

Exploration of the Application of Artificial Intelligence Assisted Learning in Rural Primary School Mathematics

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ABSTRACT

Artificial intelligence assisted learning is not only an inevitable requirement of the times for the development of rural primary education, but also an urgent need for the internal demands and efficient and high-quality development of education. This article elaborates on the value of empowering rural primary school mathematics education with artificial intelligence technology, and proposes several strategies for empowering rural primary school mathematics classroom education with artificial intelligence technology, aiming to provide some support and reference for the modernization transformation of rural primary school mathematics education.

KEYWORDS

AI assisted learning; Rural primary school mathematics; Classroom teaching; Operational research

1 Introduction

In the current wave of education reform, the education department has actively responded to the national call and issued the "Opinions on Further Reducing the Homework Burden and Extracurricular Training Burden of Students in Compulsory Education", which is widely known as the "double reduction" policy. The introduction of this policy marks a profound and comprehensive transformation in China's education sector, with the core goal of optimizing the education ecosystem, promoting students' comprehensive development, and effectively reducing their heavy academic burden and extracurricular training pressure.

The implementation of the "double reduction" policy is not only a re examination and adjustment of the traditional education model, but also a profound practice of the concept of talent cultivation in the new era. It requires schools, families, and society to work together to create a healthier and more relaxed environment for students' growth, return education to its essence, and focus on the comprehensive development of students' physical and mental health. In this context, the research on homework design strategies for rural primary school mathematics curriculum, as an important carrier to promote students' mathematical abilities and cultivate lifelong learning awareness, is particularly important.

2 Artificial intelligence assisted learning for the development of rural primary education

The development of rural primary education assisted by artificial intelligence is not only an inevitable requirement given by the times, but also an urgent need for the internal demands and

efficient and high-quality development of education. With the deepening implementation of China's Education Modernization 2035, accelerating the transformation of artificial intelligence in education and promoting high-quality development of basic education have become important components of the national strategy. In today's world, artificial intelligence technologies represented by artificial intelligence, big data, cloud computing, etc. are rapidly developing and profoundly changing all aspects of social life. The field of education is no exception, and artificial intelligence has become an important means to improve the quality of education and promote educational equity. The report of the 20th National Congress of the Communist Party of China clearly proposed to "promote the digital development of education", which has pointed out the direction for the development of rural primary education.

3 The Value of Empowering Rural Primary School Mathematics Education with Artificial Intelligence Technology

In the 21st century, artificial intelligence technology is like an unstoppable trend, profoundly changing every corner of society, and the education sector is no exception. Especially in rural primary school mathematics education, the integration of artificial intelligence technology has not only brought innovation to traditional teaching models, but also demonstrated enormous value in enriching teaching content, improving teaching efficiency, and stimulating students' interest in learning.

3.1 Enrich the content of mathematics classroom education

Traditional rural primary school mathematics classrooms are often limited by textbooks and teachers' knowledge reserves, with relatively fixed and limited teaching content. The introduction of artificial intelligence technology has greatly expanded the boundaries of mathematical knowledge. With the help of the Internet, teachers and students can easily access massive mathematical education resources, including but not limited to vivid mathematical stories, interesting mathematical games, cutting-edge mathematical research achievements, etc. These resources not only enrich the connotation of mathematics classrooms, but also make teaching content more relevant to the times and life, which helps cultivate students' mathematical literacy and interdisciplinary perspectives. Artificial intelligence technology also makes the presentation of mathematical knowledge more diverse. With the help of advanced technologies such as multimedia, virtual reality (VR), and augmented reality (AR), abstract mathematical concepts can be transformed into intuitive and concrete images or models, thereby helping students better understand and master them.

3.2 Improved the efficiency of mathematics classroom

In mathematics, a discipline that emphasizes both logical thinking and abstract concepts, the introduction of artificial intelligence technology has undoubtedly brought revolutionary changes to teaching, significantly improving the efficiency and quality of mathematics classrooms. Undoubtedly, artificial intelligence technology has greatly optimized the process of mathematics teaching through its efficient and intelligent characteristics. In traditional teaching, teachers need to spend a lot of time preparing lesson plans and grading homework, which often takes up a significant amount of their energy. However, with the rise of artificial intelligence teaching platforms, this dilemma has been effectively alleviated. Teachers can use these platforms to release preview tasks, classroom lecture notes, and homework in advance. This not only saves time on

handwritten lesson plans, but also enables them to accurately grasp students' preview situations through the platform's data analysis function, making them fully prepared for classroom teaching. In this way, students can have a preliminary understanding of the knowledge they have learned before class, and in class, they can focus more on solving difficult problems and exploring in depth, thus maximizing the use of time and improving teaching efficiency.

