

Exploring the Impact of AI-Based Cloud Technology on Classroom Teaching: Opportunities and Challenges

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Abstract: With the rapid development of technology, the application of artificial intelligence (AI) and cloud technology in the teaching field is gradually becoming popular. This article aims to explore the impact of AI-based cloud technology on classroom teaching effectiveness, including the opportunities and challenges it brings. Through literature review and empirical research, we found that AI and cloud technology can effectively improve teaching quality, promote personalized learning, and alleviate teachers' burden. However, there are also some challenges, such as data security issues, technical application difficulties, and the impact on traditional teaching models. Therefore, educators should fully recognize and respond to these challenges in order to achieve the best integration of technology and teaching.

Keywords: artificial intelligence (AI) ; Cloud technology; Classroom teaching; Teaching effectiveness; Personalized learning.

I. INTRODUCTION

In the past few years, artificial intelligence (AI) and cloud technology have made remarkable progress and gradually penetrated into various industries. Especially in the field of education, the combination of these two technologies has brought unprecedented changes to classroom teaching. AI and cloud technology provide educators with various possibilities such as personalized learning, intelligent assessment, and resource sharing, making teaching more efficient, accurate, and flexible.

However, with the widespread application of these technologies, some problems and challenges have also emerged. Data security issues, technical application difficulties, and the impact on traditional teaching models are all issues that we cannot ignore. How to effectively utilize AI and cloud technology to improve classroom teaching effectiveness, while overcoming difficulties and challenges, has become an urgent topic for educators to explore.

Based on the above background, this paper will conduct in-depth research on the application of AI driven cloud technology in classroom teaching. We will comprehensively analyze the opportunities and challenges brought by these technologies, aiming to provide valuable suggestions for educators on how to fully utilize AI and cloud technology to improve teaching effectiveness. We hope to provide some reference and inspiration for educational reform and innovation through the discussion in this article, and also inspire education practitioners to rethink teaching models to adapt to the changes and development of the new technology era (Wang Xuqiang&Hu Fangang, 2022).

II. THE RELATIONSHIP BETWEEN AI AND CLOUD TECHNOLOGY

Cloud technology is a technology that provides users with on-demand use by concentrating computing and storage resources on cloud servers (Liu Aihua & Zhu Yu, 2015). AI refers to the technology that simulates and implements human intelligent behavior. They promote each other and develop together. AI and cloud technology are the two most important technologies in today's science and technology field, and the relationship between them is mainly reflected in the following aspects:

Cloud Computing Provides Powerful Infrastructure for AI

The application of AI requires a large amount of data and computing resources, and the elastic and high-performance computing capabilities of cloud computing can meet the needs of AI for computing resources. AI algorithms usually require a large amount of computation for model training and prediction, while cloud computing can dynamically allocate computing resources according to demand through virtualization and automation to ensure the time efficiency and computing performance of algorithms (Mou Ping, 2017).

AI Can Optimize the Application of Cloud Computing

AI can help cloud computing achieve more intelligent resource scheduling and management, improve the efficiency and service quality of cloud computing. At the same time, AI can also provide more intelligent services, such as intelligent recommendations and customer service based on user needs, to improve the user experience of cloud computing services.

AI and Cloud Technology Complement Each Other

AI and cloud technology are both constantly innovating and developing technologies that mutually promote and jointly drive the development of technology. With the popularization and application of cloud computing, more and more data is being centrally stored and processed, providing AI with more application scenarios and data support. Meanwhile, with the continuous development of AI technology, the application of cloud computing will also become more extensive and in-depth (Yang Yongxi&Luo Yuewen&Chen Xiangsheng, 2021).

In summary, AI and cloud technology are inseparable, and their relationship is mainly reflected in mutual promotion and common development. With the continuous progress of technology and the expansion of application scenarios, the combination of AI and cloud technology will bring more innovation and value to future technological development.

