

Research on the Application of Educational Technology and Improvement of Teaching Quality in Higher Education Management Empowered by AI

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ABSTRACT

This article explores the application of artificial intelligence (AI) in higher education management, with a focus on how it promotes innovation in educational technology and improves teaching quality. By analyzing the potential and application of AI technology in the field of education, this article proposes the key role of AI technology in higher education management, and explores how to optimize teaching resource allocation, teaching methods, and evaluation mechanisms through intelligent means, ultimately promoting the comprehensive improvement of teaching quality.

KEYWORDS

artificial intelligence; Higher education management; Educational technology; Teaching quality; Intelligentization; reform in education

1 Introduction

With the rapid development of artificial intelligence (AI) technology, the global education sector is undergoing a profound transformation. As a key link in cultivating innovative talents, higher education urgently needs to rely on the power of modern technology to improve its management and teaching quality. AI not only provides the possibility of personalized learning in the teaching process, but also provides accurate data support for education managers, promoting the transformation of education models. However, despite the enormous potential of AI technology in higher education, its specific applications still face many challenges, such as insufficient technology penetration, data privacy issues, and the technical adaptation of educators. Therefore, exploring how AI can effectively empower higher education management and optimize teaching quality has become an urgent issue that needs to be addressed. This article will explore the current application status and development trends of AI technology in higher education management, analyze its role in promoting educational technology innovation and teaching quality improvement, and aim to provide theoretical support and practical guidance for future education reform.

2 The Application of AI in Higher Education Management

2.1 Intelligent allocation and management of educational resources

With the rapid development of higher education, how to efficiently allocate and manage educational resources has become an important challenge. Traditional resource management methods often face issues of low efficiency, outdated information, and uneven resource allocation. The introduction of AI technology has made the allocation of educational resources more intelligent and precise. By analyzing teaching data, student needs, and resource utilization through AI algorithms, educational managers can more efficiently plan and schedule resources. For example, AI can intelligently arrange courses, laboratory usage, and allocation of teaching equipment based on factors such as student numbers, course requirements, and teacher strengths, thereby improving the utilization of teaching resources. In addition, AI can automatically adjust course content and teaching strategies based on students' learning progress, interests, and academic performance, ensuring that educational resources can be dynamically adjusted according to actual needs. AI technology can not only reduce the waste of educational resources, but also provide students with more personalized and diverse learning experiences, promoting the improvement of educational equity and quality.

2.2 The role of AI in teaching decision support systems

Teaching decisions in higher education management often involve complex variables and factors, and traditional decision-making methods are susceptible to human bias, making it difficult to quickly adapt to environmental changes. The application of AI in teaching decision support systems can provide accurate decision-making basis for education managers through data analysis and model prediction. AI can provide managers with suggestions on curriculum design, teaching methods, and subject construction by analyzing students' learning data, teachers' teaching feedback, and the effectiveness of course implementation. For example, through machine learning and data mining, AI can identify weak

links in course content, propose solutions to adjust teaching content, or optimize course arrangements and teacher staffing. At the same time, AI can monitor various data during the teaching process in real time, issue timely warnings, and help decision-makers quickly identify potential problems and make corresponding adjustments. AI can provide scientific reference opinions for management in teaching evaluation, teaching quality monitoring, and other aspects, making decisions more accurate, dynamic, and forward-looking, and promoting the continuous improvement of teaching quality.

2.3 Data driven analysis and prediction of student behavior

The learning behavior data of students contains a large amount of valuable information, and traditional educational management methods often find it difficult to fully explore and utilize this data. However, AI technology can conduct in-depth analysis and prediction of student behavior through big data analysis and machine learning algorithms. AI can monitor various indicators such as students' learning process, learning habits, participation, and academic performance in real time. By analyzing this data, it can identify difficulties or bottlenecks that students may encounter in their learning. For example, by analyzing students' homework completion status, classroom interaction frequency, etc., AI can predict students' academic performance or academic risks, providing personalized intervention suggestions for education managers and teachers. Furthermore, AI can optimize learning resource recommendations based on students' learning paths, interests, preferences, and social interactions, helping students find the most suitable learning methods and content for themselves. Through data-driven analysis of student behavior, AI can provide education managers with more accurate student support measures, which can not only improve students' academic performance but also promote their comprehensive development.

