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Research on rational application of artificial intelligence technology on improving teaching quality in college education

TANA[1,2,*]

1. National University of Mongolia, Ulaanbaatar 13000, Mongolia
2. College of Artificial Intelligence and Big Data, Hulunbuir University, Hulunbuir 021008, China
*Corresponding author.
Email address: 57563798@qq.com

Abstract: With the rapid development of artificial intelligence (AI) technology, its application in the field of education is expanding at an unprecedented speed, showing great potential to reshape the education pattern. This paper deeply discusses how to effectively and reasonably use artificial intelligence technology in college classrooms, and how to significantly improve teaching quality, especially in the field of digital logic course, which is a basic course. In this paper, while fully affirming the value of AI technology, it also makes a comprehensive analysis of its advantages and disadvantages, and puts forward suggestions for rational use of AI technology. We advocate that AI technology should be used as a teaching aid and combined with traditional teaching methods to jointly build a more efficient, flexible and humanized college classroom. Through reasonable planning and careful implementation, we believe that AI technology will play a greater role in the field of education and contribute to the training of more outstanding talents.

Key words: artificial intelligence; teaching quality; personalized teaching; interdisciplinary learning

1 Introduction

With the rapid development of information technology, the reform of higher education is standing at a turning point of history, embracing both unprecedented opportunities and severe challenges. Digital transformation, this unstoppable force, is not only a wise choice to deal with challenges, but also the core engine to promote the leap in teaching quality. In this context, AI textbooks, carrying the light of machine learning, natural language processing and other high-tech, are gradually opening a new chapter of personalized learning, and injecting infinite possibilities for college students' journey of learning [1].

This article focuses on the brilliant application of AI technology in university digital logic courses and reveals how it weaves a unique learning graph for each student in the name of intelligence to make knowledge absorption more efficient and learning more fun. At the same time, we will also conduct a refined analysis of the highlights and limitations of AI in digital logic courses, laying a clear path for subsequent in-depth discussions.

This is a profound conversation about technology, education, and the future as we embark on a journey to explore how AI technology can lead higher education into a brighter future.

2 The benefits of applying artificial intelligence in digital logic courses

2.1 Personalized teaching: teach students according to their aptitude to stimulate their potential

Artificial intelligence technology, as an innovator in the field of education, is gradually becoming a powerful assistant to teaching AIDS. In college classrooms, AI has realized the dream of personalized teaching through deep learning and big data analysis. It can tailor the learning plan based on each student's learning habits, ability level and interest preferences, so that each student can master the knowledge at the best pace for their own [2]. For example, the AI system can identify students' weak points in digital logic courses, push targeted exercises and explanation videos, and help students break through difficulties.

With its excellent intelligent analysis ability, AI technology accurately captures students' learning progress, understanding depth and interest, and dynamically adjusts teaching content and strategies according to different students' learning ability. In the digital logic course, artificial intelligence is like an intelligent tutor, analyzing homework and test scores, quickly locating students' knowledge weaknesses, and recommending customized learning resources and exercises. Therefore, whether it is for weak foundations or high-level challenges, AI can properly meet the different needs of students at different levels. For example, for students lacking in basic knowledge, or lacking in design ability, or for some independent students with whimsical ideas, artificial intelligence software can provide relevant knowledge and technical help for students' learning, and provide more powerful support for each student to swim in the ocean of digital logic [3]. The specific implementation method of this example is as follows. Some online education platforms use AI technology to build personalized learning recommendation systems. By analyzing students' learning data, the system can intelligently recommend suitable learning resources and exercises for students to improve their learning efficiency.

In the digital logic experiment teaching, AI technology is used to create a virtual laboratory. Students can conduct simulation exercises in virtual environment, obtain experimental results, and improve practical skills.

In Chinese education, AI technology is used for intelligent composition correction. Through natural language processing technology, AI can automatically analyze the grammar, semantics and text structure of essays and provide students with detailed correction suggestions.

2.2 Learning at anytime, anywhere without disciplinary boundaries

AI technology offers students unprecedented flexibility in learning time. Whether it is early morning preview or late night review, AI is ready to provide students with immediate learning support. This 24-hour uninterrupted study companionship greatly improves the learning efficiency, so that students can more autonomously arrange the learning practice and progress [4].

Breaking the boundaries of time and space, AI technology makes learning free and flexible. In the digital logic course, the AI-built online learning platform is like a treasure trove of knowledge that you can carry around with you. No matter where you are, students can easily access learning materials, complete homework, participate in tests, and enjoy the fun of learning. Students feel that learning is a fun, as easy as eating and sleeping. This kind of flexibility is not restricted by the traditional classroom, and provides a new learning mode in time and space. It not only broadens the learning space, but also empowers students to arrange their own learning time, making knowledge absorption more efficient.

2.3 Interdisciplinary integration to broaden horizons and develop interests

In terms of interdisciplinary learning, AI technology also shows remarkable capabilities. It can easily integrate knowledge resources from different disciplines and provide students with a comprehensive learning experience across fields. In digital logic courses, AI can be introduced into computer science, electronic engineering, and develop new kinds of circuits and inventions in other fields such as medicine, transportation, or a broader field, thereby helping students build

a more comprehensive and in-depth cross-disciplinary knowledge system.

