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ORIGINAL

Research on the path to improve the teaching ability of college teachers based on artificial intelligence

Investigación sobre el camino para mejorar la capacidad docente del profesorado universitario basándose en inteligencia artificial

Chaofan Ji[1], Mengya Dong[2], Dong Li[1], Leigang Wang[1], Junkai Hou[1], Yitong Niu[1]

[1]School of Aeronautical Engineering, Anyang University. Anyang, China.
[2]Wuyang County Government Kindergarten, Luohe, China.

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Editor: Dr. Rubén González Vallejo

Corresponding author: Chaofan Ji

ABSTRACT

With the rapid development of artificial intelligence technology, its application in the field of education has provided a new path for improving the teaching ability of college teachers. This paper explores the role of artificial intelligence in improving the teaching ability of college teachers in terms of teaching design, classroom management, and student evaluation through literature analysis, case studies, questionnaires, and interviews. The study found that artificial intelligence technology can significantly optimize teachers' teaching design ability, classroom management ability, and student evaluation ability, but it also faces challenges such as data security and technology dependence. This paper proposes suggestions for optimizing the path of artificial intelligence to improve the teaching ability of college teachers, in order to provide a reference for the reform of higher education.

Keywords: Artificial Intelligence; Teaching Ability; Path Optimization; University Education.

RESUMEN

Con el rápido desarrollo de la tecnología de inteligencia artificial, su aplicación en el campo de la educación ha proporcionado un nuevo camino para mejorar la capacidad de enseñanza de los profesores universitarios. Este artículo explora el papel de la inteligencia artificial en la mejora de la capacidad de enseñanza de los profesores universitarios en términos de diseño de la enseñanza, gestión del aula y evaluación de los estudiantes a través del análisis de la literatura, estudios de casos, cuestionarios y entrevistas. El estudio encontró que la tecnología de inteligencia artificial puede optimizar significativamente la capacidad de diseño de la enseñanza de los profesores, la capacidad de gestión del aula y la capacidad de evaluación de los estudiantes, pero también enfrenta desafíos como la seguridad de los datos y la dependencia de la tecnología. Este artículo propone sugerencias para optimizar el camino de la inteligencia artificial para mejorar la capacidad de enseñanza de los profesores universitarios, con el fin de proporcionar una referencia para la reforma de la educación superior.

Palabras clave: Inteligencia Artificial; Capacidad de Enseñanza; Optimización de Trayectorias; Educación Universitaria.

INTRODUCTION

With the advent of the digital age, the field of education is undergoing unprecedented changes. As a representative of the new generation of information technology, artificial intelligence technology is gradually penetrating into all levels of education, bringing challenges and opportunities to the traditional teaching model. As the main body of teaching activities, the teaching ability of college teachers directly affects the quality and effect of teaching. However, in the face of increasingly complex teaching environments and diversified student needs, how college teachers can improve their teaching abilities to adapt to the requirements of the digital age has become an urgent problem to be solved in the current education field.

In recent years, the application of artificial intelligence technology in the field of teaching has become increasingly widespread, providing new ideas and methods for improving teachers' teaching ability. Through technical means such as big data analysis, machine learning, and natural language processing, artificial intelligence can assist teachers in preparing lessons, teaching, and grading homework, thereby improving teaching efficiency and quality.[1] At the same time, artificial intelligence can also provide students with personalized learning resources and paths to meet the learning needs of different students. Therefore, it is of great practical significance to study the path to improve the teaching ability of college teachers based on artificial intelligence.[2]

There are many traditional and modern methods to improve teachers' teaching ability, including lifelong learning, practice reflection, communication and cooperation, and the use of technology. However, these methods have certain limitations in improving teachers' teaching ability.[3] For example, lifelong learning requires teachers to invest a lot of time and energy, and the effect varies from person to person; practice reflection is often limited by teachers' personal experience and cognitive level; communication and cooperation are limited by factors such as region and time. In contrast, artificial intelligence technology provides new ideas and methods for improving teachers' teaching ability.[4]

There are still some deficiencies and problems to be solved in the current research. For example, the specific application effect and mechanism of artificial intelligence technology in improving the teaching ability of college teachers are still unclear; there are few studies on personalized improvement paths for different disciplines and majors; the popularity of artificial intelligence technology in the field of education and the problem of resource allocation also need to be solved urgently.[5] These problems provide positioning and direction for this study.

This study aims to construct a theoretical model for improving the teaching ability of college teachers based on artificial intelligence, enriching and developing the theoretical system of improving teaching ability. By deeply analyzing the relationship between artificial intelligence technology and teaching ability, it reveals how artificial intelligence affects and improves teachers' teaching ability, and provides theoretical support for research in related fields. At the same time, it explores how college teachers can use artificial intelligence technology to improve their teaching ability in actual teaching, and proposes specific and feasible implementation paths and strategies.[6] These research results can provide practical guidance for college teachers, help them better adapt to the teaching requirements of the digital era, and improve the quality and effectiveness of teaching.

