

Age of AI: Enhancing personalized teaching in Chinese university classrooms with AI chatbots

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ABSTRACT

There are several problems in Chinese universities, including a large number of students, uneven distribution of teaching resources, and the traditional teaching model being unable to meet the needs of personalized teaching. Utilizing AI chatbots such as Chatgpt, Deepseek, Doubao, etc. to enhance teaching efficiency has become a new breakthrough. These chatbots have the characteristics of rapid information generation, high flexibility, and personalized content. They are a new path to solve the lack of personalized teaching in university classrooms. Through research, it was found that the existing personalized teaching content in universities is mostly concentrated outside the classroom rather than in the classroom. Most students have already started using AI tools to assist their learning in the classroom, and they particularly appreciate its function of expanding knowledge. Students expect AI to integrate their needs and provide feedback to teachers, becoming a new communication bridge in classroom teaching. Therefore, this article proposes a dual-end application scheme based on domestic AI such as Deepseek and Doubao. Students interact with the AI system in real time, the system screens frequently asked questions and provides real-time answers while collecting feedback. Teachers accept the learning situation analysis and teaching suggestions generated by AI, thereby assisting in lesson planning and teaching. The proposal of this scheme can enhance the personalization and interaction efficiency of teaching, and has the characteristics of technical awareness and cost-effectiveness, providing innovative ideas for university teaching reform.

KEYWORDS

Artificial Intelligence; Personalized Learning; Chinese University; Chatbots

1 Introduction

Chinese universities face issues such as a large number of students, uneven resources, and difficulties in meeting individualized needs through traditional teaching methods. To improve efficiency, personalized teaching needs to be promoted, but it is hindered by a shortage of teachers. Even though some key universities have implemented the mentor system, the gap remains unaddressed. Software like ChatGpt and Deepseek align with the diverse needs of students, and the application of AI chatbots in classrooms has become a new breakthrough point to address the lack of personalized teaching.

The common AI chatbots available on the market are mostly intelligent search and analysis systems based on deep learning and data mining technologies. Users communicate with AI assistants through language forms such as voice and text, and engage in human-computer interaction^[1]. The artificial intelligence chat tool can integrate and analyze data. Students use it to analyze their classroom performance and identify their individualized needs. Universities upload information and train the AI to formulate plans, thereby enhancing the personalization and efficiency of teaching.

Given the characteristics of AI and the lack of personalized education in universities, exploring its application holds research value. This paper will combine research and demands, using methods such as questionnaires, literature review, and interviews, to summarize teaching situations through AI and formulate guidance plans.

2 The development status of the key research subjects

2.1 The development status of AI tools and related research

In recent years, with the continuous development of artificial intelligence technology and the accelerated promotion of various artificial intelligence software in daily life, a series of artificial intelligence chatbots represented by ChatGpt and Deepseek have gradually become popular in people's daily lives. The "Artificial Intelligence Development Report (2024)" released by the China Academy of Information and Communications Technology pointed out that "In 2024, the reasoning and understanding capabilities of large models will undergo a leap, and they will start to explore the application in specific fields." According to IDC's prediction, the global artificial intelligence industry scale will reach 623.3 billion US dollars in 2024, with a year-on-year growth of 21.5%. The global artificial intelligence industry is currently in a state of maintaining rapid growth.

However, since most people's exposure to AI functions is mostly limited to basic functions such as information search and processing, various AI assistants have difficulty being fully and deeply applied in the daily lives of the general public^[2]. In the face of the current rapid development of AI and its continuous strengthening and improvement of functions, the public should choose appropriate methods to apply AI based on different situations and purposes, rather than adhering to a fixed system or principle^[3].

Previously, a large number of research results focused on the technical improvement and property analysis of artificial intelligence itself, mainly including the solution of artificial intelligence ethical algorithms^[4], the correction of AI algorithm biases^[5], and the elimination of security risks of generative artificial intelligence algorithms^[6], etc. However, there are relatively few and rather rough academic research results on how artificial intelligence can be specifically applied in the daily lives of the general public. Therefore, this paper sets out to explore the application prospects of artificial intelligence in personalized education in university classrooms. By utilizing the two major parts of artificial intelligence's limited memory and reaction machine, and using chatbots as the application carrier, an attempt is made to explore the application methods of AI chatbots in personalized education in university classrooms.

