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Research on Education and Teaching of Artificial Intelligence Enabling Intelligent Construction

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Abstract

This study is committed to in-depth analysis of the practical application of artificial intelligence in intelligent construction teaching and its empowerment effect. An efficient and intelligent teaching platform is built, which can intelligently recommend relevant learning resources according to students' learning progress and feedback, and track students' learning situation in real time. This personalized learning style not only improves the learning efficiency of students, but also enables them to better adapt and master the knowledge and skills in the field of intelligent construction. The introduction of artificial intelligence technology has innovated the method of intelligent construction teaching. Based on the learning analysis technology of big data, we can conduct in-depth analysis of students' learning behaviors and achievements, so as to grasp students' learning status and needs more accurately. These achievements not only show the great potential of artificial intelligence technology in the field of education, but also provide new ideas and methods for the reform and innovation of intelligent construction teaching.

Keywords

Artificial intelligence, Intelligent construction major, Empowering higher education, Personalized learning path, Digital transformation

The parallel meeting of the World Digital Education Conference 2024, a grand event of "Artificial Intelligence and Digital Ethics", was held in Shanghai on the morning of January 31, 2024 (Ding & Wu, 2024, pp. 3283-3299), aiming to deeply exchange the policies and practices of various countries in the field of artificial intelligence education application, and jointly promote the positive application of artificial intelligence in education. And reached an important consensus to promote the digital transformation and development of education. The Ministry of Education also officially launched the AI empowerment Education action on March 28 of the same year, and launched four specific measures

(Pedro, Subosa, Rivas et al., 2019). These initiatives aim to promote the deep integration of teaching and learning through AI to enhance digital education literacy and skills for all. At the same time, it is also committed to developing a large model of artificial intelligence for education, and emphasizes that scientific ethics should be followed in the use of artificial intelligence to ensure the standardized use of technology. The "14th Five-Year Plan" of Shandong Province also supports Qingdao to build a benchmark city for artificial intelligence education, aiming to reshape the teaching form of schools and enhance the competitive advantage of discipline and professional construction. We are committed to building a high-level talent training system that meets the needs of economic and social development.

1. The Case of Artificial Intelligence Empowering Professional Education and Teaching in Universities

1.1 Xihua University—First-class Undergraduate Education and First-Class Curriculum Construction Enabled By Artificial Intelligence (Ding, 2024, pp. 43-47)

In order to further promote the digital transformation of professional education and further strengthen the enabling role of artificial intelligence in talent training, the School of Architecture and Civil Engineering of Xihua University actively carries out innovative exploration and practice of talent training from multiple dimensions. First, from the aspect of knowledge graph construction, carry out AI curriculum construction based on knowledge graph. Two core professional courses, "Installation Engineering Measurement and Valuation" and "Construction Engineering Measurement and Valuation", are selected to construct the knowledge map. The second is to carry out the three-dimensional digital textbook construction based on the construction of digital resources. Digital teaching materials have strong updating and iteration ability due to their innovative, multimedia, interactive and agglomeration characteristics, and their efficiency and effectiveness in knowledge transmission is the concrete embodiment of their new quality productivity.

1.2 Southeast University—Promoting the Whole Process of Teaching and Learning of Artificial Intelligence Empowerment Course in Six Dimensions (Hussein, Mohamed, Halima et al., 2022, pp. 14209-14209)

Southeast University "AI+ teaching" pilot course construction ideas, From the "personalized teaching design", "intelligent assisted teaching tools construction", "diversified teaching resources integration", "virtual classroom and virtual laboratory scene construction", "virtual learning community online collaborative learning", "real-time learning situation monitoring intelligent analysis and decision-making" six dimensions to promote the whole process of AI empowered curriculum teaching and learning reform ideas. The process of constructing knowledge map by combing knowledge system, integrating teaching resources, introducing intelligent AI teaching assistants, etc. Taking each experiment course of civil engineering discipline as an example, this paper introduces the construction process of the experiment practice course system of physical experiment + virtual simulation

experiment, and shares the exploration of the immersion experiment teaching practice of civil engineering metauniverse.

1.3 Central South University—How AI Technology Empowers Civil Engineering (Xu, Liu, Cao et al., 2021)

Central South University focuses on how AI technology can empower civil engineering, and compares traditional measurement methods with integrated new measurement methods, highlighting the advanced concept of "one plus one is greater than two" at the technical level, and arousing students' interest in this emerging field of civil engineering development. The application of AI technology in road condition comprehensive measurement was demonstrated to the students by displaying models for real-time processing of picture data and visiting multi-functional road detection vehicle (3D laser road maintenance design and detection system), so that the students present could experience the important role of AI technology in improving detection efficiency and accuracy. I intuitively feel the new power of science and technology to empower traditional engineering.

2. Artificial Intelligence Enables the Path of Intelligent Construction Professional Education

2.1 Artificial Intelligence Enables Personalized Learning Path Customization and Evaluation

In the field of modern education, the customization of personalized learning path has become a key means to improve the efficiency and quality of students' learning. In the learning process of students, we use artificial intelligence technology for real-time progress tracking and feedback. By collecting various data of students in the learning process, we can accurately understand their learning progress and existing problems, and then provide timely feedback and suggestions. These feedback and suggestions include not only objective evaluation of students' learning outcomes, but also professional guidance on learning methods and strategies, aiming to help students better adjust their learning state and optimize their learning path (Yekollu, Bhimraj, Sunil et al., 2024, pp. 507-517).