Overview of Artificial Intelligence and Teaching Capabilities

Artificial intelligence technology includes machine learning, natural language processing, computer vision and other fields, and has powerful data processing and analysis capabilities. In the field of education, artificial intelligence technology can be applied to teaching management, personalized learning, intelligent tutoring and other aspects, providing technical support for improving the teaching ability of college teachers.

Teaching ability refers to the comprehensive ability of teachers in terms of professional knowledge, teaching skills, teaching attitude, etc. in teaching activities. The evaluation methods of teaching ability include student evaluation, peer evaluation, self-reflection and other methods. Among them, student evaluation is one of the most direct and objective evaluation methods, which can reflect the teaching effect of teachers and the learning experience of students.

Artificial intelligence technology can influence and improve teachers' teaching ability by providing personalized learning resources, intelligent teaching management, and accurate teaching feedback. For example, the intelligent lesson preparation system can assist teachers in preparing lessons and improve the pertinence and effectiveness of teaching; the intelligent tutoring system can provide students with personalized learning support and reduce the tutoring burden of teachers; the intelligent assessment system can achieve instant, comprehensive and personalized assessment, providing teachers with a scientific basis for teaching decisions.

In recent years, global higher education has been undergoing a digital transformation, and the application of artificial intelligence technology in education has become increasingly widespread. According to the Ministry of Education's "Education Informatization 2.0 Action Plan", by 2025, China will build an intelligent education system to promote educational modernization. Artificial intelligence technology has shown great application

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potential in teaching management, personalized learning, and intelligent tutoring. For example, some online education platforms have effectively improved students' academic performance and learning efficiency by introducing AI intelligent teaching assistants.

METHOD

Research design

This study adopts a combination of literature review, case study and empirical research. First, through literature review, we sort out the research results and practical experience of the application of artificial intelligence in education at home and abroad; secondly, we select representative universities and teachers as cases for in-depth analysis; finally, through questionnaire surveys and interviews, we collect data and feedback on the use of artificial intelligence technology by university teachers for quantitative and qualitative analysis.

Case Study

Take Anyang University as an example. The school has introduced an intelligent lesson preparation system to assist teachers in lesson preparation. The system can provide personalized lesson preparation resources and suggestions based on the teacher's teaching plan and the student's learning situation analysis. By comparing the teaching effect of teachers and the academic performance of students before and after using the system, it is found that the teaching effect of teachers has been significantly improved after using the system, and the academic performance of students has also improved.

Empirical research

Through questionnaire surveys and interviews, data and feedback on the use of artificial intelligence technology by teachers in multiple universities in a certain region were collected. The questionnaire content included teachers' awareness of artificial intelligence technology, usage, satisfaction, etc.; the interviews were conducted with some typical teachers to conduct in-depth exchanges to understand their experiences and problems in the process of using artificial intelligence technology. Through the analysis of the collected data, it was found that most teachers have a positive attitude towards artificial intelligence technology and believe that it can improve their teaching ability and teaching effect.

Data Analysis Results

Descriptive statistical analysis of the collected data found that the proportion of college teachers using artificial intelligence technology has increased year by year. At the same time, there are certain differences in the use of artificial intelligence technology by college teachers in different disciplines and majors. For example, college teachers in science and engineering majors are more inclined to use technologies such as intelligent simulation and simulation for experimental teaching.

The collected questionnaire data were analyzed by descriptive statistics, and the basic situation of the teachers was shown in the table 1.

Table 1. Basic description of the sample

Project	Category	Frequency	Percentage
Gender	male	120	60 %
	female	80	40 %
Age	Under 30 years old	30	15 %
	30-39 years old	80	40 %
	40-49 years old	60	30 %
	Over 50 years old	30	15 %
Discipline	liberal arts	60	30 %
	science	80	40 %
	Engineering	40	20 %
	Art	20	10 %
Job Title	Teaching Assistant	20	10 %
	lecturer	60	30 %
	Associate Professor	80	40 %
	professor	40	20 %

A statistical analysis of teachers' cognition of artificial intelligence technology was conducted, and the results are shown in the table 2.

Table 2. Cognition of artificial intelligence technology

Awareness	Frequency	Percentage
Very understanding	40	20 %
Better understanding	100	50 %
General understanding	40	20 %
Not sure	10	5 %
I don't understand at all	10	5 %

The frequency of teachers using artificial intelligence technology was statistically analyzed, and the results are shown in the table 3.

Table 3. Frequency of use statistics

Frequency of use	Frequency	percentage
Daily use	60	30 %
Weekly use	80	40 %
Monthly usage	30	15 %
Rarely used	20	10 %
Never used	10	5 %

DISCUSSION

Intelligent training path

Using artificial intelligence technology to provide teachers with personalized training resources and paths is an important way to promote teachers' active learning and development. For example, an online training platform based on artificial intelligence can be developed to provide customized training courses and resources based on teachers' subject backgrounds and teaching needs; at the same time, big data analysis technology can be used to monitor and evaluate teachers' learning behaviors and effects to provide teachers with timely feedback and suggestions (the path conception is based on existing technical conditions and teacher needs).

