The Future Development of Education in the Era of Artificial Intelligence

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Abstract. In recent years, "artificial intelligence + education" has become a very hot topic under the guidance of the wave of artificial intelligence. More and more traditional education institutions begin to organize and lay out the field of artificial intelligence education. The cultivation of artificial intelligence talents will become an important mission of education. At the same time, the mode of education will also change with the development of artificial intelligence Integration will become the development trend of the future education world. The future has come, when education and artificial intelligence meet, what kind of sparks will collide? This paper mainly discusses the application, research status and development trend of artificial intelligence in the field of education, as well as the deep integration of artificial intelligence and education.

Keywords: Artificial intelligence · Artificial intelligence + education · Deep integration · Future education world

1 Introduction

Artificial intelligence, referred to as AI. In 1965, at a two-month seminar held at Dartmouth University, the term "artificial intelligence" was put forward for the first time, which marked the formal birth of the emerging discipline of "artificial intelligence". Artificial intelligence, referred to as AI. In 1965, at a two-month seminar held at Dartmouth University, the term "artificial intelligence" was put forward for the first time, which marked the formal birth of the emerging discipline of "artificial intelligence". The essence of artificial intelligence is to simulate the information process of human thinking. Its precise definition is: a computer system has human knowledge and behavior, and has the ability to learn, infer, judge, solve problems, memorize knowledge and understand human natural language. One of the main goals of its research is to enable machines to be competent for complex tasks that usually require human intelligence. As a branch of computer science, artificial intelligence technology has been widely used in various fields, such as machine vision, fingerprint recognition, face recognition, intelligent search, intelligent control and other applications, which have brought great changes to human life and social development. Since entering the 21st century, with the deepening of artificial intelligence research and the development of education informatization, the application of artificial intelligence in the field of education has been paid more and more attention. What kind of application does artificial intelligence have in the field of education? What role does it play in education? What's the impact?

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Since the 18th National Congress of the Communist Party of China, with the construction of "three links and two platforms" as the starting point, China's education informatization work has made breakthrough progress, and the indicators have generally doubled, contributing to the historic progress of the party and the country. "Broadband network school to school" has developed rapidly. The Internet access rate of primary and secondary schools in China has increased from 25% to 90%, and the proportion of multimedia classrooms has increased from less than 40% to 83%. More than 14 million teachers participated in the "one teacher, one excellent class, one teacher" activity, and 13 million excellent class resources were formed. The use of information technology has also solved the problem that more than 4 million students in remote and poverty-stricken areas do not have enough classes due to the shortage of teachers. "Renren Tong" has achieved a great leap forward development. The number of its opening has increased from 600000 to 63 million, and its application scope has expanded from vocational education to all kinds of education at all levels. "Public service platform for educational resources" has begun to take shape, with more than 68 million registered users in the public service system. Digital educational resources have changed from decentralized services to national interconnected service systems. "Public service platform for education management" has been fully applied, basically realizing "one school, one code" and "one person, one number" for teachers and students, and basically forming an information pattern of "two-level construction and five level application". The information literacy of teachers and students has been significantly improved. More than 10 million primary and secondary school teachers, more than 100000 principals of primary and secondary schools, and more than 200000 teachers of vocational colleges have received education informatization training. The majority of students' awareness and ability to use information technology for learning have been continuously enhanced. China's education informatization has an international influence and has been invited to share China's experience on the international platform for many times (Fig. 1).

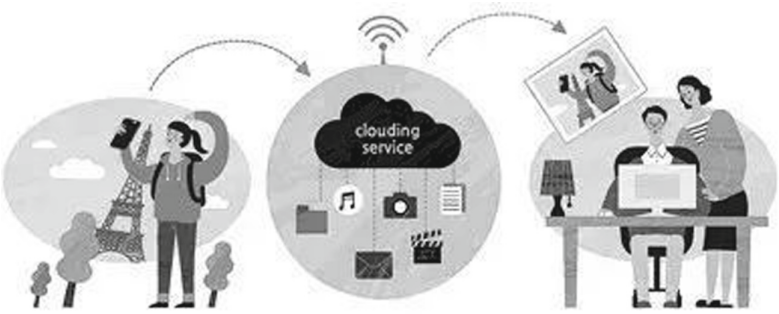

Fig. 1. Future education

2 Research Background of Artificial Intelligence Education

In the traditional teaching environment, most of our traditional education forms still stay in the stage of "exam oriented education", which ignores the high-level ability and knowledge application outside the memory. The high-cost and low-efficiency supplementary training outside the classroom also adds a great economic burden to parents. The consequence is that it increases the burden on Students' learning and even affects the development of multiple abilities And the application of the knowledge learned. It has become an urgent need to integrate artificial intelligence with education.

In 2017, the State Council issued the new generation of artificial intelligence development plan, which proposed to speed up the cultivation of high-end artificial intelligence talents, construct artificial intelligence discipline and develop intelligent education. In 2018, the Ministry of Education issued the "action plan for innovation of artificial intelligence in Colleges and universities" to promote the development of artificial intelligence from the field of higher education. In 2019, "China's education modernization 2035" was released, which proposed to accelerate the education reform in the information age, build intelligent campus, build an integrated intelligent teaching, management and service platform, and accelerate the reform of talent training mode by using modern technology. [1] With the support of relevant policies, artificial intelligence is quietly leading to a "educational reform", which not only brings opportunities and challenges to education, but also brings opportunities and challenges to teachers.