III. THE OPPORTUNITIES OF AI-BASED CLOUD TECHNOLOGY IN CLASSROOM TEACHING

With the deep integration of cloud computing and artificial intelligence technology, AI-based cloud technology has brought unprecedented changes and opportunities to classroom teaching. It not only promotes innovation in educational models, but also provides powerful tools and platforms for teachers, students, and educational managers, further improving teaching effectiveness and learning experience (Li Jianguo, 2021).

Improving Teaching Quality

The application of artificial intelligence (AI) and cloud technology in the field of education has become increasingly widespread, providing new possibilities for improving teaching quality. AI and cloud technology can provide abundant teaching resources and tools to help teachers better prepare for courses and improve teaching quality.

Firstly, AI-based cloud technology can adjust teaching content in real-time according to the learning situation of students to meet their learning needs. Through intelligent teaching systems, teachers can better understand students' learning progress and mastery, and thus develop targeted teaching content and methods. Meanwhile, AI-based cloud technology can also automatically grade homework and evaluate student learning outcomes, providing teachers with more accurate and timely teaching feedback.

Secondly, cloud technology can provide teachers with more convenient resource sharing and collaboration tools. Teachers can share teaching resources, collaborate on lesson preparation, and create courseware through cloud platforms, thereby improving teaching quality. Meanwhile, students can also learn anytime and anywhere through cloud platforms, breaking the limitations of time and space.

Research has shown that the application of AI and cloud technology in teaching can improve students' academic performance and interest. Lu Yun (2022) pointed out that students who use intelligent teaching systems have higher math scores than those who use traditional teaching methods, and also have a higher interest in learning mathematics. Peng Cheng and Xie Peng (2022) pointed out in their research that teachers and students using cloud technology can be more efficient and convenient in collaborative learning and resource sharing.

Promote Personalized Learning

Personalized learning is an educational philosophy aimed at providing tailored learning plans for each student based on their learning needs, interests, and abilities. The development of AI and cloud technology provides new possibilities for realizing this concept.

AI-based cloud technology can record students' learning in real time and collect a large amount of learning data. These data include students' learning progress, learning effect, and problems in the learning process. By analyzing these data, AI can gain an in-depth understanding of students' learning habits and ability levels, so as to provide personalized teaching suggestions for teachers (Min Jiajian & Yu Borou & Zhang Xin, 2023).

Firstly, AI-based cloud technology can accurately understand the learning status and needs of each student through big data analysis and learning behavior tracking. Teachers can use this data to develop personalized learning plans and recommend suitable learning resources for each student, meeting their different needs.

Secondly, AI-based cloud technology provides intelligent learning tools and platforms, allowing students to independently choose learning content and methods based on their interests and abilities. These tools and platforms can provide personalized learning paths and recommendations based on students' learning progress and ability levels, helping them better master knowledge and skills (Zhang Suyuan&Zhang Shui, 2021).

In addition, AI-based cloud technology also promotes communication and cooperation between teachers and students. Teachers and students, as well as students and students, can have more convenient discussions and collaborations to jointly solve problems and learn tasks. This interactive and collaborative learning environment helps cultivate students' self-learning and teamwork abilities, promoting personalized development.

In summary, AI-based cloud technology provides important opportunities for promoting personalized learning in classroom teaching through precise understanding of student needs, intelligent learning tools, personalized learning paths, and interactive collaborative learning environments. This helps to cultivate students' self-learning ability and personalized development, improve teaching quality and learning effectiveness.

Reduce the Burden on Teachers

In today's educational environment, teachers bear heavy responsibilities, not only in teaching design and classroom teaching, but also in handling a large amount of student affairs and management work. These tedious tasks not only consume a lot of time and energy from teachers, but may also affect the quality of their teaching. Fortunately, the development of AI and cloud technology has provided new possibilities for reducing the burden on teachers.

Firstly, AI-based cloud technology can provide an automated student information management system. This system can collect, organize, and update personal information of students, including attendance, learning progress, etc. In this way, teachers do not need to spend a lot of time and energy manually recording and organizing this information, thereby reducing their burden.