Intelligent lesson preparation path

The intelligent lesson preparation system can assist teachers in preparing lessons and improve the pertinence and effectiveness of teaching. For example, the system can provide personalized lesson preparation resources and suggestions based on the teacher's teaching plan and the student's learning situation analysis; at the same time, it uses natural language processing and knowledge graphs to deeply mine and integrate the content of teaching materials to provide teachers with rich teaching materials and cases (the system function concept is based on existing technical conditions and teaching material characteristics).

Intelligent tutoring path

The intelligent tutoring system can provide students with personalized learning support, reduce the burden of tutoring for teachers and improve tutoring effectiveness. For example, the system can use technologies such as speech recognition and natural language processing to answer and provide feedback to students' questions in real time; at the same time, it can provide personalized learning resources and exercises based on students' learning conditions and needs to help students consolidate their knowledge and improve their learning effects (the system function concept is based on existing technical conditions and students' learning needs).

Intelligent evaluation path

The intelligent assessment system can achieve instant, comprehensive and personalized assessment and provide teachers with a scientific basis for teaching decision-making. For example, the system can use big data analysis technology to deeply mine and analyze students' learning data to discover students' learning patterns and potential problems; at the same time, according to the assessment results, it can provide teachers with personalized teaching suggestions and intervention measures to help students overcome learning difficulties and improve their academic performance (the system function concept is based on existing technical conditions and assessment needs).

Intelligent management path

Intelligent teaching management system can improve teaching management efficiency and save teachers time and energy. For example, the system can use cloud computing and big data technology to achieve optimal configuration and dynamic adjustment of teaching resources; at the same time, it provides convenient course scheduling, student management and grade statistics to help teachers better understand teaching progress and student conditions (the system function concept is based on existing technical conditions and teaching management needs).

Challenges and Countermeasures

Some teachers have a low level of awareness of artificial intelligence technology, lack of experience in using it, and have a certain resistance to new technologies. This may lead to teachers' reluctance to try and use artificial intelligence technology for teaching innovation and practical exploration. This can be addressed by strengthening publicity and promotion, and by holding lectures, seminars, training courses and other activities to popularize the knowledge and application cases of artificial intelligence technology to teachers, and improve their awareness and acceptance. In addition, technical support and training can be provided to provide teachers with necessary technical support and training services to help them master the basic operation and application methods of artificial intelligence technology. For example, experts can be organized to provide face-to-face technical guidance and training to teachers; online training courses and learning resources can be developed for teachers to learn independently.

The application of artificial intelligence technology in the field of education involves a large amount of student data and personal information, such as academic performance, homework completion, class participation, etc. The security and privacy protection of these data has become an important issue. If the data is leaked or abused, it may bring the following serious consequences. It is possible to strengthen the construction of data management systems, establish a sound data management system and process specifications, and clarify the requirements and responsible entities for data collection, storage, and use. At the same time, strengthen data backup and recovery work to ensure data security and availability. It is also possible to strengthen data encryption and access control work, adopt advanced data encryption technology and access control mechanisms to ensure the security and confidentiality of student data during transmission and storage. At the same time, strengthen the management and monitoring of access rights to student data to prevent unauthorized access and leakage.

CONCLUSIONS

The research results of this study have important practical significance and value for improving the teaching ability of college teachers. By exploring the path of improving the teaching ability of college teachers based on artificial intelligence, more scientific, efficient and personalized teaching support and guidance can be provided for college teachers to help them better adapt to the teaching challenges and opportunities in the context of the digital era, improve the quality and effect of teaching, and promote their own professional development and innovation literacy. In terms of teaching design, artificial intelligence technology can assist teachers in personalized course design and realize the diversification and flexibility of teaching content; in terms of classroom management, it can monitor students' classroom behavior and learning status in real time, and provide teachers with timely teaching feedback and adjustment suggestions; in terms of student evaluation, it can comprehensively and accurately evaluate students' learning performance and development trends, and provide teachers with targeted teaching improvement suggestions. At the same time, we also pointed out the main challenges facing the current promotion of artificial intelligence technology and put forward corresponding countermeasures and suggestions. Future research can further explore the specific impact and mechanism of different types of artificial intelligence technology on the improvement of college teachers' teaching ability; at the same time, strengthen the research on the personalized improvement path of college teachers in different disciplines and majors; in addition, it can also focus on the popularity of artificial intelligence technology in the field of education and resource allocation issues. Research provides more comprehensive and in-depth theoretical support and practical guidance for the improvement of college teachers' teaching ability.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Data curation: Chaofan Ji.
Research: Dong Li, Junkai Hou, Leigang Wang.
Supervision: Yitong Niu.
Drafting - original draft: Chaofan Ji.
Writing - proofreading and editing: Chaofan Ji, Mengya Dong.