

# Research on the future school development path based on artificial intelligence

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**Abstract.** In the field of education, the all-encompassing penetration of artificial intelligence has made new possibilities for the future school. This study analyzed the concept of the future school at first. Secondly, this study pointed out that the future education under artificial intelligence had three characteristics: the combination of virtual and real schools; the integration of human-computer environments; Learner-directed learning. Finally, this study pointed to strategies for government, school, and student improvement that were necessary to achieve effective integration of artificial intelligence with future school.

**Keywords:** Artificial Intelligence; Future School; Enhancement Strategies.

## 1. Introduction

During the Covid 19, many schools had difficulty conducting offline instructional activities. In this situation, online teaching gradually became the mainstream way to conduct courses. As technology improves, schools, students, parents, and the community seem to be more and more receptive to online education. Through various online education platforms on the Internet, a new form of school organization has evolved through the intertwining of a "virtual school" and a "physical school" organization. This miracle of "no classes, no school" in the information age is actually a reflection of the new generation of technology and education integration, resulting in new changes.

Society as a whole has changed dramatically over the centuries, and education has been profoundly influenced by society. Since the Industrial Revolution, industrialized mass production and the demand for specialized knowledge have caused the traditional family education of the agrarian era to give way to school education with the classroom system as the core, and the educational management operation mode has shown the characteristics of intensification and standardization. And in recent years, as Paul McGillivray said[1], "An industrial revolution based on the combination of the Internet and new materials and energy sources is coming". In 2020, the World Economic Forum released the report "Schools of the Future: Defining a New Education Model for the Fourth Industrial Revolution"[2], which clarifies that the development of human society has entered the age of innovation, and that quality education in the age of innovation is called "Education 4.0", which advocates that society, schools and businesses to work together to drive educational change and equip younger generations to create a more inclusive and cohesive, productive world. It indicates that education is newly influenced by society in this new era and that there is a need for new educational changes in the context of current realities. And this new change, the obvious one, is artificial intelligence.

Artificial Intelligence (AI), the powerful engine of the fourth industrial revolution, is bringing unprecedented changes to various fields around the world. In the field of education, the all-round penetration of AI has stimulated people's imagination about the school of the future and sparked extensive discussions about the school of the future. Although the practical exploration and theoretical research of future schools have made certain achievements, there are still some urgent problems that need to be solved, and artificial intelligence may become an important breakthrough for its further development.

Therefore, this study aims to analyze the theory of future school, explore the effective integration of AI and education, and finally propose the construction strategies of the future school.

## 2. Concept of the Future School

Now and for some time to come, schools are still the main place where education takes place. Schools have social attributes, which make them subject not only to many factors such as educational goals and educational targets, but also to the political, economic, and cultural developmental changes of modern society. The future school is not a synonym for a particular school or any school of the future, but a vision of change in school development based on the level of productivity development of the times, supported by available technology and resources, a vision and design of the future, and a school group of the best model. That is, the school of the future is not a fixed concept, but an eternal educational topic and a process of educational innovation.

The analysis of the connotation of future schools by scholars has revealed the following main types. First, some scholars have analyzed the idealized future school at a macro theoretical level. Masschelein, J. and Simons, M. point out that the future school is an idealized articulation of education as a particular time-space-issue arrangement that includes specific constructions, technologies, practices, and characteristics[3]. This study analyzes specific ideas for the development of the school of the future from a philosophical perspective and at a macro level. According to Professor Manabu Sato from Japan, the school of learning communities is a 21st century type of school, and the vision of learning community reform consists of three philosophies: the philosophy of communality, the philosophy of democracy, and the philosophy of excellence[4]. This provides a philosophical level of support for how schools of the future should proceed along these lines.

On the other hand, some researchers interpret the future school from the perspective of future talent cultivation with the goal of "what kind of people to train" in school education. For example, Zhang Sheng suggested that the construction of future schools must aim at cultivating students' higher-order cognitive abilities and provide innovative talents for the future society[5]. Based on students' core literacy and learning ability development, Li Xiaofei proposed that the construction of future schools should stand on the high point of the future and create a more suitable future education for students, i.e., an education that focuses on and develops students' core literacy[6]. They consider the proper connotation of the future school from the perspective of educational goals and analyze the future school in the context of the core literacy that is currently the most important focus of the Chinese educational community in cultivating students' thinking.

The above-mentioned literature introduces the school of the future from two perspectives: the theoretical level and concrete practice. However, with the development of future society, more and more researchers are focusing on the new changes in the future of education in the context of a society that combines education and technology. Cao Peijie pointed out that the school of the future is a structural change in the school in the context of the new industrial revolution, and is a new stage, a new level and a new model in the chain of progressive changes in the school. It is a new state of education in the process of continuous dynamic development based on the deep integration and innovation of future talent training needs and artificial intelligence technologies[7]. According to Luo Shengquan the future school will be characterized by a ubiquitous school space-time with a blend of virtual and real, a structural school system with an integrated human-computer environment, and a school education service based on learner-adaptive learning[8].

