

Analysis of Adaptive Learning Mode of Normal University Students in the Age of Artificial Intelligence

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Abstract: With the growth of flipping classrooms in universities, the improvement of information-based teaching methods and the use of online teaching platforms, online education in universities has broken through the limitations of time and space, enabling students to obtain flexible learning methods. The integration of artificial intelligence (AI) and education is gradually promoting the innovative growth of educational concepts, instructional models and management models, and bringing the process of educational modernization into a new era of speeding up and increasing efficiency. The intelligent learning environment provides conditions for the individualized growth of students in the new era. The adaptive system in the intelligent learning environment can automatically perceive all kinds of information about students' learning, filter and analyze it, and actively provide students and teachers with corresponding teaching and learning strategies and help in learning, so as to fully promote the individualized growth of students. This paper explores the adaptive learning mode of normal college students in the AI era, aiming at the problems of excessive use of new technologies, too many but not sophisticated online resources, lack of pertinence of online courses and lack of scientific assessment and tracking system.

1. Introduction

In the 21st century, the rapid growth of information technology such as Internet of Things and cloud computing has quietly influenced all aspects of this era. It has impacted the traditional educational model and provided new educational methods and concepts for learners[1]. Simple online learning has restricted the improvement of learning effect because of the lack of interactive learning atmosphere, and students do not have strong self-control and can not control learning time and progress well. With the deepening of big data and AI, online education has also undergone changes[2]. At the same time, the integration of AI and education is gradually promoting the innovative growth of educational concepts, instructional models and management models, which has brought the process of educational modernization into a new era of speeding up and increasing efficiency. With the growth of mobile internet and intelligent education, personalized adaptive learning system suitable for individual characteristics has become a new research hotspot and will become a new educational technology model based on big data[3]. Adaptive learning mode can make up for students' lack of foundation, ease their learning mood, and provide teachers with layered teaching basis and scientific assessment means. AI adaptive learning is a instructional mode

that fully integrates AI and education through machine learning algorithm combined with big data analysis[4]. It can analyze and match a personalized learning plan that is suitable for students, help students to complete their learning tasks more effectively, discover their potential at the same time, improve teachers' teaching efficiency, and truly teach students in accordance with their aptitude[5].

With the growth of flipping classrooms in universities, the improvement of information-based teaching methods and the use of online teaching platforms, online education in universities has broken through the limitations of time and space, enabling students to obtain flexible learning methods. However, due to the lack of communication and interaction, students lack strong self-control, so that the learning effect is not satisfactory[6]. AI can use big data to analyze students' learning habits and hobbies, tap students' potential, match personalized learning programs suitable for students, help students learn more effectively, improve teachers' teaching efficiency, and better realize teaching students in accordance with their aptitude[7]. With the rise of AI technology, the adaptive learning mode can recommend personalized learning resources according to the different characteristics of learners' cognition, personality, interest and knowledge level, and track and evaluate them, so as to provide accurate learning services for learners and help them achieve their learning goals[8]. The basic goal of intelligent learning environment is to provide students with personalized learning methods and give full play to their autonomy and flexibility in learning. By effectively integrating AI technology into school education, we can develop an adaptive learning system suitable for normal education. According to students' cognitive level, study habits and emotional state, we can plan appropriate learning paths, dynamically adjust learning content, realize personalized learning and improve learning performance.