2.2 Current development status and demands of personalized teaching in Chinese university classrooms

Regarding personalized teaching, the academic community holds that "individuality" is the core point of this teaching approach. Under the combined influence of an individual's inherent nature and the environment they are exposed to in the postnatal period, the overall set of thoughts and behaviors that exhibit individual characteristics can be regarded as individuality^[7].

At present, personalized education in Chinese universities is mainly carried out through the form of a mentor system outside the classroom, while it is relatively lacking in unified-paced classroom teaching. The mentor system usually refers to a method where a person of higher status, greater achievements, and greater prestige guides or supports the development of another person, with the latter being regarded as the person being guided^[8]. The mentor system in Chinese universities has been relatively mature in the postgraduate stage. However, in the undergraduate teaching stage, the implementation of the mentor system is mostly reflected in the guidance of undergraduate graduation theses, and the role of the mentor system in the classroom learning process from the first year to the third year is relatively small.

Classroom teaching, as one of the important sources for students to acquire knowledge and master skills during their university years, is of vital importance for the cultivation of students' abilities and the acquisition of professional knowledge. However, when college students with different personalities, learning abilities, and cognitive levels receive the same information in the classroom, inevitably, there will be a problem where the teaching content cannot fully match the knowledge gaps of the students. This leads to the delay of students' learning progress, which in turn results in a decline in the quality of their learning and a lag in their progress.

The fundamental solution to this problem lies in students clearly identifying their knowledge gaps and then formulating specific personalized learning needs. Under the current circumstances, this demand cannot be fully met through the implementation of the mentor system. Therefore, new forms of personalized teaching methods urgently need to be introduced. The important goal of this article is to explore the use of classroom teaching methods that combine the use of chatbots.

3 Current application of AI chatbots in personalized teaching in Chinese university classrooms and future demands

3.1 Implementation of personalized teaching in current university classrooms in China and the role played by AI chatbots

In order to design a specific and feasible plan for enhancing the degree of personalized teaching in Chinese university classrooms through the use of AI assistants, it is particularly important to understand the current situation of personalized teaching in Chinese university classrooms and analyze the role that AI Chatbots have already played in it. Only by conducting a thorough analysis of the actual situation of artificial intelligence chatbots and personalized education and applying it effectively can this paper help students make greater progress in their learning process^[9]. This article achieves its goal through a questionnaire survey. The questionnaire consists of two sections: students' feedback on personalized classroom teaching and the use of AI chatbots. A total of 51 valid questionnaires from different regions and grades of mainstream majors in China were collected. It should be noted that the data is based on students' direct classroom experiences and does not represent their professional understanding of the teaching system and AI tools.

The results of the questionnaire on personalized teaching in domestic universities shows that 85.42% of the respondents' universities have already implemented such teaching (52.08% for mentor courses and 39.58% for small-class

courses), but these two types of teaching have not been integrated into the teaching process. They are merely supplementary after class. As a result, 19.6% of the respondents believe that the teaching content can meet their needs. This reveals that the low degree of personalized teaching is due to the lack of content and types.

In the survey conducted among college students regarding the use of chatbots, 68% have developed the habit of using AI to assist their studies. The main reasons are to search for information, understand the course content, and overcome difficult points. The average recognition rate of AI functions by students is 71.35%, and the knowledge expansion rate reaches 81.25%. This reflects the disconnection between teaching and needs as well as students' high expectations for AI. Therefore, leveraging AI to expand content and break communication barriers is a practical reform path.

3.2 The manifestation of students' demand for chatbots in personalized classroom teaching

Previous studies have shown that the use of artificial intelligence tools can effectively enhance personalized teaching in Chinese university classrooms. To promote the practical application of this achievement, this paper adopts the interview survey method. It selects subjects from the respondents of the previous questionnaire survey and conducts interviews around the functions that students expect chatbots to have and the corresponding learning problems, further exploring the real needs of students. According to the basic rules of the interview survey, the author should meet the following requirements during the interview process, including obtaining informed consent, handling problems and questions that arise, and ensuring that no essential questions are omitted and no inappropriate answers occur^[10].

