

Research on AI Applications in Education Management: Current Status, Challenges and Optimization Approaches

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Abstract. It is obvious that artificial intelligence (AI) is integrating with every aspect of daily life. The use of AI in education management is getting more attention. However, current research has not fully discussed the practical problems and improvement methods. This paper studies the main uses of AI in education management, the existing problems, and possible solutions. Research finds that AI can help schools in many ways, especially in the management aspects. It can make better class schedules, predict student grades, and help with decision-making. These all can improve management efficiency. There are also some problems. For example, data may not be accurate enough, the algorithms might be unfair, and the cost is too high. To solve these problems, this paper suggests that it should use simpler models and collect better data. For management, setting up supervision teams and classifying data properly. These measures can assist educational institutions in leveraging AI more effectively and responsibly.

Keywords: Artificial Intelligence, Education, Educational Management, Algorithmic Bias

1. Introduction

After entering the 21st century, artificial intelligence is increasingly integrating into every aspect of human daily life, including the field of education. Undoubtedly, it is with the assistance of artificial intelligence that education will accelerate towards a modernized mode. Nowadays, society tends to transition towards intelligence, and educational management, as a part of the education system, also faces an urgent need for transformation. The traditional management education model has many shortcomings, such as rigid decision-making, a lack of flexibility, difficulty in making timely decisions that adapt to student diversity, uneven allocation of educational resources, and a lack of diversity in teacher evaluation and encouragement mechanisms. Therefore, artificial intelligence technology is needed to comprehensively improve the level of education management and promote the positive development of education management [1]. Education not only needs to change its management mode, but also improve the quality of management to enhance the efficiency of educational management.

Nowadays, many related studies are focusing on the relationship between artificial intelligence and teaching management, such as exploring the construction of an artificial intelligence ecological environment system for higher artificial intelligence education. These studies provide some experience and methods, but artificial intelligence as a technology also has some issues. Studies

have shown that artificial intelligence not only has a positive impact on the academic field but also carries negative implications, such as questioning the ethical and fair use of AI [2]. These issues may affect the process and ultimate effectiveness of teaching management, which requires more careful consideration and the formation of corresponding solutions.

Understanding the current situation of artificial intelligence in teaching management and identifying its problems can help schools and teachers better utilize this technology and promote the positive development of teaching management.

In addition, many studies are now focusing on the benefits that artificial intelligence brings to education, but there are not many studies that focus on the negative impacts. This study mainly discusses the application and problems of artificial intelligence in teaching management, analyzes in which aspects artificial intelligence can help improve teaching management, identifies its shortcomings, and finally proposes some improvement suggestions, aiming to make artificial intelligence play a greater positive role in teaching management.

2. The core application of artificial intelligence in educational management

2.1. Intelligent teaching process

Artificial intelligence technology is rapidly developing and changing a key part of educational management - the teaching process. Artificial intelligence can make the teaching process more intelligent. It helps schools improve teaching efficiency by analyzing large amounts of data and combining it with its own intelligent algorithms. At the same time, it can make resource allocation more reasonable and provide corresponding assistance suitable for each student's learning characteristics.

2.1.1. Intelligent course scheduling and resource scheduling system

Traditional scheduling and resource allocation often rely on manual operations, which are not only time-consuming and labor-intensive but also fail to adapt to the current education system reform and talent training programs, resulting in scheduling not achieving ideal results. The intelligent scheduling system analyzes multi-dimensional data such as teachers, classrooms, and course times, and combines multiple algorithms to form the optimal scheduling plan, reducing conflicts caused by uneven resource allocation [3]. In addition, according to genetic algorithms, intelligent scheduling can also detect real-time demand, adjust resources promptly, and maximize resource utilization and accuracy, becoming an important guarantee for building a smart campus [4].

2.1.2. Personalized learning path recommendation

Artificial intelligence analyzes students' learning behavior data, such as exam scores, knowledge mastery, and interests, to accurately construct models of learner profiles and recommend personalized learning paths for them. AI can allocate suitable learning resources to students based on their specific requirements, including videos, online exercises, and teacher-student Q&A. In addition, AI can also adjust the difficulty of tasks. By continuously analyzing students' learning outcomes, conducting in-depth analysis of homework completion and study duration, students can identify the challenges in the learning process and promote the improvement of their learning outcomes [5].

2.2. Precise student management

Artificial intelligence is changing the way schools manage students. Now, teachers and administrators can have a clearer understanding of each student's situation. The system will track students' performance and behavior in real-time. When an abnormal situation is detected, the system will immediately issue a reminder, and the school can quickly take assistance measures.

Firstly, artificial intelligence can predict and warn students' academic performance. By analyzing students' academic data, such as historical grades, classroom attendance, homework completion, and accuracy, combined with campus behavior data, artificial intelligence can accurately analyze students' learning status. Research has shown that the random forest model can achieve an accuracy rate of 80% -90% in predicting student grades, which helps teachers and students optimize their learning strategies and intervene in underperforming students promptly [6].