2. The Connotation and Growth of Adaptive Learning

Adaptive learning, also known as adaptive teaching, is an educational method. It uses computer algorithms to interact with learners and provide them with customized learning content and activities to meet the individual needs of learners. Traditional and non-adaptive methods cannot realize adaptive learning on a large scale, so adaptive learning system should be used to help learners change from passive acceptance to participation and cooperation. Personalized adaptive learning is very different from traditional autonomous learning. It realizes an interactive learning between learners, between learners and systems, and between learners and teachers. In the whole learning process, it can not only realize learners' controlled learning, self-regulated learning, teachers' personalized intervention and guidance, but also realize the push of systematic adaptive learning resources[9]. As the driving technology of adaptive learning, AI has established an AI adaptive learning system. Its working principle is to build a learning model on the basis of big data collection and analysis, and finally output learning suggestions. Self-organization is one of the basic behaviors of complex adaptive systems. It is a process in which the system spontaneously organizes from a disordered state into an ordered structure, and it is the floorboard of dissipative structure and synergetic theory. If the system is not driven by external forces in the evolution process, all parts of the system will interact with each other in terms of time and space or function according to their own behavior rules, and gradually present an orderly structure, and form a self-organized system with certain time and space and functional structure through the development and evolution of the system itself.

The current classroom teaching is more standardized and unified. Adaptive learning system can not only make more suitable content recommendations for students, but also further judge whether the recommended content is effective and provide more detailed guidance for teachers' instructional process. Adaptive learning uses computer algorithms to interact with learners and provide them with customized learning content and activities to meet the individual needs of learners[10].

Traditional and non-adaptive methods cannot realize adaptive learning on a large scale, so adaptive learning system should be used to help learners change from passive acceptance to participation and cooperation. Adaptive learning system quantifies students' interest preference, potential ability, binding force, innovation and other indicators by collecting data in the learning process on the basis of whether students do the problems correctly or not. Through data analysis, the adaptive learning system can design a learning path that is suitable for students' emotions and engagement, so that teachers can truly understand students' learning order and improve inappropriate teaching methods.

3. The Demand of Normal Education for Adaptive Learning

According to the content recommended by the adaptive learning system, students with different foundations can cram blank knowledge points in a short time, which is beneficial for students to quickly enter the learning role, improve their confidence and successfully complete the connection of knowledge. At present, the classroom in universities still maintains the state that all students accept the same progress of teaching tasks. Long-term learning environment with the same progress will reduce the improvement of outstanding students, and the underachievers will gradually lose their learning motivation because they can't keep up with the progress. For a variety of learning emotions displayed by college students, adaptive learning establishes an adaptive learning engagement model through the interactive data between students and the system. The system can adjust learning activities according to students' emotions in time, so that students' emotions tend to be stable; At the same time, it can also detect which learning activities can make students more involved and which learning activities are more effective for students.

Adaptive learning uses scientific assessment methods to accurately analyze students' weaknesses. The real assessment results can make teachers and students clearly understand the existing problems, formulate effective plans and special exercises in the later period, and greatly improve teaching efficiency. In college teaching, although hierarchical teaching is advocated and used by many teachers, in the actual implementation process, teachers still can't accurately grasp the strengths and weaknesses of each student, can't pay attention to the actual situation of each student, and can't adjust the teaching rhythm because a student has requirements for the speed of progress. In this respect, adaptive learning can detect students' mastery level, intelligently plan each student's learning path for teachers, and recommend teaching content suitable for students' level.

All members are equal and free to form a learning team, give full play to the learning advantages of the team, and conduct discussions on specific learning tasks. In this way, students learn in the adaptive learning mode. With the deepening of learning content, students interact and cooperate more and more closely, and gradually improve the learning ability of the team, make self-growth and achieve better learning results. Teachers always hope to monitor and evaluate students accurately, and adaptive learning analyzes students' test scores and determines their ability levels through the ability assessment model. In the process of testing, the order of questions is intelligently adjusted according to students' ability and knowledge relevance, and the degree of students' mastery of knowledge and ability structure are scientifically evaluated, and then the map of students' thinking ability is presented with visual graphic information.

