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Exploration of the Path of Artificial Intelligence Technology Empowering the Digital Transformation of Higher Education

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Abstract: Amid the vigorous development of the digital economy, the digital transformation of education has become the core engine driving the high-quality development of universities, and a key measure to implement the education power strategy and cultivate innovative talents. Currently, the digitalization process of higher education still faces prominent pain points such as uneven resource allocation, rigid teaching models, single evaluation systems, and insufficient management efficiency, which restrict the improvement of education quality and connotative development. With its core advantages of powerful data processing, intelligent interaction, and personalized services, artificial intelligence (AI) technology provides a new path and technical support for solving the above problems. Based on the reality of university teaching and management, this paper focuses on the in-depth integration of AI technology and the digital transformation of higher education, systematically explores key implementation paths such as the renewal of educational concepts, the reconstruction of personalized teaching models, the optimization of refined management mechanisms, and the empowerment of precise faculty development under technology empowerment. It also deeply analyzes the core logic and practical key points in the process of technology integration, aiming to provide theoretical reference and practical insights for universities to accelerate the digital transformation of education with the help of AI technology, build a modern education system, and cultivate high-quality innovative talents adapting to the needs of the times.

Keywords: artificial intelligence; higher education; digital transformation; practical path

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1. Introducton

Against the background of current educational reform, educational informatization has become the direction of reform and development for universities in the new era. The state has issued a series of measures to promote the informatization of higher education. Although certain achievements have been made in the informatization of higher education in China, there are still many urgent problems to be solved: the shortage of high-quality resource supply cannot meet the diversified needs of students; the traditional classroom teaching form is rigid, leading to poor communication between teachers and students; educational management information is fragmented, making it difficult to make reasonable judgments. AI, characterized by

big data and intelligence, is an important technical support to solve these problems. Studying the methods of AI promoting the informatization construction of universities can not only solve the practical problems in the current development of universities but also further improve the quality of education and teaching and management level, promote the education model to adapt to the needs of university talent training and high-quality development, and has strong practicality and pertinence[1].

2. Main manifestations of ai technology empowering the digital transformation of higher education

2.1. Reconstruct personalized teaching models

By conducting intelligent data analysis of students' learning processes, AI records students' learning situations, builds models for each student's characteristics, and forms personal learning files, thereby achieving a "one-size-fits-one" personalized education model. At the same time, based on the results of big data calculations, AI can provide corresponding learning materials and suggestion plans for different students, avoiding the problem of teachers adopting a unified teaching standard for all students[2]. Meanwhile, intelligent Q&A robots, virtual simulation teaching systems, etc., break the boundaries of time and space, expand teaching scenarios, improve the efficiency of teacher-student interaction and teaching experience, and promote the in-depth transformation of the teaching model from "teacher-centered" to "student-centered".

2.2. Optimize refined management efficiency

AI technology has changed the traditional management model of "making decisions based on experience". Based on data analysis from educational administration systems, student systems, and asset management systems, it can realize evaluative and predictive analysis of teaching, students, resources, etc., and provide corresponding solution suggestions to help educational managers make scientific and reasonable decisions. For example, in student status management, it can make predictive warnings about students' learning situations and conduct timely interventions; in resource allocation, it can reasonably allocate teachers and classroom resources according to teaching arrangements, greatly improving work efficiency, reducing unnecessary workload, and providing strong management support in the process of educational informatization construction[3].

2.3. Empower precise faculty development

AI technology provides digital support for the construction of university faculty teams. By analyzing multi-dimensional information such as classroom interaction data, courseware usage effects, and student evaluation feedback during teachers' teaching processes, it builds teachers' teaching ability profiles. Based on the profiles, it can accurately identify teachers' teaching shortcomings, push customized training resources and training plans, and help teachers improve their digital teaching abilities. At the same time, the AI-assisted teaching achievement analysis system can quickly sort out excellent teaching experience and realize large-scale promotion, promoting the iterative upgrading of the overall teaching level of the faculty team and laying a solid talent foundation for the digital transformation of education.

3. Practical difficulties of ai technology empowering the digital transformation of higher education

3.1. High difficulty in practical adaptation of intelligent teaching tools

Currently, in the process of universities promoting the digital transformation of education empowered by AI technology, the operation of AI teaching software is relatively complex, and it is not designed for the characteristics of different

subjects. Teachers find it difficult to quickly grasp its working principles and thus form their own teaching progress; at the same time, in some classrooms focusing on reasoning, the operation mode of AI simulation software often does not match teachers' teaching ideas, and can only be barely used after repeated debugging, which increases the lesson preparation workload, easily disrupts the classroom rhythm, and undermines classroom continuity [4].

