# The Application and Potential Future Development of Artificial Intelligence in Education

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**Abstract.** With the coming of the era of artificial intelligence, the impact of artificial intelligence technology on basic education has been widely discussed, but there are still many problems and challenges. This paper focuses on the analysis of AI technology enabling basic education and the challenges in the application process. This paper concludes that artificial intelligence helps teachers carry out intelligent teaching and promotes students' personalized learning. But at the same time, AI also brings many challenges and risks, such as how to protect privacy and filter information in data overflow; And how to keep students creative while using AI. Based on this, this paper puts forward the following suggestions: the government should strengthen the investment and optimize the allocation of basic education resources; The government will explore the development of ethical norms and regulatory mechanisms applicable to artificial intelligence in the field of education; Schools to strengthen the training and introduction of teachers; Individual students combine artificial intelligence with real life.

**Keywords:** Artificial intelligence, education, future development of AI in education.

## 1. Introduction

Taking into account the progression of contemporary society and science and technology, artificial intelligence has become a new force leading The Times. It involves and affects many fields, one of which is the field of basic education. The conventional methods of education are insufficient to cater to the demands of contemporary society because they need the empowerment of artificial intelligence to deepen the technological reform of education. In each education stage, the basic education stage composed of primary and secondary schools is the key stage to cultivating talents. Artificial Intelligence plays a crucial role in fostering students' creativity and critical thinking abilities. At present, artificial intelligence education in primary and secondary schools has been highly valued by governments around the world, and countries around the world have introduced various policies to incorporate artificial intelligence into primary and secondary school curricula and train future talents. Meanwhile, as technology advances, more and more educational platforms and tools have emerged, such as QuillBot, Course Hero, and so on. These tools and platforms provide a wealth of AI resources for teachers and students. In this context, more and more schools around the world have begun to try to integrate artificial intelligence into daily teaching to enhance the caliber and efficacy of instruction. However, in the process of implementation, there are also many problems [1]. First of all, the speed of change of artificial intelligence is extremely fast, whether it is the education system or the teaching team teachers, need to stay current with the latest trends, and constantly update the knowledge system and technology. Secondly, teachers and students are bound to face an enormous amount of information and resources when using AI education platforms and tools. How to classify and identify this information quickly becomes a problem and challenge that cannot be ignored. Finally, the combination of artificial intelligence and basic education aims to cultivate students' ability to innovate and solve problems. However, in the practice process, students over-rely on artificial intelligence and a lot of plagiarism, which seriously hinders the development of students' innovative abilities [2]. Therefore, the purpose of this study is to study how to deal with the opportunities and challenges brought by artificial intelligence in the context of basic education, and to seek new ideas and inspirations for basic education.

# 2. Application of AI Technology in Education

## 2.1. Feasibility and Advantages of Applying Artificial Intelligence to Education

The application of AI technology in basic education is of great significance. Compared with traditional education, it can provide a path for personalized learning for students, optimize the allocation of teaching resources for teachers, and improve teaching efficiency. Through AI-assisted classroom teaching, students' individual needs can be better met, and teachers can also help analyze students' performance, thereby improving the quality of education and learning outcomes. Primarily, the following aspects serve as the primary reflection of this phenomenon. The first thing helps students with personalized learning; AI can help students learn throughout the learning process. Before class, provide students with rich background knowledge and do not let them enter the classroom with an empty head; In class, according to the student's learning progress and understanding of the situation, provide targeted help; After class, help students consolidate what they have learned, and provide questions and answers. Secondly, helps teachers to teach intelligently: AI can also help teachers to teach throughout the teaching process. Before class, through the basic situation of students, effectively set the teaching objectives and design the teaching process; In class, use AI to better monitor and regulate the classroom; After class, learn about students' learning through AI and arrange teaching progress appropriately. In summary, artificial intelligence education has good feasibility, it can cater to the requirements of both teachers' intelligent teaching and students' personalized learning and has a positive role in promoting basic education.

