

The Benefits, Challenges, and Strategies of Empowering Microeconomics Course Teaching with Artificial Intelligence Technology

JingJing Shao, WeiPeng Wang, YuQing Wan

Qingdao City University, Qingdao 266100, Shandong, China

ABSTRACT

This article explores the benefits, challenges, and implementation strategies of artificial intelligence technology in the teaching of microeconomics courses. Firstly, this article analyzes the application value of artificial intelligence technology in personalized learning, intelligent tutoring, expansion of teaching resources, and innovation of teaching methods. Secondly, this article analyzes a series of issues related to the use of artificial intelligence technology in teaching, including high introduction costs, low digital literacy of teachers, and poor adaptability of students. Finally, this article elaborates on how artificial intelligence technology can improve teaching quality and effectiveness, and proposes a series of specific implementation strategies, including adding relevant courses, integrating economics and big data technology, and introducing cutting-edge research results.

KEYWORDS

Artificial intelligence technology; Microeconomics; Teaching Strategy

1 Introduction

The application of artificial intelligence technology in the field of education has profound significance. It can not only improve teaching quality and learning efficiency, but also promote educational equity and innovation. Artificial intelligence technology provides teachers with various intelligent teaching assistance tools, such as automatic homework grading systems, intelligent lesson preparation systems, etc., reducing teachers' workload and improving teaching efficiency. Through natural language processing and image recognition technology, artificial intelligence technology can intelligently analyze students' classroom performance and homework completion, providing teachers with detailed student analysis reports. Through online education platforms, students in remote areas and regions with relatively scarce educational resources can enjoy the same high-quality educational resources as students in developed areas. Artificial intelligence technology can also provide personalized support for students with special educational needs, helping them learn and develop better. Artificial intelligence technology is playing an increasingly important role in the field of education, driving education towards a more scientific, personalized, and intelligent direction.

Microeconomics, as one of the fundamental courses in economics, involves various aspects such as supply and demand theory, consumer behavior theory, and producer behavior theory. It is beneficial for students to apply economic theories and models to analyze problems, make decisions, and predict trends. Microeconomics studies social phenomena and human behavior, requiring a certain level of abstract thinking. For example, demand reflects changes in demand caused by

factors other than price, while demand quantity reflects changes in the quantity of demand caused by changes in price. There is an essential difference between the two. Students often have difficulty combining abstract theoretical knowledge with practical economic phenomena, leading to difficulties in understanding. In addition, microeconomics often uses a large number of graphics to derive theoretical knowledge, and some theories require analysis through functional models. This is a great challenge for students with poor mathematical foundations, as they may have difficulty understanding and applying these mathematical tools and models. The current traditional teaching methods are unable to meet the needs of students and have limited teaching effectiveness. Therefore, it is urgent to introduce artificial intelligence technology and explore its application strategies in microeconomics course teaching.

2 The benefits of using artificial intelligence technology in teaching

Artificial intelligence technology can analyze students' learning data, such as homework completion status, exam scores, study time, etc., to develop personalized learning plans and course content for each student. For students who have a slower understanding of price theory, the system can provide more relevant cases, explanations, and exercises. For students who have already mastered a certain knowledge point proficiently, the system can quickly advance to more in-depth or cutting-edge content. This personalized learning path can improve students' learning efficiency and motivation, enabling them to achieve better results in the study of microeconomics.

Artificial intelligence driven tutoring systems can provide assistance to students at any time. These systems can not only answer students' questions, but also infer their thinking misconceptions based on their questioning methods and types of errors, and provide targeted guidance. For example, when students have a misunderstanding of the movement of the supply and demand curve, the tutoring system can help them clarify their thinking through intuitive graphical demonstrations and detailed explanations. In addition, the intelligent tutoring system can also monitor students' learning status in real time. When students experience learning fatigue or lack of concentration, it can promptly remind and adjust the learning content to maintain their learning motivation.

Artificial intelligence can filter valuable economic data from massive amounts of network information, such as the latest research reports, actual economic cases, authoritative academic papers, etc., and organize them into a form that is easy for students to understand and absorb. These resources not only enrich the teaching content, but also expose students to the latest economic trends and practical applications, broadening their horizons and ways of thinking.

The application of artificial intelligence technology has made teaching methods more diverse. For example, through VR technology, students can feel as if they are in a virtual market environment, experiencing firsthand the impact of price changes on supply and demand relationships, and enhancing their understanding and memory of microeconomics concepts. This immersive learning experience can enhance students' application skills and problem-solving abilities.

3 The challenges of using artificial intelligence technology in teaching

The operation of artificial intelligence technology requires high-performance computing devices, such as high-performance servers. The introduction of advanced artificial intelligence technology requires a significant investment in the purchase of hardware equipment and maintenance of software systems, which have high procurement and maintenance costs. Moreover, with the continuous development of technology, the speed of equipment replacement is also fast, which is a

heavy burden for some educational institutions with limited resources. Due to the complexity and specialization of artificial intelligence technology, universities need to recruit high-quality talents with relevant skills and experience to support teaching and research work. The recruitment cost of these talents is usually high, and they need to provide good compensation and benefits to attract and retain talent. In order to introduce artificial intelligence technology into teaching, universities need to design and develop specialized courses, including theoretical and practical teaching, which requires a significant investment of manpower, material resources, and financial resources to ensure the quality and effectiveness of the courses. In addition, universities also need to purchase relevant teaching resources, such as textbooks, courseware, laboratory guides, etc., and the production and updating of these resources also require certain costs. Moreover, due to the continuous development and innovation of artificial intelligence technology, universities need to continuously invest resources to ensure that teachers and students can keep up with the latest advances in technology, which greatly increases the cost of introducing artificial intelligence technology in teaching.