3 The Promoting Role of Educational Technology in Improving Teaching Quality

3.1 AI assisted personalized learning and innovative teaching methods

AI technology provides powerful support for personalized learning. Through real-time collection and analysis of student learning data, AI can tailor personalized learning plans for each student. In the traditional education model, students are often required to learn at a unified pace and in a uniform manner, ignoring the differences in their learning. However, the application of AI enables education to truly make personalized adjustments based on the characteristics of students. AI can analyze students' learning habits, interests, learning speed, and mastery situation, and recommend the most suitable learning content, textbooks, and learning methods for each student. In addition, AI technology can adjust teaching methods in a timely manner based on students' reactions, improving their learning efficiency. For example, AI can intelligently recommend learning resources such as videos, articles, and exercises to help students conduct targeted training in weak areas. Meanwhile, AI can also provide dynamic learning content and tasks through interactive learning platforms, and adjust teaching strategies in real-time based on students' progress and feedback. This personalized learning approach not only enhances students' interest and motivation in learning, but also effectively improves their academic performance, enabling each student to achieve better development in a suitable learning environment.

3.2 Construction of Intelligent Evaluation and Feedback System

Traditional educational assessment methods often rely on final exams and standardized tests, which often cannot fully reflect students' learning process and true level. The introduction of AI provides a more intelligent and multidimensional way for teaching evaluation, especially in the dynamic evaluation of students' learning process, which has great potential. AI can continuously track and analyze students' homework, classroom performance, learning logs, and generate personalized learning reports. These reports can reflect students' learning progress, understanding depth, and knowledge mastery in real time, providing teachers with more accurate evaluation data. AI based assessment systems can also help teachers identify students' learning bottlenecks in a timely manner through automatic grading and data analysis, providing personalized feedback and guidance. For example, AI can automatically adjust evaluation criteria and optimize students' learning paths based on their performance in post class exercises. At the same time, AI systems can automatically generate targeted learning suggestions to help students correct mistakes in a timely manner, further improving learning effectiveness. The construction of an intelligent evaluation and feedback system can not only provide teachers with scientific teaching evaluation data, but also provide students with timely and accurate learning feedback, promoting the comprehensive improvement of teaching quality.

3.3 Intelligent Tutoring and Support of AI in the Education Process

The intelligent tutoring role of AI in the education process is becoming increasingly prominent, especially in providing

personalized learning support for students, which is particularly evident. Through natural language processing and machine learning technology, AI can simulate the tutoring behavior of teachers and provide students with 24-hour learning assistance anytime, anywhere. This intelligent tutoring system can answer students' questions encountered during the learning process, provide immediate feedback, and develop personalized learning plans based on students' needs. For example, when students are studying a certain subject, AI systems can identify their weak links in knowledge points and provide relevant supplementary materials and exercises through a series of intelligent recommendations to help students consolidate their learned knowledge. In addition, AI can adjust the depth and difficulty of tutoring content according to students' learning progress and feedback, ensuring that students can effectively learn at their own pace. Intelligent tutoring systems can provide students with continuous learning support, while teachers can focus more on classroom interaction and advanced teaching, improving the overall efficiency of education. AI not only provides personalized learning experiences for students, but also greatly alleviates the burden on teachers, helping to improve teaching quality and optimize the allocation of educational resources.

4 The Challenges and Future Development of AI Empowering Higher Education Management

4.1 Ethical Issues and Privacy Protection in Technical Applications

With the increasing application of AI technology in higher education management, ethical issues and privacy protection have become core issues that must be addressed. The application of AI in higher education requires a large amount of student data, including sensitive information such as personal learning behavior, grades, interests, and social interactions. The collection, storage, and use of data, especially for students' personal information, may pose risks of privacy leakage and abuse. Therefore, how to process and protect student data in AI systems is a prerequisite for ensuring the safe and effective application of technology. For the use of educational data, it is necessary to first comply with data protection laws and privacy policies, ensure that student data collection is clearly authorized, and strictly limit access permissions during use. Secondly, the "black box" problem of AI technology may lead to opacity in algorithm decision-making, which may affect educational equity. AI may unconsciously incorporate biases when making evaluations and decisions, such as making unfair judgments based on factors such as students' background, gender, race, etc., which may further exacerbate discrimination in the field of education. Therefore, educational institutions need to take measures to ensure the transparency and interpretability of AI systems, and avoid algorithmic bias. To address these challenges, education administrators and technology developers need to strengthen ethical reviews, regularly audit AI systems to ensure their use in educational management follows ethical standards, and increase investment in privacy protection technologies, such as encryption and anonymization, to safeguard students' personal data security and privacy from infringement.