Integrating the above research, this study examines the future school as an idealized school concept based on futuristic theory and innovative practices, placing the school in the context of the evolving space-time of AI. The school of the future is closely linked to artificial intelligence and consists of a physical school in the traditional physical sense, as well as a virtual school constituted by the Internet.

### **3. The performance form of the future school combined with artificial intelligence**

The future of learning combined with artificial intelligence has the following three characteristics: the combination of virtual and real schools; the integration of human-computer environments; and Learner-directed learning.

#### **3.1 the combination of virtual and real school**

Since its origins, the school has existed as a physical school organization. But now, based on technology, schools have begun to break down the walls of traditional physical schools, and virtual schools are entering the public eye. The virtual school of the future will act as a basic educational facility for society, a school organization that is built and shared by all, and will be able to provide intelligent educational services to learners at all times and in all places. For example, the Khan Lab School, established in 2014 in the United States, integrates new technologies into the educational process, and students spend most of their time learning online. Virtual schools will take on the role of traditional school knowledge education, and individualized knowledge learning will be accomplished in virtual schools.

#### **3.2 human-machine environment integration**

Based on the integration of the virtual school and the actual school, the school of the future has a school environment that integrates human and machine environments. The essence of human-machine environment integration is the coexistence of human, AI and environment, which is a high degree of integration among human, AI and environment, not only about the improvement of AI's ability of human body and cognitive ability, but also about the improvement of human's ability of AI's perception and emotional cognition, which is a symbiosis of human, AI and environment. The future school based on human-machine environment integration will not only be able to passively cater to the personalized use and needs of teachers and learners for school education time and space, educational resources, and educational media, but will also be able to actively recommend educational services that suit the educational needs of teachers and learners. Based on artificial intelligence and big data, schools will be able to accurately grasp the education and teaching trajectory of each teacher and learner, and provide accurate education and teaching suggestions based on the individualized trajectory, thus proactively providing accurate education services.

#### **3.3 Learner-directed learning**

The future school will provide the public with school education services based on the independent needs of students. With the support of AI and big data, the school of the future will provide high-quality, accurate, and personalized services to learners, teachers, parents, school staff, and parents; with the construction of various school databases, the future school will move from the traditional school management control and discipline of teachers and students to the construction of a comprehensive service system based on individual development needs. By recording the digital development process of each education participant in the school, it will help optimize the performance assessment of the school and the academic evaluation of students, as well as promote the professional development of teachers and the effective construction of a deep organic partnership between home and school. Based on the organic integration of AI technology and virtual reality, the future school curriculum will be more diverse and realistic, and will be able to enter learners' life situations. Integrated courses, activity courses, and integrated courses will become the norm for the future school curriculum. Learners will be able to choose their favorite courses based on their own preferences, thus moving the school curriculum from a uniform setting to individual creation.

## **4. Construction mechanism of the future school**

The exploration of the connotation of the school of the future and its manifestation is a good hope for the future school. To make the future school combined with AI really come true, it needs the joint efforts of society, school and students.

### **4.1 The government should promote the development of future schools through legislation**

In order to truly develop citizens who are valuable to the current society, the first step is to legislate, from the top down, the implementation mechanism of AI in the future schools from the government's perspective. In fact, some initial legislation based on the integration of information technology and education is already underway in China. However, there is still the phenomenon of "two skins" between information technology and education teaching, and the enthusiasm to promote information technology in education needs to be improved and intensified. The institutional mechanism still needs innovation, the majority of teachers and students and education managers to further stimulate the application of motivation.

Therefore, the new education legislation should clarify how to integrate AI with the school of the future and set out specific evaluation criteria. The legislation should allow schools to have case studies to refer to, and various trainings should make the education bureau, schools, and teachers aware of the various advantages of integrating AI with the future school.

### **4.2 Schools should change its own development concept**

The development of the school of the future is primarily driven and guided by the external conditions of the school; however, whether the external conditions become the actual driving force for the development of the school of the future depends on the internal adaptive development of the school of the future, on the school's own internal development needs and on its positive response to the external conditions.

The future school should be built with the concepts of smart education innovation, educational equity, and personalized education. The concept of smart education innovation refers to the innovative educational forms and practices of future school; the concept of smart education equity refers to future schools ensuring that every learner has equal access to and uses smart technology; and the concept of smart education individualization refers to future school cultivating intelligent talents on the basis of personalized school education.

Only by using the concept of smart education as a guide can schools establish a mechanism for transmitting the value of the concept of smart education. This ultimately realizes the foundation of the school of the future from within.

### **4.3 Students should build their own virtual school from the bottom up**

The future school is not a solid physical place, but a dynamic process of development based on internal and external interaction. For students, it is necessary to collect resources according to their needs and use educational technology to achieve independent learning on their own initiative. In fact, the educational process itself is a combination of formal education and informal learning. It is only in the past that education has focused too much on purposeful formal education and neglected the self-directed informal learning that is latent in life. With the application of AI, intelligences will not only be instrumental beings, but will also teach and learn from each other as friends, assistants, or mentors. As individuals recognize their responsibility to grow in life, "learning" shifts to "teaching" and students take the initiative to learn for their own pleasure. In this case, students are no longer limited to learning at school, but all the ways of acquiring knowledge become the virtual field of learning.

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