3.2. Difficulty in intelligent generation and adaptation of personalized teaching plans

At present, many teaching designs based on AI technology do not match teachers' teaching needs. AI teaching design plans are often formed based on standard learning data, and to a certain extent, it is difficult to fully conform to teachers' personal judgments on students' cognitive characteristics and learning characteristics, requiring teachers to make a lot of modifications according to students' situations and their own teaching objectives[5]. In addition, due to AI's insufficient timely grasp of students' dynamic learning changes, teachers also need to continuously conduct manual supplementary recording and plan adjustments, making it difficult to achieve truly precise teaching.

3.3. Insufficient teaching innovation capabilities in technology integration

Against the background of technology integration, many teachers have insufficient teaching innovation capabilities supported by AI technology. Many teachers have an unclear understanding of how to use information technology to optimize classroom teaching, cannot jump out of the traditional teaching model, and find it difficult to create teaching scenarios for students' independent learning and cooperative inquiry supported by AI in teaching; they cannot effectively use intelligent Q&A, real-time evaluation and other methods to mobilize students' enthusiasm according to teaching needs[6]. In addition, they cannot make good use of smart platforms to carry out hierarchical tutoring during after-class counseling, resulting in insufficient exertion of the value-added effect of AI teaching.

4. Main paths of ai technology empowering the digital transformation of higher education

4.1. Refine tool adaptation and optimize teaching connection

To address the insufficient practical adaptability of tools, teachers should conduct hierarchical and classified learning of the intelligent teaching tools used based on teaching needs. First, select small-scale intelligent tools suitable for subject characteristics, actively participate in relevant practical training, establish subject teacher communication groups to share usage experience and tool teaching adaptation strategies, test tools before lesson preparation, incorporate the operation of intelligent platforms into teaching plans, and set up failure plans for tool use[7]. In addition, design the application links and time points of tools according to the curriculum progress. In chapters explaining formulas, the operation process of virtual simulation experiment software can be preset in advance, so that the experiment operation process follows the teaching context, integrating tools into normal teaching activities, reducing teachers' pre-class preparation workload, and ensuring curriculum integrity.

For example, in the process of designing the "Early Childhood Scientific Inquiry Education" project, professional course teachers need to screen and push some intelligent preschool education simulation tools to students around core contents such as "observation of natural phenomena" and "simple experimental operations" in the project, such as virtual animal and plant growth observation systems, early childhood safety experiment simulation platforms, etc. By organizing students to participate in special practical training, teachers from the same department are united to form an interactive community, and students are organized to sort out different early childhood inquiry scenarios in the tools, such as simulation of seed germination process, simulation of safe electricity use experimental activities, etc. In this process, students are organized to improve operation steps, memorize key parameter setting points and their corresponding relationships with relevant curriculum knowledge points[8]. During lesson preparation, teachers can debug simulation experiment tools in advance, and at the same time, customize the logical sequence and key links of simulation

demonstrations for students according to the cognitive characteristics of 3-6-year-old children, and preset response methods for failures such as slow loading of simulation scenarios and overly complex interactive operations, such as downloading offline demonstration packages in advance, simplifying operation steps to adapt to young children's hands-on abilities, etc.[9] Through such forms, in the teaching process, the software use process is integrated into the classroom teaching process, which not only conforms to the characteristics of young children's intuitive thinking but also effectively improves classroom efficiency.

4.2. Lead plan iteration to precisely adapt to student learning situations

In response to the insufficient matching degree of personalized learning plans, teachers should take the initiative to intervene, forming a learning plan improvement strategy of "machine generation - human intervention - continuous improvement". On the basis of automatic machine generation, conduct subjective analysis according to the understanding of students and the cognition of learning laws, add corresponding student learning situation information, and adjust unreasonable parts to make the plan more suitable for students' learning situations[10]. Construct a student learning status tracking record form, and timely input classroom observations, homework evaluations and other contents into the system to offset the problem of delayed data acquisition by the platform. Continuously enrich key information such as learning materials and learning routes according to students' learning situations and evaluation results, realize the dynamic generation of personalized learning plans, and effectively improve the effectiveness and pertinence of personalized learning plans[11].

