of teachers in the process of classroom learning. In the new era, the application of new technology has played an important role in promoting classroom teaching. Teachers must pay attention to the innovation of teaching methods, according to the actual situation of classroom teaching, the introduction of new technology, build personalized classroom, so as to achieve the expected teaching effect.

4.2 Classroom questions are random and formalized

As a language subject, it is difficult for mechanized memory to fully reflect the value of English learning. At present, it is necessary to apply the knowledge learned to the actual life and carry out daily dialogue, so as to improve their application ability. From the current situation of classroom teaching, we can understand that some problems raised by teachers in classroom teaching are lack of science, and do not fully consider the quality and level of the problem itself, just retelling the content of the textbook. In addition, the questions are relatively open. It is difficult for students to give accurate answers, lack of deep thinking, and cannot judge students understanding of the key knowledge in this chapter. Classroom interaction to stimulate students interest played a key role, the current in the process of questioning, just one-way to the question, and for the students answer or students answer the question, not in-depth thinking, lack of communication and discussion between each other, it is difficult to promote the growth of students. Mind map for text reading can be seen in Figure 3.

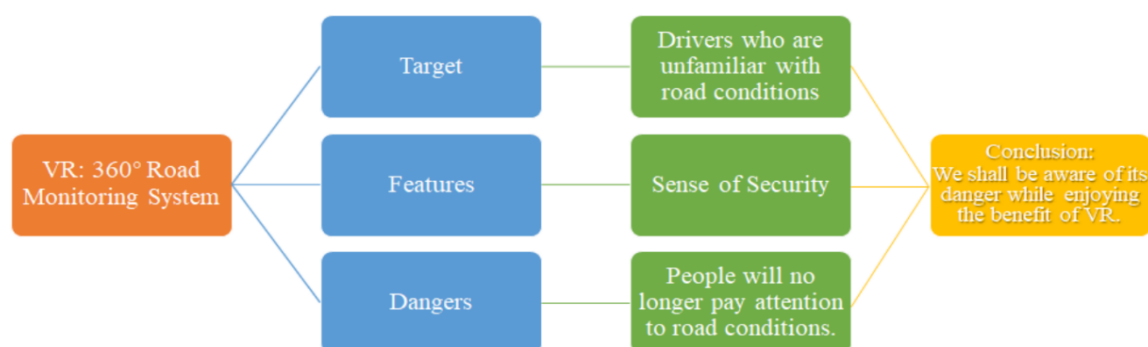


Figure 3 Mind Map for Text Reading

4.3 Low classroom participation

Influenced by the exam-oriented education system, in the process of classroom teaching, most of them are teachers to impart knowledge, and students passively accept knowledge. There is little communication between each other, the development of classroom activities, and the participation of students are not high, all of which seriously affect their personal growth. As a

language subject, English is the focus of practical ability in the process of learning. If students do not actively participate in the development of classroom activities, they cannot effectively exercise their listening ability, reading ability and oral expression ability. In addition, the current college English classroom lacks the establishment of an effective reward mechanism. When answering teachers questions or completing the activity tasks, due to the lack of motivation to participate, students do not gain more new knowledge in the activities.

4.4 Lack of practical opportunities

English classroom teaching pays special attention to the improvement of students oral expression ability. The knowledge on the books is closely related to the students actual life, guiding students to use these basic knowledge for daily oral communication, so as to fully show their personal English ability. But the current classroom teaching, each student of oral practice opportunities and time is relatively small, especially for the foundation is relatively weak students, in the process of oral communication, vocabulary, for the cognition of grammar itself, just say a few simple words of English, unable to effectively improve in the process of practice. In addition, in order to improve students English application ability, creating appropriate life scenes is very critical. Many schools have serious deficiencies in the scene creation, and learning stays at the theoretical level, and it is difficult to apply them to the actual life.

5 CONCLUSIONS

Efficient English classroom teaching first needs to pay attention to the innovation of teaching methods, and then pay attention to the improvement of students independent learning ability. From the current classroom teaching, we can understand that there are various problems in the teaching work, such as the lack of methods and innovation, too random questions, low participation in the classroom, and less practice opportunities, which seriously limit the growth of students. In order to be able to better promote the English teaching, the generation of artificial intelligence technology applied in English classroom teaching, build ecological mode of experimental teaching, design hybrid learning scheme, the introduction of intelligent guidance system, strengthen the construction of the interaction between teachers and students platform, cultivate students autonomous learning ability, so as to achieve the desired teaching effect.

DATA SHARING AGREEMENT

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

DECLARATION OF CONFLICTING INTERESTS

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