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Research and practice on digital teaching model innovation in higher education empowered by artificial intelligence

Chang LIU

College of Digital Economy, Taishan University, Tai'an 271000, China

Abstract: As the cradle of cultivating innovative talents, higher education must follow this trend and explore the teaching mode that adapts to the future educational needs. This study explores the innovative path of digital teaching mode in higher education in light of the latest advances in AI technology, and proposes the potential and challenges of AI application in higher education through practical case studies. It is found that AI-enabled digital teaching not only improves teaching efficiency and optimizes the allocation of teaching resources, but also promotes personalized learning and student learning experience. This paper aims to provide theoretical support and practical guidance for teaching reform in higher education.

Key words: artificial intelligence; higher education; digital teaching; teaching mode; innovation; practice

1 Introduction

Against the background of the era of informationization and intelligence, artificial intelligence has become a key force in promoting innovation in all walks of life, especially in the field of education. Higher education urgently needs to explore a new teaching mode that adapts to future educational needs. Empowerment through AI can promote the digital transformation of higher education , and provide a new impetus for the future development of global education. This study aims to explore the application of artificial intelligence in higher education, analyze its role and effectiveness in the innovation of teaching mode, and explore how to better promote the digital transformation of higher education by combining specific practice cases.

2 Literature review

2.1 Application of artificial intelligence technology in education

The application of AI in education is broad and far-reaching, covering a wide range of aspects from intelligent teaching systems to conversational general AI. Intelligent teaching systems and personalized learning platforms provide customized learning paths and content by analyzing student data, greatly enhancing the personalization and efficiency of learning, while AI assistants and intelligent tutoring systems provide students and teachers with convenient support tools to help the teaching and learning process in all aspects, from study advice to homework help. Education data analysis and intelligent assessment systems can use AI technology to deeply mine education data, helping teachers and administrators better understand student needs and optimize teaching decisions. Meanwhile, virtual reality (VR) and augmented reality (AR) technologies combined with AI bring an immersive learning experience to students, further enriching the means of

education. In addition, the emergence of intelligent education grand models and conversational general artificial intelligence (e.g., ChatGPT) provides powerful technical support for educational content generation and real-time interactive learning, pushing education in the direction of intelligence and personalization [1].

2.2 Digital teaching models in higher education empowered by AI

By integrating with traditional teaching, AI technology provides teachers with real-time feedback and intelligent coaching tools, helping to optimize teaching content and strategies, and making up for the shortcomings of traditional teaching that make it difficult to take into account individual differences. At the same time, the adaptive learning system uses AI algorithms to analyze students' learning behaviours, generate personalized learning paths for each student, and provide real-time feedback and resource recommendations, thus significantly improving learning outcomes.

2.2.1 Integration of AI technology and traditional teaching mode

The integration of AI technology with traditional teaching modes has brought significant changes to higher education. At the same time, the AI-driven dynamic adjustment of teaching content ensures that the teaching difficulty matches the level of students, further enhancing the teaching effect [2]. In addition, AI technology also provides students with 24-hour online Q&A services to help solve after-school learning problems.

2.2.2 Innovative teaching tools and platforms

In terms of innovative teaching tools and platforms, AI technology has significantly improved teaching efficiency and interactivity by optimizing smart classroom management and providing real-time assessment feedback. The smart classroom platform uses image and voice recognition technology to monitor student performance in real time, providing teachers with detailed classroom reports and teaching suggestions to help them make timely adjustments to their teaching strategies. Meanwhile, AI-driven virtual labs and online education platforms break the time and space constraints, providing students with an immersive learning experience and personalized experiment guidance. Combined with AI technology, these platforms are able to dynamically recommend learning resources based on students' learning behaviors and progress, enriching learning styles, enhancing the fun and autonomy of learning, and promoting the digital transformation of higher education teaching models.