4. The Construction of Adaptive Learning Mode in College Classroom under the Background of AI

4.1 Learner Model Construction

Different learners have different learning acceptance abilities because of their differences in personality, interests and knowledge base. When teaching in universities, teachers can't do it in a

traditional way, let alone treat learners as objects with the same ability and foundation. Adaptive learning can accurately stratify students by using AI technology, and the intensity of stratification is obviously better than that of teachers' manual stratification. According to the students' dynamic learning situation, the learning difficulty and learning content should be adjusted in time, so as to gradually realize large-scale personalized education. Self-organization theory requires teachers to change from teaching leaders to teaching organization supervisors in the instructional process[11]. In the adaptive learning mode, teachers are not doing nothing and letting students drift. Instead, they should carefully design teaching contents, select teaching organization forms and methods according to students' basic information, and stimulate students' self-organization, independent practice and team learning with the help of specific projects.

College students have different learning foundations, learning habits and learning styles. Every student will show his own unique learning behavior in his daily study and reflect his own preference for different learning resources. A large amount of data is needed to develop personalized resources suitable for college students in adaptive learning system, so it is particularly important to continuously collect behavioral data of college students in peacetime. Record their interest preferences, cognitive level and learning behavior at any time. The system structure of adaptive instructional process database is shown in Figure 1.

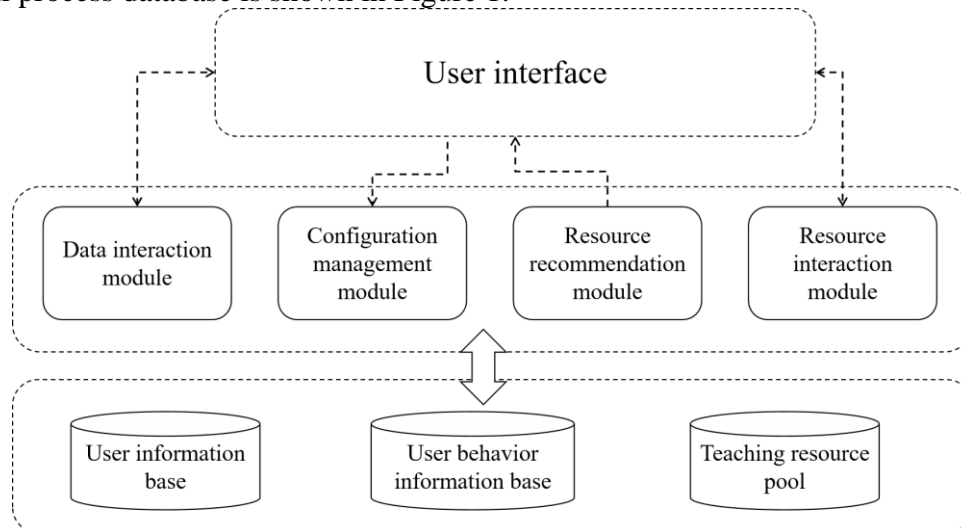


Fig.1 System Structure of Adaptive Instructional Process Library

The instructional model is to map the cognitive level in the learner model to the learning content in the domain model according to the learning goal, and recommend the corresponding learning content through the learner's personality characteristics. The instructional model is equivalent to the organization of the instructional process, and contains a series of rules designed for learners, which provides a guarantee for the adaptive learning system to realize self-adaptation. In the AI era, computers can help teachers to complete some transactional auxiliary work, collect data during students' learning process, use these data to describe the whole picture of students' learning ability and the degree of mastering learning content, quantify students' interest preferences, potential ability, self-control, creative potential and other indicators, and help teachers plan each student's learning path intelligently. Teachers should combine the professional characteristics and curriculum objectives of normal education, make a complete plan in the learning, practice and testing, and sort out high-quality content. By fully understanding students' preferred knowledge points and what kind of learning help they are easy to accept in the process of teaching and communicating with students, we can accurately locate where students need help and implement intervention. By planning a reasonable learning path for students, the advantages of adaptive learning system can be

brought into play.

4.2 Learning Path Construction

Domain knowledge model includes the learning content and knowledge structure of subject knowledge, which is the foundation and core of adaptive learning system. The essence of domain knowledge model is professional domain knowledge base, and its important component is the relationship between domain knowledge elements and knowledge. To build a domain knowledge model for different types of courses, we must first make clear the content of the courses we have studied, and decompose the whole content into relatively independent knowledge units according to the logical relationship between the contents, which should be independent and interrelated.