In order to better apply artificial intelligence technology to classroom teaching, teachers need to master the basic principles and application scenarios of artificial intelligence technology. Teachers need to learn to collaborate with artificial intelligence technology and use it as a teaching aid rather than a substitute. This requires teachers to flexibly adjust the ways and strategies of human-machine collaboration in the teaching process. The application of artificial intelligence technology requires teachers to shift from traditional lecture based teaching to a student-centered, practical, and innovative teaching model. This transformation requires teachers to redesign teaching processes and methods to adapt to new teaching needs. In addition, although artificial intelligence technology can provide personalized learning resources and advice for students, teachers need to have the ability to analyze and interpret student data to develop more effective personalized teaching strategies. Different artificial intelligence software may have different interfaces and data formats, and teachers need to ensure that the teaching software they use is compatible with the school's computer systems and other teaching tools. However, currently many teachers' digital literacy and ability to apply artificial intelligence technology still need to be improved.

Some students may have resistance or lack adaptability towards the application of artificial intelligence technology. Artificial intelligence requires students to possess stronger logical thinking, critical thinking, and innovative abilities, which may require students to transform their existing ways of thinking, and this process may be accompanied by certain difficulties and challenges. Some students may be influenced by negative evaluations or concerns about artificial intelligence technology in society, such as job substitution and privacy breaches, leading to resistance towards AI technology.

4 The strategies of using artificial intelligence technology in teaching

Related majors should add courses related to big data and artificial intelligence to provide students with necessary technical foundations. These newly added courses should comprehensively cover core areas such as data science, machine learning, and artificial intelligence fundamentals. The data science course will delve into key aspects such as data collection, cleaning, organization, analysis, and visualization, enabling students to deeply understand the importance of data in economic research and learn how to efficiently process and analyze massive amounts of data. Machine learning courses are dedicated to teaching students how to use algorithms and models to extract valuable information and patterns from data, which is of crucial importance for predictive analysis and evaluation in economics. Through the study of these courses, students can master basic

skills such as data processing, model construction, and algorithm application. These skills are essential tools in economic research and application, helping students to gain a deeper understanding of economic phenomena and predict economic trends more accurately. These courses not only provide students with the necessary technical foundation, but also cultivate their innovative thinking and practical abilities, laying a solid foundation for their future economic research and application.

While adding relevant courses, related majors also need to integrate big data technology and economic theory, and innovate teaching methods. This process of integration and innovation can be achieved through various methods such as case analysis, experimental teaching, and project practice, providing students with a learning environment that combines theory and practice, and emphasizes both knowledge and skills. By selecting economic phenomena or problems in the real world and combining them with big data technology for analysis and interpretation, students can intuitively understand the application of economic theories in practice. For example, students can select price strategy optimization cases from e-commerce platforms and analyze the data-driven decision-making process involved. By constructing a simulated experimental environment, students can personally operate big data analysis tools, experience the entire process of data processing, model training, and result interpretation. Project practice is the most advanced form of combining big data technology with economic theory. By participating in real economic research projects or corporate collaboration projects, students can apply their learned knowledge to solve practical problems. These projects can involve multiple fields such as market analysis, policy evaluation, risk management, etc., requiring students to comprehensively apply big data technology and economic theory for analysis and decision-making.

5 Conclusion

This article explores the benefits, challenges, and implementation strategies of artificial intelligence technology in the teaching of microeconomics courses. By analyzing the application of artificial intelligence technology in personalized learning, intelligent tutoring, expansion of teaching resources, and innovation of teaching methods, this article elaborates on how artificial intelligence technology can improve the quality and effectiveness of teaching. In addition, this article explores a series of issues related to the use of artificial intelligence technology in teaching, such as high introduction costs, low digital literacy of teachers, and poor adaptability of students. Finally, this article proposes a series of specific implementation strategies, including adding relevant courses, integrating economics and big data technology, and introducing frontier research results. The implementation of these strategies will help promote the reform and innovation of microeconomics curriculum teaching, improve teaching quality and effectiveness, and cultivate economic talents with the spirit of the times and innovative abilities.

References

- [1] Chen L., Chen P., & Lin Z. (2020). Artificial intelligence in education: A review. *Ieee Access*, 8, 75264-75278.
- [2] Sun Z., Anbarasan M., & Praveen Kumar D. J. C. I. (2021). Design of online intelligent English teaching platform based on artificial intelligence techniques. *Computational Intelligence*, 37(3), 1166-1180.
- [3] Dimitriadou E., & Lanitis A. (2023). A critical evaluation, challenges, and future perspectives of using artificial intelligence and emerging technologies in smart classrooms. *Smart Learning Environments*, 10(1), 12.
- [4] Yang S. J., Ogata H., Matsui T., & Chen N. S. (2021). Human-centered artificial intelligence in education: Seeing the invisible through the visible. *Computers and Education: Artificial Intelligence*, 2, 100008.