Interview survey shows that regarding the problem of insufficient satisfaction of students' individualized needs, due to the limited classroom teaching time, the respondents hope that artificial intelligence can integrate the different needs of students and summarize the feedback for the teachers, making the teaching content more in line with the needs of the majority. Regarding the communication barriers between teachers and students, the respondents believe that it is caused by the lack of timely feedback, and they hope that artificial intelligence can serve as a communication bridge, allowing students to provide feedback on their understanding of the courses, facilitating teachers' adjustments. They also hope that the artificial intelligence chat assistant can analyze the class content and mark the key points to help students understand.

3.3 Specific Application Scheme Design for Artificial Intelligence Chatbots

To enhance the practicality of the research, this paper will, based on the conclusions of Sections 3.1 and 3.2, design an implementation plan that utilizes artificial intelligence chatbots to enhance personalized education in efficient classrooms. This plan sets three main goals: to transform the AI chatbots into a new tool for personalized teaching; to fill the gap in personalized teaching content in the classroom; and to improve the efficiency of communication between teachers and students, creating conditions for conducting personalized teaching within limited class hours, thereby achieving the core goal of improving the efficiency of classroom teaching.

Based on the previous questionnaire survey results, the mainstream chatbots used by the respondents mainly include DeepSeek (usage rate 89.58%), Doubao (usage rate 70.83%), and Chatgpt (usage rate 54.17%). Given that domestically developed chatbots are more suitable for the educational model, it is planned to mainly focus on Deepseek and Doubao, and apply different language models according to the different needs of teachers and students in different scenarios to enhance their universality. The specific content will be introduced later.

4 The nature and specific contents of the application plan

4.1 Overview of the Plan

In response to the demand for enhancing the individualized level of classes in Chinese universities, educational institutions should constantly innovate the measures that influence course design, teaching methods, and assessment strategies^[11]. During the process of updating these teaching measures, it is essential for students to start accepting and mastering the process of using new learning tools. At the same time, as front-line teachers, adopting interactive teaching strategies centered on students' needs is also of crucial importance^[12]. This plan aims to clarify how to apply AI chatbots in Chinese university classrooms to enhance the degree of personalized teaching, which will consist of two parts, separately formulated from the perspectives of students and teachers.

The advantages and feasibility of this plan mainly lie in three aspects: the ease of technical implementation, controllable costs, and its promotional potential. All the functions involved in the plan are based on the existing mature AI question-answering models in China, and can be deployed without complex development. Moreover, these functions are all realized on the personal devices of students and teachers. The platforms and functions involved are all free and open,

and there is no need to update the existing teaching hardware or software. Furthermore, it can be piloted in individual regions, schools, or even classes, and then the applicable scope can be further expanded.

4.2 The content of project

The plan is presented from two perspectives: that of students and that of teachers. This article first elaborates on the perspective of students. During classroom learning, students mainly access the AI chatbot program by scanning the dynamic QR codes on the classroom screen. Students can send the knowledge points they don't understand or the problems they wish to solve to the program. The system automatically filters out the frequently asked questions raised by students based on the preset teaching scope of the course. It answers students' questions quickly through information feedback or real-time display on the screen, or provides further explanations for the content presented by the teacher. This helps to assist teachers in explaining concepts and further fills in the blind spots in the teacher's teaching process. Additionally, after presenting the content to students, the system will send questions about whether they understand the teaching content and will use students' feedback to understand their acceptance level and adjust the strategy of answering questions immediately. For the part of expanding classroom content, teachers can set the system to generate a teaching content outline every fixed period of time, and automatically search for relevant knowledge points based on the outline content. Then, it will send the content in paragraph form to students' devices for them to refer to.