Secondly, AI-based cloud technology can assist teachers in correcting homework. Through intelligent analysis and comparison, AI can quickly and accurately determine whether a student's answer is correct and provide correction suggestions. In this way, teachers do not need to check each assignment one by one, greatly improving work efficiency.

In addition, AI-based cloud technology also provides intelligent teaching tools and platforms, which teachers can use to prepare lessons, create courseware, organize classes, and so on. These tools can simplify the daily workflow of teachers, improve teaching quality and efficiency (Wang Kai&Wang Kide, 2022).

In summary, AI-based cloud technology has reduced the burden on teachers through automated management systems, intelligent tools, and other means. This helps teachers better utilize time and resources, improve the efficiency and quality of teaching design and guidance, and further promote innovative development in teaching.

IV. THE CHALLENGES OF AI-BASED CLOUD TECHNOLOGY IN CLASSROOM TEACHING

Introducing AI and cloud technology in classroom teaching involves the integration of numerous technologies and systems, including cloud computing, big data, artificial intelligence, etc. This requires educational institutions to have corresponding technical backgrounds and professionals to be responsible for integration and implementation. In addition, the cost and resource requirements of technology implementation are also issues that cannot be ignored.

Data Security Issues

With the development of AI and cloud technology in the field of education, data security issues are becoming increasingly serious. A large amount of student personal information and learning data are stored in the cloud, and how to protect the security and privacy of this data has become an important issue.

Data security issues mainly manifest in areas such as data leakage, data misuse, and data migration. Hackers may attack cloud servers, obtain sensitive information, and lead to the leakage of student privacy. Unauthorized third parties may misuse student information and learning data, which not only infringes on the rights of students but may also have adverse effects on their future development. In addition, when students or educational institutions change service providers, data migration can also become an important issue. How to ensure the integrity and confidentiality of data and prevent leakage or illegal acquisition during data migration is a challenging task.

In order to ensure data security, measures such as strengthening data encryption, implementing strict access control and permission management, establishing a sound data backup and recovery mechanism, formulating clear privacy policies, and conducting regular audits and monitoring can effectively reduce data security risks and protect the rights and interests of students. In the future, with the continuous development of technology and the expansion of application scope, we still need to continue to pay attention to data security issues and take corresponding measures to ensure the security and privacy of student information and learning data (Shen Liyan&Li Meng et al., 2022).

Technical Application Difficulty

With the continuous development of educational technology, many advanced tools and platforms have been introduced into classroom teaching. However, the application of these technologies also poses new challenges for teachers. In order to truly achieve the goal of reducing the burden on teachers, teachers need to continuously improve their technical application abilities.

Firstly, teachers need to continuously learn how to use new technologies and tools. They need to understand how to effectively utilize these technologies to improve teaching quality and efficiency, while avoiding the troubles caused by technology. This requires teachers to have the awareness of self-directed and lifelong learning, constantly follow the development of technology, and update their knowledge and skills.

Secondly, teachers need to have good technical integration skills. They need to integrate technology into teaching, so that technology complements teaching content and goals, rather than simply stacking technology. Teachers need to think about how to use technology to stimulate students' interest in learning, promote active learning, and how to use technology to provide more personalized and accurate teaching support (Chen Yuming&Mei Xue, 2023).

In addition, teachers also need to pay attention to ethical and privacy issues related to technology. In the process of using technology for teaching, teachers need to follow relevant ethical norms to protect student privacy and data security. They need to understand how to fully leverage the advantages of technology and improve teaching quality while adhering to ethical principles.

To summary, improving teachers' technology application ability is an important challenge to reduce teachers' burden. In order to cope with this challenge, teachers need to constantly learn and explore the application of new technologies in teaching, have good technology integration ability and ethical awareness. Only in this way can teachers truly use technology to reduce burden, improve teaching efficiency and quality, and better serve students' learning and development (Li Shijin & Gu Xiaoqing, 2022).

Impact on Traditional Teaching Models

With the continuous development of science and technology, AI and cloud technology are being applied more and more widely in the field of education. The application of these technologies has a profound impact on the traditional teaching mode, prompting educators to re-examine and adapt to the new teaching mode.