For example, in the process of designing the "Early Childhood Language Expression Education" course project, teachers should guide students to initially generate personalized early childhood learning plans relying on intelligent language learning systems (such as early childhood voice interaction training platforms). On this basis, combined with the differences in the language development levels of children in the class (mainly including some children with substandard pronunciation and some children with insufficient vocabulary) and children's learning style characteristics (some children are good at situational imitation, and some are good at nursery rhyme memory), supplement personalized learning data in the field of preschool language for students. Among them, the language learning materials pushed by intelligent systems often face the problem of mismatching with teaching practice. Teachers can guide students majoring in preschool education to manually add learning materials such as common situational dialogues in early childhood life, excerpts from preschool picture books, or seasonal theme nursery rhymes[12]. In the process of adding, the difficulty level of materials should be appropriately adjusted to achieve teaching students in accordance with their aptitude. For children with weak pronunciation, guide students to add monosyllabic follow-up materials; for children with rich vocabulary, add some coherent expression tasks; for children good at situational imitation, add some role-playing voice materials, combined with animation scenes to assist children's understanding; for children good at nursery rhyme memory, strengthen the push of rhythmic language nursery rhymes, tongue twisters and other materials. In addition, guide students to establish offline data accounts such as children's classroom language expression, picture book interactive reading situation, and oral homework error types, and input the data into the intelligent system every week, so as to effectively make up for the lag of the system in capturing children's offline language learning status[13].

4.3. Strengthen capacity improvement and innovate integration design

To solve the problem of insufficient teaching innovation capabilities in technology integration, teachers should actively improve their digital literacy and technology-integrated teaching innovation capabilities, actively participate in special training on AI education applications, learn and master the basic logic and method strategies of technology and teaching integration, and expand technology-integrated teaching innovation thinking; combined with subject teaching needs, break the limitations of the original teaching model, create inquiry-based and interactive teaching scenarios supported by AI, such as using intelligent Q&A systems to assign hierarchical questions and conduct real-time questioning and discussion in class; at the same time, use the hierarchical guidance function of intelligent systems during after-class counseling,

formulate different guidance plans for students at each level, and continuously try and improve to find a method suitable for their own information technology application in classroom teaching, maximizing the role of information technology[14].

For example, in the "Early Childhood Art Creation" course, teachers should actively participate in relevant AI education and teaching method training organized by the school, master the application methods and skills of intelligent painting software and music interaction systems in "Early Childhood Art Creation", and innovate the traditional "demonstration teaching - early childhood imitation" model into "creativity inspiration - intelligent auxiliary creation - personalized guidance" to carry out independent learning tasks. Before class, assign preview tasks through the smart teaching platform, allowing young children to freely doodle around the theme "My Kindergarten" through the "theme association" function of the intelligent painting APP, and the system automatically records data such as children's color preferences and line characteristics; during class, based on the data return function of the smart teaching platform, obtain each child's initial creative works and creative expressions, display excellent cases through the intelligent interactive whiteboard, organize children to discuss in groups "how to make the kindergarten picture more rich", and teachers provide personalized guidance for children's creative shortcomings (such as recommending gradient color matching schemes for children with single colors, and providing simple composition templates for children with messy lines). After class, use the hierarchical counseling function of the intelligent system to push consolidated materials such as basic early childhood painting tutorials and classic children's illustration appreciation for children with weak artistic perception, and assign extended tasks such as "solar term theme creative painting" and "original early childhood song lyrics filling" for children with outstanding creativity. Through continuous practice and refinement, form a technology-integrated teaching model suitable for their own teaching style, effectively stimulating young children's enthusiasm for artistic creation and imagination.

5. Conclusion

In short, in the era of AI, achieving the in-depth integration and application of AI and higher education and teaching is an important work, and also one of the important means to promote the reform of higher education[15]. The process should be based on the teaching activities of university teachers, solve problems such as insufficient adaptability, limited data sharing, and insufficient teachers' use capabilities in the application of AI, and effectively promote the organic combination of AI and education and teaching from aspects such as tool learning, system optimization, organic integration, and data analysis. Only by starting from teaching reality, improving teachers' information technology capabilities, and strengthening the construction of teaching data management, can AI technology be better applied to higher education and teaching, and promote the development of higher education informatization.

Disclosure statement

The author declares no conflict of interest.

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