With its extensive knowledge system, AI technology has become a bridge for interdisciplinary learning. In the digital logic course, AI skillfully integrates computer science, electronic engineering, mathematical logic and other fields of knowledge, presenting a comprehensive and profound learning picture for students. Especially in the practice process, students can make a variety of small circuits with wonderful ideas [5]. With the guidance of AI, students can explore the wide application of digital logic in all walks of life, and discover themselves in interdisciplinary learning, which can stimulate their curiosity in unknown fields and thus unleash their unique brilliance. For example, some students are interested in chemistry knowledge. Therefore, it is possible to search in AI for knowledge that cannot be learned from specialized teachers, and above all provide better help for students' interdisciplinary learning.

2.4 Deep learning, professional development

AI technology has laid a solid foundation for deep learning and professional improvement. In the digital logic course, AI provides rich teaching resources such as simulation experiments and project practice, so that students can transform abstract theoretical knowledge into the ability to solve practical problems. Through the assistance of AI, students can not only deeply understand the core principles of digital logic, but also exercise innovative thinking in practice, improving their professional literacy, and arouses students' interest, making them more able to specialize in scientific knowledge.

2.5 Learning evaluation and feedback

With its excellent data tracking and analysis capabilities, AI technology continuously monitors and deeply digs students' learning data, accurately evaluates learning results through advanced algorithms, and provides detailed and personalized teaching feedback to teachers [6]. This process not only greatly enhances teachers' insight into students' learning dynamics, but more importantly, it enables teachers to respond quickly and adjust teaching strategies flexibly in order to achieve the optimization of teaching effects. With the power of AI, we can break the limitations of traditional teaching, achieve precise customization of teaching content and methods, thus maximizing teaching quality and learning effectiveness, and creating a new chapter in education optimization.

3 Limitations and advantages of artificial intelligence technology

However, although AI technology shines like a bright star, it is not omnipotent super magic. It carries numerous advantages, like the dawn light illuminating the path of education, but equally, defects also follow, revealing its limitations that cannot be ignored. Imagine that in the AI-built classroom, although knowledge is flooding in, it may lack the warm emotional communication and delicate humanistic care of human teachers, making the warm picture of teacher-student interaction become a distant memory that is difficult to reach.

More worryingly, when AI technology is misused or abused, it seems to turn into poison. In a sea of technology, students are addicted and over-dependent on it, and gradually their brains seem to be eroded by inertia, unwilling to think actively and explore with their own hands. It should be the spark of innovation, but over-reliance will make students become passive; It should have been the exercise of hands-on ability, but the reliance on artificial intelligence has made the ability become rusty and fragile. In this technological carnival, the cultivation of independent learning and thinking ability, like a forgotten treasure, will be buried silently in the corner of no one.

Therefore, while embracing AI technology, we should be alert to its limitations, protect every step of students' growth, and ensure that the wings of technology can truly take them to a higher sky, rather than keeping them in the cage of dependence. Here is a detailed analysis of the advantages and disadvantages of artificial intelligence. The advantages include these. First, personalized teaching: AI technology can accurately match the needs of students to promote all-round development. Second, flexible learning: It breaks the limitations of time and space and makes students learn more freely.

Third, interdisciplinary integration: it broadens knowledge horizons and stimulates innovation potential. Fourth, deep learning: It can strengthen practical ability and enhance professional quality. The disadvantages include these. First, data security: Student data protection needs to be strengthened to prevent the risk of leakage. Second, the cost and technical threshold: Due to the high development and maintenance costs, the popularity of AI technology is facing challenges. Thirdly, adaptive challenges: Teachers and students need to adapt to the new teaching model, which requires time and training support.

4 Rational control of artificial intelligence to create a new future of education

First, technology foundation and platform construction. A solid technology platform should be built to ensure the efficient operation of AI systems, including strengthening servers, data storage, security and network access capabilities. Second, teacher training and empowerment: Regular AI technology and pedagogy training will be held to improve teachers' AI application ability, so that science and technology can truly serve teaching. Third, student acceptance and motivation: Student interest should be stimulated through course introductions, field demonstrations and pilot projects, and feedback should be emphasized to continuously optimize the AI system experience. Finally, feedback loop and continuous optimization: A regular evaluation mechanism can be established to constantly adjust and optimize the AI system based on the teaching effect feedback, ensuring that the education quality and technological innovation improve simultaneously.

5 Conclusion

The application of AI technology in college classrooms provides new possibilities for improving teaching quality. In college and university courses, AI can personalize instruction, provide flexible study time, make students learn across disciplines, and help students to further study and specialize in professional knowledge. However, AI technology also has some drawbacks and challenges, such as data privacy and security concerns, technology cost and popularity, as well as teacher and student adaptability. Therefore, universities should fully consider these factors when using AI technology, and take reasonable measures to deal with it. Through continuous exploration and practice, AI technology will play a greater role in college classrooms and make greater contributions to cultivating high-quality talents.

Conflicts of interest

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

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