



# Artificial Intelligence + Education: Application Status, Problems and Countermeasures

Han Xu<sup>1,\*</sup>, Siqi Wang<sup>2,a</sup>

<sup>1</sup>School of Management, Hubei University of Chinese Medicine, 16 Huangjiahu West Road, Wuhan 430065, China

<sup>2</sup>Research Center for the Development of Traditional Chinese Medicine, Key Research Institute of Humanities and Social Sciences of Hubei Province, 16 Huangjiahu West Road, Wuhan 430065, China

\*Correspondence: hanxu520@hbtcmm.edu.cn, <sup>a</sup>wangsiqi860628@163.com

**Abstract.** The rapid development of AI (artificial intelligence) has prompted radical changes in the field of education. The application of intelligent teaching systems, virtual experiments and simulation training, and intelligent education management plays a huge role in improving the quality of education, promoting education fairness, fostering innovative talents, and advancing the internationalization of education. However, the application of AI in the field of education has also brought about a number of problems, such as data privacy leakage, algorithmic bias and misjudgment, challenges to teachers' roles, etc. The purpose of this paper is to discuss the current situation of the application of AI in education, analyze the existing problems, and put forward countermeasures such as strengthening data protection, optimizing algorithm design, and improving teachers' skills, with a view to promoting the healthy development of artificial intelligence in higher education.

**Keywords:** Artificial intelligence+; personalized learning; intelligent assisted teaching

## 1 Introduction

In recent years, the rapid development of artificial intelligence has accelerated the digital change and innovation in all walks of life in the world [1], which has had a great impact on the social, economic and cultural fields, and the field of education is no exception [2]. In the digitalization wave driven by AI, new educational paradigms such as human-computer collaboration, borderless learning, and co-creation and sharing continue to impact traditional educational theories, teaching scenarios, education processes, and teacher-student relationships [3, 4]. China's Minister of Education stated that "AI-enabling actions will be implemented to promote the deep integration of intelligent technologies with education and teaching, scientific research, and society, and to provide effective action support for the development of a learning society, intelligent education, and digital technology". The application of artificial intelligence

in the field of education not only improves the efficiency of teaching, but also provides students with a more personalized, diverse and modern learning experience. However, everything has advantages and disadvantages, and while artificial intelligence brings convenience to education, it also exposes some problems, such as data privacy leakage and algorithmic bias. Therefore, this paper will sort out the current situation of the application of artificial intelligence in education, analyze the problems, and put forward corresponding countermeasures.

## 2 The Connotation and Application of Artificial Intelligence + Education

During the two sessions of China in 2024, "Artificial Intelligence +" was written into the government work report for the first time. The report proposed to deepen the research and development applications of big data and artificial intelligence, carry out "AI+" actions, and create internationally competitive digital industry clusters in order to accelerate the development of new quality productivity. Artificial intelligence + education, as the name suggests, refers to the application of artificial intelligence technology in the field of education, through intelligent means to assist teaching, management and evaluation and other aspects, forming three main models of tool-based assisted teaching, artificial intelligence subject education and smart campus (as shown in Table 1).

**Table 1.** AI + education development model

Pattern	Connotation
Tool-based assisted instruction	The application of AI+ Big Data, Knowledge Graph, Speech Semantic Recognition, Visual Recognition and other technologies is gradually becoming widespread, and online education products tend to be personalized.
Artificial intelligence subject education	A discipline-based curriculum and teaching system developed on the basis of artificial intelligence technology is called artificial intelligence discipline education. Its main forms of expression include programming education, aerospace education, robotics education and so on.
Smart campus	The IoT-based campus work, study and life will constitute an integrated environment that fully integrates teaching, research, management and campus life with various application service systems.

This new education model aims to take advantage of AI, such as big data analysis, machine learning, natural language processing, etc., to enhance the level of intelligence in education, and thus achieve a more efficient and personalized learning experience. Artificial intelligence + education has become an irreversible development trend in the field of education. It not only changes the traditional teaching methods and learning experience, but also improves the efficiency and quality of education, injecting new vitality into the future development of education, and its application in reality is mainly reflected in the following aspects:

### **2.1 Personalized Learning**

In educational practice, the application of artificial intelligence for personalized learning has achieved remarkable results. For example, an online education platform uses artificial intelligence technology to develop a personalized learning plan for each student by analyzing the student's learning data and behavioral patterns. Based on students' knowledge mastery and learning progress, the platform intelligently recommends relevant learning resources and practice questions to help students enhance their learning in a targeted manner. In this way, students' learning motivation and learning effect have been significantly improved.

### **2.2 Intelligent Assisted Teaching**

Artificial intelligence can also be used as an intelligent auxiliary teaching system to provide teachers with real-time student learning data and analysis reports. For example, a university introduced an intelligent teaching assistant, which can automatically collect data on students' classroom interactions, homework completion, etc., and display students' learning status for teachers through data visualization technology. Based on these data, teachers can more accurately understand students' learning needs, so as to adjust teaching strategies and methods and improve teaching efficiency and quality. For example, some teachers use ChatGPT to allow students to interact with virtual teachers, train students' language skills and communication skills, and help students practice speaking, listening, reading and writing [5].