## 2.2. Current Status of Artificial Intelligence Application

Artificial intelligence technology is conducive to the construction of intelligent teaching systems. The implementation of Artificial Intelligence technology in education has received more and more attention, and it has become a good helper in teachers' teaching. Before class, teachers can release learning tasks and arrange previews through the artificial intelligence platform, so that students can consult good materials before class. This can effectively supplement students' course background knowledge so that students do not enter the classroom "empty head". In the class, VR technology is an important way of classroom teaching. For example, in the geography class, students can personally explore the geographical environment of various countries and regions through VR technology, and deepen their understanding and memorization of geographical knowledge [3]. After class, artificial intelligence can provide students with real-time feedback and evaluation through automated assessment technology. By analyzing students' homework and answers, teachers can understand students' learning progress and adjust teaching strategies in time. For example, a report that surveyed teacher adoption of GenAI has shown a rapid increase in the utilization of GenAI. Two out of five teachers now are using GenAI in their roles. According to a survey conducted by TeacherTapp in November, 42 percent of primary and secondary school teachers now use GenAI to assist them in refining their instructional strategies [4].

Artificial intelligence technology facilitates personalized learning for students. Traditional basic education is "one-size-fits-all", but catering to the unique requirements of each student can be a challenging task. Through in-depth analysis of students' learning data, interests, abilities, etc., artificial intelligence can tailor learning plans for them and recommend suitable learning resources. This means that every student can enjoy a VIP-like learning experience that allows them to grow quickly at their own pace and interests (Pratama et al., 2023). For example, in a report that surveyed student GenAI usage, it was found that students were more likely to use GenAI than educators. Ofcom reports that 74% of online children aged 16-24 in the UK have used GenAI tools. Use of GenAI tools is also high among younger children, with 79 percent of online teens (ages 13-17) and 40 percent of online 7-12-year-olds reporting that they have used ChatGPT, Snapchat My AI, Snapchat My AI, and Snapchat My AI. Midjourney or DALL-E [4].

Artificial intelligence technology can be an interactive learning tool. Artificial intelligence can be used as a partner for students' interactive learning, conducting dialogue and communication with

students to help students deepen their understanding and memory of knowledge. ChatGPT, for example, allows students to talk with it, raise questions they have encountered in the learning process, and share their own opinions on a certain issue. ChatGPT also provides feedback and guidance to facilitate students' thinking and knowledge construction. This interactive way can effectively inspire students' enthusiasm for academic pursuits and improve the effect of learning [5,6]. For example, when students are confused about how to learn English well, they can ask ChatGPT online and receive advice on vocabulary, listening, speaking, writing, reading comprehension, AIDS, and study plans. If students still have doubts at this time, they can continue to ask until the doubts are cleared [7].

## 3. Challenges and Prospects

### 3.1. Challenges

Although the application of artificial intelligence in basic education has broad prospects, it also faces many challenges and difficulties. First, is data security. Although artificial intelligence can assist students' personalized learning and teachers' intelligent teaching, it often needs to collect a lot of data to achieve this. During this process, data can easily be compromised, so protecting the information security of students and teachers is Paramount. In addition, the phenomenon of cyber violence and bullying caused by data breaches is also very common among students and teachers. In the age of artificial intelligence, everyone has a microphone, and they can freely vent their emotions based on hiding their information and abusing their right to speak [8].

Second, the distribution of educational resources and teachers is uneven. Under the current education system, the phenomenon of uneven educational resources is very common. Some schools and regions have lagged in the investment and practice of AI education, resulting in a relative lack of teachers with professional knowledge and professional skills. The lack of resources and the imperfect skills of teachers also lead to the uneven quality of personnel training. In developed countries and regions, schools generally have access to more AI education resources and support. They have advanced AI LABS, high-performance computers, and rich AI applications such as intelligent teaching platforms and personalized learning systems. These resources not only improve the quality of teaching but also improve the learning efficiency of students, so that they can better adapt to the future development needs of society. However, in remote and low-income areas, schools face a lack of resources for AI education. The lack of necessary hardware and quality teachers makes it difficult for schools in these areas to make full use of AI for teaching. This not only limits the possibilities for them to use AI to improve the quality of teaching but also leads to a huge gap between schools in developed regions. This unfair phenomenon will not only weaken social mobility but also aggravate social injustice, thus causing contradictions and conflicts [9, 10].