Secondly, artificial intelligence can monitor the psychological state of students. By integrating students' behavioral data, psychological state changes, and exam scores through complex teaching evaluation models, artificial intelligence can comprehensively evaluate students' performance at specific learning stages [7]. This analysis, based on multidimensional data, provides more accurate decision support for educational management.

2.3. Administrative decision support

Artificial intelligence is changing the way schools make management decisions. Traditional decision-making requires processing large amounts of data, which is both time-consuming and laborious. Nowadays, artificial intelligence can automatically complete data analysis work, quickly organize various types of information, assist management personnel in decision-making, and improve the scientificity of decision-making.

In terms of teaching quality assessment, AI can help analyze grades and generate evaluation data, generate reports, and assist teachers in identifying problems and improvement measures in the teaching process. In actual English classroom teaching, teachers can use artificial intelligence to understand whether students can adapt to and enjoy current teaching methods. Based on the data provided by artificial intelligence, teachers can change their classroom teaching strategies, making it easier for students of the current age group to accept and absorb the knowledge taught. Among them, artificial intelligence serves as a tool to test the effectiveness of teachers' teaching [8].

In terms of employment forecasting, artificial intelligence analyzes employment market trends, predicts actual demand for majors, and provides recommendations for enrollment adjustments. At the same time, personalized and stronger employment advice can be provided based on the strengths of different students.

3. Limitations analysis of three artificial intelligence applications

3.1. Technical limitations

Artificial intelligence technology is gradually integrating into the field of education, showing many possibilities, but it must be realized that there are still many technological bottlenecks in its practical application. These limitations not only constrain the performance of AI systems but also have a direct negative impact on teaching effectiveness.

3.1.1. Data quality and algorithm bias issues

The quality of data plays a decisive role in the performance of artificial intelligence. In educational settings, data may come from students' learning records, behavioral data, or teacher evaluations, but these data often have issues such as incompleteness and inaccuracy. There is still a certain data bottleneck problem in China. The lack of high-quality data volume leads to selective data, which is the main reason. The connectivity between Internet enterprises is not enough, and the data lacks a certain openness. Users cannot directly enjoy the high-quality data brought by various AI connections [9].

In addition, algorithmic bias may further exacerbate educational issues. The lack of training in data or system configuration, or design is the main reason for algorithm bias [10]. Algorithmic bias can raise questions about data transparency and fairness. The opacity of data manifests in the lack of knowledge about the detailed steps involved in the operation of artificial intelligence, which can lead to a security crisis for personal information and exacerbate social inequality. In the field of education, educational resources tend to flow to areas with good resources and students, widening the gap of educational inequality and limiting the development of students in impoverished areas [11]. Every time artificial intelligence gives biased results, what is actually given is questionable fairness, and all algorithms based on this data will produce more unfairness [12]. Such unequal conclusions will have profound impacts on the field of education, such as uneven resource allocation, biased evaluation criteria, differences in access to opportunities, and learning barriers for special groups of students, further exacerbating educational issues.

3.1.2. Insufficient adaptability to complex educational scenarios

The educational environment is very complex and ever-changing. It is not only about the transmission of knowledge, but also involves multiple aspects such as students' thinking processes, emotional changes, and interpersonal interactions. However, existing AI technologies are difficult to fully adapt to this complexity.

Currently, most artificial intelligence systems in education rely on fixed static data. These systems perform well in teaching standardized knowledge, such as being able to effectively explain mathematical formulas or grammar rules. When faced with problems that require students to engage in divergent thinking, artificial intelligence becomes inadequate. For example, in open-ended questions such as literary appreciation or scientific exploration, AI often cannot respond flexibly like ordinary human teachers to solve various complex problems raised by students.

The real classroom environment is full of variables. Various unexpected situations may arise during group discussions, and students' reactions may also vary. Although speech recognition and image analysis technologies have made significant progress, artificial intelligence still struggles to adapt to different situations like human teachers. It cannot adjust the teaching pace based on students' micro expressions, nor can it immediately change the teaching methods according to individual students' special needs, which human teachers can easily achieve.

The lack of adaptability has greatly limited the application of artificial intelligence in practical teaching. It is more suitable as an auxiliary tool rather than completely replacing teachers and becoming the main lecturer. To truly integrate artificial intelligence into the education field, it still needs more breakthroughs in technology.

3.2. Implementation obstacles

3.2.1. Collaborative resistance between teachers and technicians

The application of artificial intelligence in educational management relies on the close cooperation between teachers and technical personnel. In reality, there are significant differences between the two in terms of goals and language. Teachers are most concerned about teaching effectiveness, often concerned about whether artificial intelligence can help them better manage teaching. The technical team often places more emphasis on whether the system runs smoothly and whether its functions are powerful. This difference in focus often leads to artificial intelligence tools not meeting practical needs.