Adaptive learning mode is open, teachers are only supervisors and examiners of teaching organizations, students give full play to their subjective initiative in an open environment, and do not stick to any form of free combination learning. In the whole teaching activity, all students are equal, and there is no leader or organizer. Learner model records learners' basic information, personality characteristics and dynamic learning situation, which is the basis for adaptive learning system to provide learners with personalized learning decisions. In the usual teaching, we should constantly collect students' learning preferences, cognitive level, learning behavior and other data. For example, the number of times students drag the timeline when watching the teaching video, whether they will pause to leave during the viewing process, whether they will use the prompt function to answer the interactive questions, whether they will view the topic analysis, whether they will collect the questions, and so on. The framework and process of learning resource retrieval are shown in Figure 2.

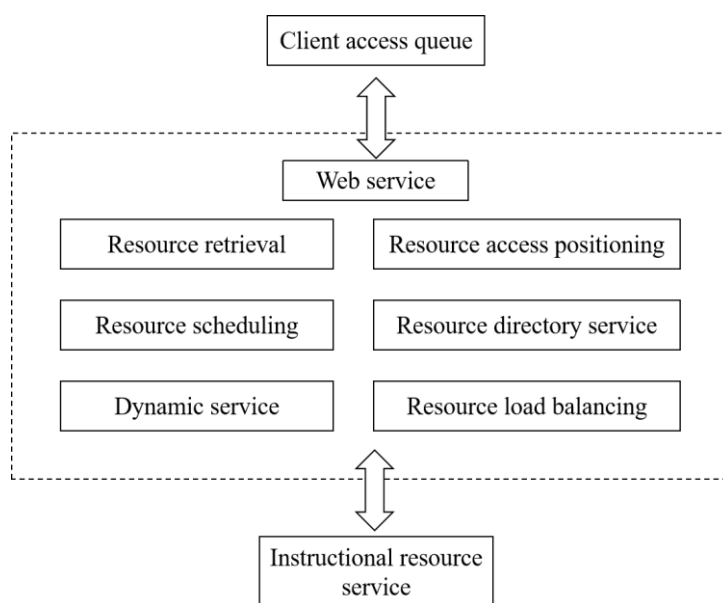


Fig.2 Learning Resources Retrieval Framework and Process

In the growth of information application, it will also become a new research topic to explore the application of AI technology in the intellectualization of education and teaching quality management and school decision-making, and to promote the formation of an intelligent, efficient and flat internal governance system of schools, which will help improve the efficiency of school education and teaching management. Based on classroom big data, a personal digital growth file is established for each student, students' digital portraits are accurately portrayed, learning status is analyzed with real-time big data, attendance records are recorded, students' knowledge structure is

dynamically analyzed, knowledge maps are constructed, and personalized learning resources are provided for students. Students can use the student terminal to complete the knowledge test issued by teachers or submit the results of group inquiry, and immediately generate statistical analysis reports after submission, and generate personalized feedback for each student, supporting students to collect exercises or content shared by teachers, and building a new form of adaptive learning and precise teaching.

5. Conclusions

The realization of AI and big data to students' personalized guidance makes the application of adaptive learning in normal education have broad prospects. How to apply adaptive learning technology to the classroom of normal students in universities for more learners is the challenge and main research trend of the integration of AI and real education. This paper introduces AI and adaptive learning mode, then discusses the current situation of online learning, and then expounds the adaptive learning mode based on AI from the aspects of knowledge base construction, learner mode construction and learning path construction, so as to provide new ideas for students' online learning. Personalized adaptive learning in smart learning environment promotes the construction of online learning space for everyone and future smart education, and promotes the pace of China's educational modernization. In the future, the application of AI technology in the field of education is bound to bring more comprehensive and deeper support and guarantee for learners' personalized learning.

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