Third, students rely too much on artificial intelligence. Artificial intelligence can answer questions for students and help students with personalized learning, which undoubtedly increases the frequency of students using artificial intelligence. In this process, it is easy for students to rely too much on artificial intelligence, thus losing the ability to think and innovate independently. The common problem in modern education is that there is a lot of pressure and homework. Faced with a lot of homework and exams, many students think of using artificial intelligence as a convenient tool. Through the artificial intelligence system, students can get answers quickly and solve homework problems. This convenience and efficiency make more and more students rely on artificial intelligence. However, this over-reliance will lead to a deterioration in students' problem-solving and thinking skills, which in the long run will also affect creativity [11].

### 3.2. Prospects

The above problems will hinder the implementation and implementation of artificial intelligence policy, so how to solve these problems? What is the future direction of artificial intelligence?

First of all, from the government level, the government will strengthen the investment and optimal distribution of basic education resources, and the basic needs of artificial intelligence education in all

regions will be met. At the same time, governments can explore the development of ethical norms and regulatory mechanisms applicable to AI in the field of education to ensure the rational application of the technology while protecting the privacy of users [12]. The National Cyberspace Administration of China and seven other departments jointly issued the *Interim Measures for the Management of Generative Artificial Intelligence Services* (hereinafter referred to as the "Measures"). It can contribute to the advancement of generative artificial intelligence, while simultaneously addressing the propagation of fake messages, personal details invasion, safety of data, and prejudice. The full text of the Measures refers to the protection of personal information in many places, requiring service providers to obtain personal consent when using personal information for data training; When providing services, users' input information and usage records shall be protected according to law, and non-essential personal information shall not be collected [13].

Secondly, at the school level, the training and introduction of teachers should be strengthened. Only by updating teachers' technology can schools make teachers' teaching methods intelligent and improve their professional quality. As a soft power in the digital transformation of education, teachers need to reconstruct their professional system and knowledge system for artificial intelligence education. The release of the industry standard *Teacher Digital Literacy* in 2023 puts forward new requirements for teachers' teaching and learning in the digital age [14]. It is crucial to augment teachers' cognizance, proficiency, and accountability in utilizing digital technology to enhance, innovate, and transform educational and teaching activities. In that way, teachers will be more adaptable and innovative in the education and teaching process in the digital intelligence era. Therefore, schools should spare no effort to train teachers and improve their digital literacy.

Finally, at the student level, combining artificial intelligence with real-life aims to use artificial intelligence to solve real-life problems. In this process, improve their ability to solve problems and independent innovation. Meanwhile, when using artificial intelligence, the access data is encrypted and stored to ensure that the data is not illegally obtained. As students, they should be able to consciously choose intelligent tools to solve problems according to needs, and be willing and good at using artificial intelligence to carry out collaborative innovation activities. While feeling the convenience brought by artificial intelligence to life and learning, they can also recognize the potential problems it may cause and consciously avoid the potential risks brought by artificial intelligence. Students should consciously get rid of the blind rejection of artificial intelligence tools caused by "technology fear", and avoid falling into the "trap" of blind worship of artificial intelligence because "technology follows the trend" [15].

## 4. Conclusion

This study aims to explore the intelligent teaching and personalized learning in basic education enabled by AI technology. Through in-depth discussion and analysis of this topic, the following conclusions can be drawn:

First of all, AI, as a powerful auxiliary tool, can help teachers to teach intelligently. It can provide teachers with massive lesson preparation resources and data and can help teachers understand students' mastery in real-time, to optimize their teaching methods and adjust the course of class.

Second, AI can enable personalized learning for students. Through pre-class materials, interactive tools in class, and after-class questions and answers, students can adjust their learning progress according to their actual situation and realize personalized learning.

Finally, while AI has many benefits, there are also many crises and challenges. Students and teachers should pay attention to the protection of personal privacy during use, and learn to encrypt and store data. At the same time, students should also understand that AI is only an auxiliary tool, and the way to learn to live with it is not absolute dependence, but rational use.

To sum up, AI has a broad prospect in basic education, and in future research, it can further explore how to optimize the use of AI and how to jointly promote the role of AI in basic education.

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