In addition, many teachers have a resistance to AI, especially reflected in their concern that these new technologies will replace their positions and take away their jobs. If schools do not provide sufficient training, teachers' anxiety will become even more severe. They may simply give up using these teaching tools because they are not familiar with the operation.

3.2.2. High infrastructure investment and maintenance costs

Investing in artificial intelligence in the field of education management requires a high initial cost, which poses a huge burden on schools with limited resources. All advanced technologies require significant costs, which is one of the major challenges facing artificial intelligence. Technicians may need expensive hardware devices to support them in inputting large amounts of data into artificial intelligence to train algorithms, which requires a lot of computing resources [13]. Ordinary hardware simply cannot support such a large and complex number of computer algorithms, and they may crash during the process, losing completed algorithms and rendering their efforts in vain.

The long-term cost of using artificial intelligence is also a major issue. Schools may find that these systems require continuous investment in maintenance during use. AI systems need to be regularly updated and upgraded, and older versions may not be able to perform the most accurate analysis of data, which requires a dedicated fund for payment. The storage of student data also requires more space, and with the increase in the number of students and the passage of time, the general space is simply unable to meet the large data storage needs of the school. The most important thing is that schools also need to hire technical personnel to manage these systems, maintain them regularly, and prevent sudden system crashes. Many schools have found that they can afford the initial pilot costs, but cannot afford large-scale promotion. Especially in remote areas, schools often have to put AI teaching projects on hold due to insufficient funding.

4. Improvement strategies and future prospects

4.1. Technical optimization direction

4.1.1. Application of lightweight AI models

At present, lightweight models often refer to models that balance speed and accuracy, which can reduce the number of parameters and improve the inference speed during operation while ensuring the overall performance of the model remains unchanged [14]. The application in the field of artificial intelligence has helped solve many problems. Firstly, the cost of lightweight models is only a fraction or even a dozen times that of heavyweight models, which allows schools in impoverished areas to use artificial intelligence at a low cost. In addition, lightweight models can be applied to

various hardware environments, from network terminals to smart watches on everyone's wrist, and can be incorporated into the operation of lightweight models [15]. Teachers can detect students' Status anytime and anywhere. Finally, lightweight models can also help teachers customize personalized learning plans for different students, highlighting their advantages of customization and personalization, and assisting teachers in managing and teaching the classroom in a targeted manner [15].

4.1.2. Building high-quality datasets in the field of education

High-quality datasets play an important role in the field of artificial intelligence. They are high-value, high-density, and standardized data with reliability, and they play a crucial role in artificial intelligence.

In terms of policies, the government encourages the creation of industry common data resource libraries, demonstrating China's emphasis on high-quality datasets. In the field of education, establishing multiple dimensions during the data collection stage, controlling the improvement of data quality, and applying it to multiple teaching management scenarios, such as personalized learning tutoring, teaching evaluation, etc., to enhance the quality of education management.

4.2. Improvement of management mechanism

Schools need to address ethical issues brought about by artificial intelligence while also protecting the security of educational data. Firstly, schools and educational institutions can establish specialized review committees, including teacher representatives with teaching experience, experts in artificial intelligence technology, and relevant legal professionals. The main task is to first check whether the artificial intelligence system is fair and whether it may bias students. Secondly, supervise the algorithm modification process to ensure that each system update is reasonable. Finally, responsible for handling relevant complaints and issues. Secondly, the current education data management is relatively chaotic. The hierarchical protection system can classify different categories of data, separate ordinary data, sensitive data, and core data, and implement different ways of management for different categories of data to achieve data security.

5. Conclusion

This article studies the use and existing problems of artificial intelligence in educational management, and the main findings are as follows:

Firstly, artificial intelligence has three important uses in educational management. Firstly, it can achieve intelligent scheduling and personalized learning recommendations, making the teaching process more efficient. Secondly, it can accurately predict students' grades and monitor their psychological state, helping students manage more accurately. Finally, it can also assist in evaluating teaching quality and predicting employment, making administrative decisions more scientific.

However, research has also identified some issues. In terms of technology, there are issues such as low data quality and possible bias in algorithms. In practical applications, teachers have difficulty using new technologies, and the equipment investment cost is also high.

In response to these issues, this article proposes specific suggestions, including using simpler AI systems to reduce costs, establishing a dedicated management team to supervise the usage process, and classifying and managing educational data.

This study has two significant implications. On the one hand, it illustrates the practical use of artificial intelligence, and on the other hand, it points out the issues that need attention. Future research can focus on two directions: how to balance technological innovation and educational equity, and how to make these new technologies affordable for more schools.

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