1. The enhancement of personalized teaching needs

The traditional classroom teaching model usually adopts a one size fits all approach, lacking attention to personalized needs. However, the application of AI and cloud technology enables the sharing of educational resources and provides teachers with more accurate student data and analysis tools. This enables teachers to better understand the learning status, interests, and needs of each student, and thus develop more personalized teaching plans (Liu Jing&Cui Lei, 2021).

In this context, teachers need to change traditional teaching concepts, focus on personalized development of students, and adjust teaching content, methods, and progress according to the actual situation of students. This not only requires teachers to have more comprehensive teaching skills, but also requires them to have certain data analysis abilities in order to better utilize the data resources provided by AI and cloud technology.

2. The rise of blended learning models

The development of AI and cloud technology has driven the rise of blended learning models. This model organically combines online and offline teaching resources and methods, providing students with more flexible learning methods and diversified learning content (Tao Lei&Wang Pingping, 2022).

In the blended learning mode, teachers need to master the operational skills of online teaching platforms, and use the functions provided by the platform to design teaching, publish resources, and answer online questions. At the same time, teachers also need to pay attention to the connection between online and offline teaching content and activities to ensure the coherence and effectiveness of student learning.

Construction of Collaborative Learning Environment

The application of AI and cloud technology provides students with a more convenient space for communication and cooperation, making collaborative learning possible. In this environment, students can communicate in real-time, collaborate to complete tasks, and share learning outcomes through online platforms. This not only helps to cultivate students' teamwork skills, but also enhances their communication and expression abilities (An Xin&Shen Xi et al., 2023)

In order to adapt to this new learning method, teachers need to guide students in collaborative learning, design appropriate collaborative tasks and activities, and cultivate students' awareness and ability to cooperate. Meanwhile, teachers also need to pay attention to the individual differences and needs of students, ensuring that each student can leverage their strengths in collaborative learning.

Cultivate autonomous learning ability

With the application of AI and cloud technology, students can more conveniently access various learning resources, making self-directed learning possible. The cultivation of self-learning ability helps students develop good learning habits, improve learning outcomes, and enhance self-management abilities.

In order to cultivate students' autonomous learning ability, teachers need to pay attention to students' learning process and methods, provide necessary learning guidance and support. At the same time, teachers also need to pay attention to students' learning feedback and evaluation, and adjust teaching strategies in a timely manner to meet students' actual needs (Zhang Guanglu, 2017).

The application of AI and cloud technology has a huge impact on the traditional teaching model. In order to adapt to this change, teachers need to change the traditional teaching concepts, update the teaching methods and skills, pay attention to the personalized development of students, guide students to carry out collaborative learning and cultivate the ability of independent learning. At the same time, students also need to actively adapt to the new learning environment and ways, and give full play to their initiative and creativity. Through the joint efforts of teachers and students, we can better utilize the advantages brought by AI and cloud technology to improve the effectiveness and quality of teaching (Hu Chintai & Wu Wenyan, 2021).

V. CONCLUSION

With the continuous development of technology, the application of AI and cloud technology in the field of education will become increasingly widespread. In the future, we can expect more intelligent tools and platforms to enter the classroom, further optimizing teaching processes and improving teaching effectiveness. For example, using AI and big data technology for intelligent analysis and prediction, providing teachers with more accurate teaching strategies and suggestions. At the same time, we also need to pay attention to humanistic care and social responsibility in the application of technology, ensuring that technology serves educational equity and quality improvement.

AI-based cloud technology has brought unprecedented opportunities and challenges to classroom teaching. As educators, we need to actively respond to challenges, fully leverage the advantages of technology, and promote innovation and development in education and teaching. At the same time, we also need to pay attention to potential issues that may arise in the application of technology, such as data security and difficulty in technology application, to ensure that technology has a positive impact on education. Only in this way can we truly achieve the best integration of technology and teaching, and cultivate talents who can meet the needs of future society.

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