In addition, artificial intelligence teaching platforms also have powerful real-time feedback functions, which are difficult to achieve with traditional teaching methods. In traditional classrooms, teachers often need to understand students' learning situation through homework or quizzes after class, and this process often has a lag. The artificial intelligence teaching platform can provide immediate feedback to students after completing exercises, allowing them to timely understand their mistakes and shortcomings. This instant feedback mechanism not only helps students correct their mistakes in a timely manner, but also stimulates their learning motivation and encourages them to be more actively engaged in learning. At the same time, teachers can quickly understand the overall learning situation of the class based on the data provided by the platform, and adjust teaching strategies accordingly to ensure that each student can learn at their own pace.

3.3 Helps to stimulate students' interest

Interest is the best teacher, and this statement is not only applicable to urban educational environments, but also particularly important in rural primary schools. At this stage, children's imagination and curiosity are flourishing. Cultivating their interest in mathematics can not only lay a solid foundation for them in the subject, but also sow the seeds of exploring the unknown and pursuing truth in their hearts. With the rapid development of technology and the integration of artificial intelligence technology, new vitality has been injected into mathematics teaching in rural primary schools, becoming one of the effective means to stimulate students' interest in mathematics. Artificial intelligence technology creates a more vivid and interesting mathematical learning environment for students through its unique interactivity and multimedia presentation. In traditional teaching methods, students often can only acquire knowledge through static media such as blackboards and textbooks, which can easily make them feel bored. Artificial intelligence technology can utilize advanced technologies such as virtual reality and augmented reality to transform abstract mathematical concepts into intuitive and vivid images and animations, allowing students to experience the charm of mathematics through interaction.

For example, when explaining geometric shapes, artificial intelligence technology can simulate three-dimensional models of various shapes, allowing students to observe, rotate, and stitch them from different angles, thereby gaining a profound understanding of the properties and relationships of the shapes. This immersive learning approach greatly enhances students' participation and interest.

Each student is a unique individual with different learning styles and rhythms. However, in the traditional "one size fits all" teaching model, it is difficult for teachers to take into account the individual differences of each student, resulting in some students being unable to keep up with the teaching progress, while others feel that learning is too simple. Artificial intelligence technology, through techniques such as big data analysis and machine learning, can accurately identify students' learning characteristics and needs, and tailor learning plans and resources for them. This personalized learning approach not only helps students better grasp mathematical knowledge, but also cultivates their self-learning ability and innovative spirit. For example, some intelligent learning platforms can intelligently recommend practice questions and expand resources that are suitable for students based on their answering situation and mastery of knowledge points, allowing students to continuously improve at their own pace.

4 Strategies for Empowering Mathematics Classroom Education in Rural Primary Schools with Artificial Intelligence Technology

4.1 Innovate curriculum forms and lead the transformation of rural primary school mathematics education with artificial intelligence technology

In the current era of rapid development of artificial intelligence technology, rural primary school mathematics education is standing at an unprecedented crossroads of change. This change not only profoundly affects traditional teaching concepts and models, but also opens up vast space for comprehensive innovation of curriculum forms. The introduction of artificial intelligence technology is like a strong east wind, blowing away the dullness and limitations of traditional education, injecting new vitality and hope into the mathematics learning journey of rural children.

The course content is the cornerstone of educational reform. Empowered by artificial intelligence, rural primary school mathematics curriculum is gradually moving away from dull and theoretical teaching, and instead pursuing deep integration with the real world. Through carefully designed teaching content, mathematical knowledge is cleverly embedded into a series of practical situations that are close to students' lives. For example, using AI technology to simulate real farm management scenarios, students can naturally master basic concepts such as addition, subtraction, multiplication, division, proportion, and percentage in the process of calculating crop yields and planning fund allocation. This teaching method not only enhances the fun and practicality of mathematics learning, but also allows students to deeply appreciate the value and charm of mathematical knowledge in solving practical problems.

In addition, artificial intelligence also provides students with rich exploratory learning resources. Through programming software, students can design simple math games by themselves, such as "Math Maze", "Arithmetic Backbone", etc. These games not only test their mathematical calculation ability, but also exercise their logical thinking and creativity. At the same time, using AI simulation software to explore the properties of geometric shapes, such as dynamically demonstrating the area changes of circles, the sum of interior angles of triangles, etc., allows students to intuitively feel the mysteries of geometry, thereby deepening their understanding and memory of mathematical concepts.

AI technology provides teachers with a rich variety of interactive tools and platforms, such as online discussion boards, virtual laboratories, and collaborative documents. These tools not only greatly enrich teaching methods, but also provide students with more convenient and efficient communication and collaboration platforms. On the online discussion board, students can engage in lively discussions about a certain mathematical problem, sharing their viewpoints and problem-solving strategies; In the virtual laboratory, they can verify mathematical theorems and formulas through simulation experiments; In collaborative documents, they can work together to complete a math project and experience the joy and sense of achievement of teamwork.