2.2.3 Big data and artificial intelligence assisting decision making

Big data and artificial intelligence technologies play an important role in educational decision support. By integrating multi-dimensional data such as students' academic performance, classroom performance, and homework completion, big data analysis can comprehensively assess the quality of teaching, identify problems and deficiencies in the teaching process, and provide education administrators with a scientific basis for optimizing the allocation of teaching resources and formulating a reasonable teaching plan [3]. At the same time, AI technology can carry out predictive analysis based on historical data, identify students' possible learning difficulties in advance, and help teachers carry out personalized interventions. In addition, by monitoring students' learning behaviors and motivation in real time, the AI system can provide teachers with precise teaching suggestions to stimulate students' learning motivation, thus enhancing students' learning results. This data-driven decision-making model not only improves the science and accuracy of education management, but also provides strong support for personalized teaching.

3 Practical exploration of digital teaching models in higher education

3.1 Application of AI-assisted teaching system in a university

By introducing an AI-assisted teaching system, a university has deeply transformed its traditional teaching mode, significantly improving students' independent learning ability and the effectiveness of teacher-student interaction. The system uses an intelligent platform to integrate rich teaching resources, including online courses, virtual labs and intelligent

tutoring tools [4]. At the same time, AI technology provides teachers with detailed classroom reports and feedback on students' learning progress by analyzing students' learning behaviors and data in real time. In addition, the intelligent platform also supports real-time interactive functions, so that students can ask teachers questions at any time, and teachers can reply in time through the platform, which promotes efficient communication and interaction between teachers and students.

3.2 AI-powered personalized learning platform

A university has successfully implemented a personalized education model through an AI-powered personalized learning platform. The platform uses AI algorithms to analyse students' learning characteristics and behavioral data to tailor course content and learning paths for each student, ensuring that the teaching content matches students' learning progress and abilities. Teachers flexibly adjust their teaching methods and adopt more targeted counselling strategies based on the data and suggestions provided by the platform to help students overcome their learning difficulties and improve their learning results. At the same time, the school focuses on enhancing the technical skills of teachers, helping them master the use of AI tools and better adapt to the changes in AI-assisted teaching through regular training and practical guidance [5]. The school further fosters students' independent learning ability through curriculum design and learning guidance, guides students to make reasonable use of AI technology for efficient learning, and promotes the innovation and change of learning mode.

4 Advantages and challenges of digital teaching models in higher education empowered by AI technology

In the AI-enabled digital teaching model of higher education, its advantages are mainly reflected in the following aspects. Firstly, AI technology significantly improves the quality and efficiency of teaching through personalized and precise teaching content design. Secondly, AI systems can optimize the allocation of educational resources, and maximize the use of resources, especially in the application of virtual labs, online courses and intelligent tutoring tools, which greatly expands the coverage of educational resources [6].

In the AI-enabled digital teaching model of higher education, despite the many advantages it brings, it also faces a series of challenges and problems. Firstly, the problem of adaptation between technology and teachers is a major obstacle. Many teachers face difficulties in integrating AI technologies into their daily teaching, which not only requires teachers to master new technological tools, but also requires them to adapt their teaching methods and mindsets to take full advantage of AI. Secondly, the issue of data privacy and security has become a key challenge. AI platforms require a large amount of student data to enable personalized learning and intelligent tutoring. In addition, the individual differences of students and their ability to adapt to technology should not be ignored. Some students may be resistant to new technologies, especially those who are not used to or familiar with digital tools. Therefore, how to improve students' acceptance of AI teaching platforms and help them better adapt to technology-driven learning environments is also a key concern. These challenges need to be overcome gradually through various efforts such as teacher training, technology optimization and student guidance to ensure the effective application and promotion of AI technologies in higher education.

5 Conclusions and outlook

This study has deeply explored the practical application and effect of AI-enabled digital teaching mode in higher education, and the results show that AI technology has significant advantages in improving education quality and student learning outcomes. The future teaching mode will be more intelligent and personalized, and AI will not only be able to accurately analyse students' learning behaviors and needs, but also dynamically adjust the teaching content and strategies to achieve truly tailored teaching. Educators need to continuously improve their technical skills, actively adapt to the

changes brought about by AI technology. Through multi-party collaboration, the AI-enabled digital teaching model for higher education will provide strong support for cultivating the innovative talents needed by the future society.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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