2.2 Artificial Intelligence Enabling Simulation Experiment Environment Construction and Optimization

With the continuous development of science and technology, virtual reality technology and artificial intelligence technology are increasingly widely used in the field of education. In the field of intelligent construction, the construction of virtual laboratories can provide students with a new way of learning and effectively improve their practical ability and hands-on ability.

In the construction of virtual laboratory, virtual reality technology is used to simulate the real intelligent construction experiment environment and operation process, so that students can carry out experiment operation in the virtual environment and experience the experiment process. This learning method not only has a high sense of reality, but also can reduce the cost of the experiment and improve the efficiency of the experiment. Through repeated practice and simulation, students can better master experimental skills and improve their understanding and application of theoretical knowledge (Yi, 2020, p. 6672).

2.3 Artificial Intelligence Enables the Construction of Intelligent Course Resource Library

In the field of civil engineering education, it is a crucial task to integrate and use high-quality teaching resources. To this end, we are committed to collecting a wide range of teaching resources in the field of civil engineering, including but not limited to teaching videos, case studies and practical projects, in order to build a comprehensive and rich teaching resource library.

In order to ensure the practicality and efficiency of the resource library, we use artificial intelligence technology to intelligently process and classify the collected resources. By integrating high-quality resources, intelligent processing and classification, and dynamic updating and maintenance, we have successfully built an efficient, practical and professional civil engineering teaching resource library, which provides strong support for the development of civil engineering education.

3. Optimization Strategies of Education Evaluation Reform Empowered by Artificial Intelligence

3.1 Strengthen the Digital Foundation for Evaluation and Build a Data Brain

Technology is the cornerstone of artificial intelligence education evaluation, and strengthening the base construction of intelligent education evaluation system is an indispensable link for the development of artificial intelligence education evaluation. At present, intelligent educational assessment is in the stage of exploration and beginning. In the practice of intelligent educational assessment, a large number of cases are conducted as independent studies, focusing on the assessment of certain complex skills. This process tends to result in a pattern that focuses on a single research point and lacks holistic consideration. From the whole practice of educational evaluation, this form of "each for himself" is not conducive to the continuous development of educational evaluation.

The brain's ability to calculate, store and analyze can meet the needs of intelligent education. The improved evaluation status is re-evaluated by forming a functional closed loop. On this basis, education evaluation data brain can be further established. The construction of data brain is based on the aggregation of a large number of data resources in the field of education, including but not limited to learning behavior data, teaching interaction data, measurement results data and academic achievement data. The construction of the basic education database can eliminate the data barriers between different departments, realize a more efficient way of education evaluation, and build a comprehensive intelligent, scientific and multi-faceted education evaluation system.

3.2 Break through the Limitations of Intelligent Technology and Introduce Expert Knowledge

Avoid overreliance on technology to ignore the substantive objectives of educational evaluation, and integrate multiple tools and methods to meet the various challenges posed by the application of technology. On the one hand, for the limitations of technology itself, educators and researchers must remain vigilant, timely track and adapt to new technological developments to prevent investment losses, and choose stable and mature software and hardware platforms as much as possible to maintain system stability and avoid sunk costs. At the same time, more resources should be invested to promote

breakthroughs in key educational technologies, such as adaptive learning platforms, data mining and learning analytics, so that they can achieve material breakthroughs, while maintaining a critical view of the promotion of scientific and technological products and rationally evaluating technologies.

The maturity of the technique. On the other hand, it is essential to incorporate the knowledge of experts in the field of education. The so-called expert system refers to the computer program that simulates the decision-making process of human experts, which provides decision support for users in a specific field.

Under this framework, the expert knowledge is encoded, the expert knowledge base combined with artificial intelligence system is created, and the knowledge is transferred and applied through the expert system to enhance the decision quality of artificial intelligence. These expert knowledge may cover various aspects of learning theory, cognitive psychology, educational assessment methods, etc., so that AI systems can deal with complex problems in educational activities with a deeper understanding. At the same time, through continuous machine learning and self-optimization, AI models can calibrate strategies under the guidance of experts in the field of education, thus enhancing the learning process and educational evaluation more effectively.

4. Conclusion

The introduction of artificial intelligence technology has a profound impact on the field of intelligent construction teaching, which not only improves the quality and efficiency of teaching, but also opens up a new path for the sharing of educational resources and innovative development. The application of artificial intelligence technology makes the teaching of intelligent construction more accurate and efficient. Through intelligent algorithms and data analysis, teachers can more accurately grasp students' learning progress and difficulties, develop personalized teaching programs, and improve teaching effects. At the same time, AI technology can also automate a large number of repetitive teaching tasks, such as homework correction, score statistics, etc., so as to reduce the work burden of teachers, so that they have more time to focus on teaching research and innovation.

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