For teachers, this article provides the following application ideas. During the process when students listen to the teacher's lecture and the AI supplements the content, the system will simultaneously feedback the students' understanding level to the teacher's end, thereby helping teachers achieve precise analysis and dynamic optimization of each teaching stage. The AI can automatically analyze the keywords and emotional tendencies of the students' posted content, generate visual reports to mark students' questions, and integrate the feedback of homework and tests to generate differentiated teaching suggestions. During the teaching stage, teachers can use AI-assisted random questioning, set a theme, and have the AI automatically generate random questions, thereby expanding the content of classroom teaching and enhancing the interactivity of the teaching process. Teachers can evaluate based on the reference answers provided by the system, and can also adopt the method of anonymous online questioning at the same time, saving classroom teaching time. In the lesson preparation stage, after inputting the course objectives and the existing learning situation analysis of students, the system automatically matches teaching cases and multimedia materials from the teaching resource library. While simplifying the teaching volume, it makes the deep concepts more understandable, fundamentally reducing the workload and difficulty for students to understand the knowledge points.

The above two aspects are carried out simultaneously in the process of classroom teaching. Although the role of the system is mainly manifested in the process of classroom teaching, in fact, it will integrate and analyze the work of students and teachers after class, and further make it better serve classroom teaching. The organic combination of these functions improves the efficiency of classroom teaching, reduces the workload of teachers and students, and significantly enhances the teaching efficiency of university classrooms while increasing the individualized degree of classroom teaching, making it better serve the cultivation and progress of students in various majors.

5 Conclusions

Based on the content discussed in this article, this study, through questionnaires and interviews, discovered that AI offers a new way to fill the gap in personalized teaching in universities. The data shows that there are significant deficiencies in personalized teaching in Chinese university classrooms. 85.42% of the students reported that the existing personalized teaching forms in schools are mainly limited to after-class activities, and only 19.6% of the classes within the classroom can meet the needs. While 68% of the students have already used AI tools to assist their learning, the recognition rate of the knowledge expansion function is 81.25%. Students expect AI to integrate the feedback of their needs and serve as a communication bridge to collect and understand feedback on comprehension in real time, mark the key points of the courses. Based on these findings, this article proposes a dual-end solution centered on domestic AI technologies such as DeepSeek and Doubao: Students can scan a code to send questions to AI, and the system will screen the frequently asked questions and provide real-time answers while collecting feedback; The teacher's end receives the analysis of student learning situations and teaching suggestions generated by AI, which can assist in lesson preparation and teaching, and can also use AI to randomly generate questions and save time through anonymous questioning. The system can generate outlines and expand knowledge points for students on a regular basis and send them to them, forming a "question - screening - adjustment" closed loop.

This study holds that it has positive effects ranging from efficiency improvement to model innovation. The implementation of the plan will bring multi-dimensional value. At the level of personalized teaching, AI can precisely match students' knowledge gaps and fill the shortcomings of traditional classroom "one-size-fits-all" through real-time

answering and content expansion; in terms of efficiency optimization, teachers can use AI to automatically analyze students' learning situations and generate teaching materials, reducing the burden of lesson preparation, and students can also immediately solve their doubts, avoiding the accumulation of problems. In terms of teacher-student interaction, AI breaks the traditional communication barriers, and the anonymous feedback mechanism enables students to express themselves freely, allowing teachers to dynamically adjust the teaching pace. Moreover, the plan is based on existing mature models and does not require additional hardware investment. It can be piloted first before being promoted, and it has both technical feasibility and cost controllability, providing a low-barrier innovative path for university teaching reform.

Although the plan is already practical, there is still room for exploration in terms of technological integration and detailed scenario design. For instance, by combining emotion recognition technology, AI can more accurately capture students' learning emotions, or by introducing knowledge graphs, the logic of personalized recommendations can be optimized. In terms of application scenarios, it can be expanded from public courses to experimental courses, graduation projects, and even integrated with the campus management system, forming a complete intelligent assistance system covering the entire process of "pre-class preparation - in-class interaction - post-class review". At the same time, continuous attention must be paid to AI ethical issues, such as data privacy protection and algorithm fairness, to ensure that the application of the technology always serves the essence of education and promotes the deep transformation of university teaching from "standardized production" to "personalized cultivation".

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