### **2.3 Automated Assessment and Feedback**

AI also plays an important role in assessment and feedback. For example, in English composition correction, the AI system can automatically detect students' grammatical errors, spelling mistakes and other problems, and give appropriate suggestions for revision. This kind of automated assessment and feedback not only reduces the teachers' workload, but also provides students with more timely and accurate feedback, which helps them correct their mistakes in time and improve their learning effect.

## **2.4 Virtual Experiment and Simulation Training**

For some courses that require practical operations, such as physics and chemistry, AI can build virtual laboratories so that students can conduct experimental operations in a safe environment. In addition, the simulation training system can also help students with vocational skills training and improve their practical ability.

## **2.5 Intelligent Education Management**

Artificial intelligence technology can also be applied to education management, such as student information management, curriculum arrangement, teaching resource allocation and so on. Through intelligent management, the utilization rate of educational resources can be improved, the teaching process can be optimized, and the cost of education can be reduced.

# **3 Problems in the Application of Artificial Intelligence in Education**

## **3.1 Risk of Data Privacy Leakage**

The application of artificial intelligence in education requires the collection and processing of a large amount of student data, including personal information, learning trajectories and so on. However, there is a risk of privacy leakage in the collection and processing of these data. Without strict data protection measures, students' personal information may be abused or leaked, bringing unnecessary trouble and loss to students.

## **3.2 Algorithmic Bias and Misjudgment**

Artificial intelligence decision-making is based on algorithms and data, yet the algorithms themselves may be biased or misjudged [6]. For example, certain algorithms may be influenced by historical data, leading to biased assessments of certain groups of students. Such bias and misjudgment may cause unfair treatment to students and affect their learning and development.

## **3.3 Challenges to the Role of Teachers**

With the increasing application of AI in education, the role of teachers is also facing challenges [7]. On the one hand, teachers may need to adapt to new teaching methods and technologies and continuously improve their skills and abilities [8]; on the other hand, some teachers may worry that AI will replace their roles, leading to uncertainty in career development. Research has found that most normal university students worry that artificial intelligence will replace human teachers [9]

## 4 Countermeasures and Suggestions

### 4.1 Strengthening Data Privacy Protection

In order to safeguard students' data privacy, a strict data protection mechanism should be established. Formulate clear policies on data collection and use, restrict access and use privileges of data, and strengthen data encryption and security measures. At the same time, a monitoring mechanism should be established to supervise and check the process of data collection and processing to ensure the legitimacy and security of data. For example, schools can cooperate with professional data security organizations to jointly develop data encryption technology to ensure the security of student data during transmission and storage.

### 4.2 Optimize Algorithm Design

In order to reduce the cases of algorithmic bias and misjudgment, the research and development and optimization of algorithms should be strengthened. Improve the design of algorithms to reduce their dependence on historical data; increase the transparency and interpretability of algorithms to make the decision-making process of algorithms fairer and more reasonable; and carry out regular evaluation and review of algorithms to ensure that they comply with the laws of education and ethical requirements. In addition, a third-party organization can be introduced to independently evaluate the algorithms to ensure their fairness and accuracy.

### 4.3 Enhancement of Teachers' Skills and Role Positioning

Facing the challenges of AI, teachers should actively adapt to new teaching methods and technologies and improve their skills and abilities [10]. Schools can organize regular teacher training activities to help teachers understand and master the application skills of AI in education. At the same time, the role of teachers should be repositioned from traditional knowledge transmitters to student guides and partners. Teachers should make full use of the auxiliary role of artificial intelligence to provide students with more personalized and precise teaching services. For example, teachers can utilize the AI system to collect students' learning data, carry out accurate teaching design and classroom management, and improve the teaching effect.

## 5 Conclusion

Through the above example arguments and current situation analysis, we can see that the application of artificial intelligence in education has a broad prospect and potential, but it also faces some problems and challenges. By strengthening data privacy protection, optimizing algorithm design, improving teachers' skills and other countermeasures, we can better play the role of AI in education and promote the progress and development of education. In the future, we should continue to pay attention to

the dynamics of the application of AI in education, constantly improve and refine the relevant technologies and policies, and contribute more to the development of education.

Artificial intelligence + education has become an irreversible development trend in education. It not only changes the traditional teaching methods and learning experience, but also improves the efficiency and quality of education, injecting new vitality into the future development of education. However, we should also see that the application of AI in education still faces many challenges, such as data security, privacy protection, technology updates and other issues need to be addressed. In the future, we expect that under the joint efforts of science and technology, education, policy and other aspects, AI+ education can go farther, more stable and better, contributing wisdom and strength to build a community of human destiny.

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