4.2 Needs for Enhancing the Abilities of Higher Education Managers and Teachers

The application of AI technology not only has an impact on educational content and methods, but also puts forward new competency requirements for education managers and teachers. Firstly, AI technology requires higher education managers to possess more professional technical literacy. Managers not only need to understand the basic principles of AI technology, but also need to master the ability to apply AI in educational management to optimize resource allocation, improve teaching quality, support decision-making, and other aspects. For example, managers need to be able to analyze and interpret teaching data generated by AI systems to make scientific decisions, which requires managers to have a certain basic knowledge of data analysis and AI applications. At the same time, the application of AI in educational management often involves interdisciplinary knowledge, and managers should possess systematic thinking, be able to integrate various information and resources, and promote the intelligent transformation of the education system. For teachers, the application of AI technology also poses higher requirements. With the popularization of personalized learning and intelligent tutoring systems, teachers need to constantly update their teaching concepts and methods, and master the ability to use AI tools for teaching design and interactive teaching. Teachers should understand how to integrate AI technology into classroom teaching, how to support students' autonomous learning, personalized tutoring, and real-time feedback through AI. In addition, AI has also changed the way students and teachers interact, with teachers not only playing the role of knowledge transmitters, but also becoming learning guides and managers of educational technology.

4.3 Future Development Trends and Policy Suggestions

In the future, the application of AI technology in higher education management will be further deepened, promoting the development of education towards intelligence and personalization. Firstly, with the continuous advancement of AI

technology, personalized learning will become one of the core goals of education. AI can provide customized learning paths based on students' learning progress, interests, and needs, automatically adjust learning content and methods, help students learn at the most suitable pace, and further improve learning effectiveness. At the same time, the application of AI in educational evaluation, teaching feedback, resource allocation, and other aspects will become more extensive and accurate. Education managers can obtain real-time data through AI systems and make more scientific and flexible decisions. Secondly, the development of AI technology will drive a comprehensive transformation of the higher education management system. Intelligent campus management will become a future development trend, and AI can help schools achieve automation and efficiency in enrollment, course scheduling, teacher resource allocation, and other aspects, thereby optimizing the overall management efficiency of schools. At the policy level, the government should introduce corresponding regulations and policies to promote the standardized application of AI technology. In terms of data privacy protection, the government should establish strict data protection regulations, clarify rules for data collection, storage, use, and sharing, and safeguard the personal privacy of students and teachers. At the same time, the government needs to increase its support for AI technology research and development, encourage cooperation between educational institutions and technology companies, and promote the deep integration of AI and education. In addition, policies should attach importance to the technical training of education practitioners, especially in the application of AI technology, to help teachers and managers continuously improve their abilities to cope with the changes brought about by the AI era. In the future, policies should encourage schools to establish AI research centers and innovation platforms, promote innovation in the application of AI technology in the field of education, and lay the foundation for achieving educational equity and quality improvement.

5 Conclusion

This article explores the application of AI in higher education management and its role in improving teaching quality, indicating that the widespread use of artificial intelligence technology in the field of education has brought unprecedented changes to educational management. AI can optimize the allocation of educational resources, enhance the personalization of teaching methods, and improve evaluation and feedback mechanisms through intelligent means, thereby effectively improving the quality of teaching. However, the rapid development of technology has also brought many challenges, including ethical issues, data privacy protection, and the adaptability of teachers and managers. Therefore, while promoting the application of AI technology in higher education, it is necessary to strengthen the training of education practitioners' abilities and formulate relevant policies to address potential risks in technology applications. In the future, with the continuous development and improvement of AI technology, its deep integration in the field of education will promote the comprehensive upgrading of the higher education management system and further enhance the quality of teaching.

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