4.2 Building a smart learning ecosystem and utilizing artificial intelligence technology to create a cross temporal teaching environment

Building a smart learning ecosystem has become an important driving force for promoting innovation in rural primary school mathematics education, especially as the light of artificial intelligence technology gradually shines on this hopeful field. This strategy is not only a profound reflection and transcendence of the traditional education model, but also a brave depiction of the future education blueprint. Smart learning ecology, as the name suggests, is a comprehensive teaching environment that integrates advanced information technology, innovative teaching concepts, and humanistic care. It is committed to creating a learning paradise that is both intelligent

and vibrant.

The core of the smart learning ecosystem lies in the word "wisdom", which not only refers to the intelligence at the technical level, but also includes the comprehensive upgrading of educational concepts, teaching methods, and learning styles. In this ecosystem, artificial intelligence technology is cleverly integrated into every aspect of teaching, from personalized learning path planning, to precise delivery of intelligent teaching resources, to real-time feedback on learning outcomes, all reflecting the power of intelligence. Students are no longer passive recipients of knowledge, but have become active explorers and constructors of knowledge; Teachers transform into guides, facilitators, and partners of learning activities, swimming together with students in the ocean of knowledge.

4.3 Deeply tap into the potential of the classroom and comprehensively achieve deep learning interactive communication that respects differences

In today's rapidly changing era, rural primary school mathematics education is facing unprecedented challenges and opportunities. Activating classroom potential and achieving deep learning interactive communication that respects differences is not only the key to improving teaching quality, but also the core strategy of empowering rural primary school mathematics education with artificial intelligence technology. This strategy aims to create an inclusive and inspiring learning environment through the application of advanced technology, allowing every child to freely soar in the ocean of mathematics and fully demonstrate their unique potential.

Through carefully designed educational software, teachers can easily provide students with a range of math problems with varying levels of difficulty and rich content. These questions not only cover basic knowledge points, but also incorporate real-life examples and interesting elements, aiming to stimulate students' interest in learning and thirst for knowledge. Students can choose their own challenges based on their learning abilities and interests, and gradually improve their mathematical literacy in a relaxed and enjoyable atmosphere. In addition, the application of virtual reality (VR) and augmented reality (AR) technologies has brought revolutionary changes to rural primary school mathematics classrooms. These technologies can create immersive learning experiences for students, making abstract mathematical concepts intuitive and easy to understand. For example, when teaching geometry, students can "step into" a wonderful world composed of various shapes through VR glasses, touch, rotate, and stitch these shapes with their own hands, and thus deeply understand their properties and characteristics. This immersive learning method not only improves students' learning efficiency, but also greatly stimulates their imagination and creativity.

In addition to technological innovation, deep learning interactive communication is also an important part of achieving education that respects differences. Online discussion platforms provide students with a space for free expression and mutual learning. Here, students can engage in in-depth discussions and debates on mathematical problems, sharing their problem-solving ideas and strategies. Teachers can use these platforms to timely monitor students' discussions and provide necessary guidance and feedback.

4.4 Innovate teaching tools and deeply integrate high-quality digital teaching resources

Reforming teaching tools and deeply integrating high-quality digital teaching resources is another important strategy for empowering rural primary school mathematics education with artificial intelligence technology. It emphasizes the use of advanced digital tools and resources to

improve the quality and efficiency of teaching, while providing students with richer and more diverse learning experiences. The innovation of teaching tools can shift from traditional blackboards and chalk to intelligent whiteboards and interactive projectors. Intelligent tools can not only display rich multimedia content such as videos, animations, and simulations, but also achieve real-time interaction between teachers and students, improving classroom participation and interactivity. For example, teachers can use smart whiteboards for dynamic math demonstrations, and students can also participate in classroom activities such as online quizzes and group discussions through smart devices.

Deeply integrating high-quality digital teaching resources, closely integrating artificial intelligence teaching content and materials with teaching activities, including electronic textbooks, online courses, educational games, simulation software, etc., providing interactive and visual effects that traditional textbooks cannot achieve, and can also adaptively adjust according to students' learning progress and understanding level. For example, through intelligent education platforms, teachers can push personalized learning tasks and exercises to students, helping them consolidate and deepen their mathematical knowledge. The deep integration of high-quality digital teaching resources also needs to consider students' learning experience and learning effectiveness. When designing and selecting digital resources, educators should fully consider students' age characteristics, cognitive levels, and learning needs to ensure the suitability and effectiveness of the resources. At the same time, attention should be paid to students' digital literacy education, teaching them how to effectively utilize digital resources for learning, and cultivating their abilities in information retrieval, evaluation, and application.

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