On the basis of the education goals proposed in the 2030 agenda for sustainable development, UNESCO adopted the education 2030 action framework on November 4, 2015, which makes specific plans for the realization of the 2030 education goals, namely "towards inclusive, fair and quality education and lifelong learning for all". Teaching 2030 points out that the teaching ecology will change: the progress of cognitive science and technology enables teachers and students to carry out immersive personalized learning. Teachers will combine the new findings of brain research and cutting-edge technologies to improve teaching, and customize personalized learning programs based on students' learning styles and needs; learning will focus on critical thinking and problem solving, communication skills and cooperation skills And 21st century skills centered on creativity and innovation skills. Germany, Finland, Canada, Japan and other countries have put forward new vision and goals for future education. "China's education modernization 2030" is being formulated. The focus of attention of all countries in the world can be summarized as follows: personalized learning of students, diversification of teachers' roles, scientific research based on brain and cognition, informatization of education and learning methods, diversified evaluation based on big data, and learning The integration of school, family and community. The realization of these goals and contents depends on the scientific basis.

The relevant data shows that in some places, only nearly half of the students in grade two of junior high school are short-sighted, 22% of the students are unwilling to go to school, 15% of the students are seriously tired of learning, and more than half of the students make up classes outside school. These problems directly affect the healthy growth of children and adolescents, affect the happiness of every family, and affect the

level of human capital and the long-term development of our country Quantity. There are many problems in education within a certain range, such as "attaching importance to knowledge and neglecting ability", "attaching importance to intellectual education and neglecting moral education (lack of social participation and practice)" "emphasizing results and neglecting process", "emphasizing transmission and light exploration", "emphasizing unity and neglecting individuality". The essence of the contradiction lies in that we still rely on the original experience and our own experience to interpret the new needs of education in the new era, lack of scientific data support, and it is difficult to describe the characteristics of learners in the new era; educators at all levels lack sufficient data model support for the motivation system and educational principle of education in the new era; the paradigm of education system research still stays in the empirical method Can carry out personalized learning in depth on the existing basis. The solution of these problems needs the support of big data and the research of new education theory.

One core idea and two basic principles are the key to promote the modernization of education. One of the core concepts is to promote and serve the reform and development of education as the fundamental purpose of education informatization, and to promote the deep integration of information technology and teaching practice as the core concept. The real essence of educational informatization is integration rather than technology. The key to integration is not from construction, but from application. The two basic principles are to adhere to application driven and mechanism innovation. On the one hand, it is application-oriented, creates application environment through infrastructure construction, expands application channels through teaching and scientific research, promotes application efficiency through training, and improves application level through evaluation. On the other hand, we should pay attention to mobilizing the whole society to promote education informatization, especially to play the role of the industry, not only relying on the power of the government. In recent years, educational informatization has made great achievements, mainly relying on mechanism innovation. Adhering to the "two legs" of the government and the market, "invisible hand" and "visible hand" work together to explore and form a working mechanism of "government policy support, enterprise participation in construction, and schools focusing on application".

Artificial intelligence will accelerate the profound reform of education in the future.

The modernization of education is inseparable from the strong support of modern science and technology. Information technology has a revolutionary impact on the development of education. Driven by the new theories and technologies such as mobile Internet, big data, supercomputing, sensor network and brain science, as well as the needs of economic and social development, the rapid development of artificial intelligence has shown new features such as deep learning, cross-border integration, human-computer collaboration, open group intelligence and autonomous control, which promotes the rapid leap from digitalization, networking to intelligence in all fields of economy and society.

3 Application of Artificial Intelligence in Education

One of the biggest challenges of education is that everyone's learning style is different. It is difficult for teachers to accurately grasp the real learning situation of each student, which leads to the teaching design and teaching process, and it is difficult to focus on the real learning needs of each student, resulting in the waste of energy, time and teaching resources. The artificial intelligence system can provide personalized learning methods for each learner, so that each student can learn in the most suitable way for himself, accurately record the learning status of each student, assist teachers to realize hierarchical teaching and precise teaching, and effectively solve the core problem of teaching and learning. At present, the application of artificial intelligence in our education field mainly includes image recognition, speech recognition, human-computer interaction and so on. The application mainly focuses on tutoring, online learning, classroom teaching and so on.

The application of artificial intelligence in the field of teaching is mainly reflected in the application of intelligent tutoring system. Intelligent teaching system is a smart teaching system which integrates intelligent classroom, intelligent marking, intelligent diagnosis, intelligent treatment, intelligent preview, intelligent homework and intelligent learning situation analysis. It aims to create a good learning environment for students, so that students can easily and quickly transfer various resources and receive all-round learning services, so as to achieve the success of learning. By establishing the subject of teachers, students and teaching management, we can formulate and implement corresponding teaching strategies according to the characteristics of different students, and provide personalized teaching services for students. The distributed intelligent teaching system based on network is the latest development direction of intelligent teaching system. It can make students in different areas learn together in the virtual environment, make full use of network resources, give full play to the initiative of learners, and bring better teaching effect.

As learning becomes more paperless, AI driven learning systems will continue to become more effective and efficient. With the aid of artificial intelligence for intelligent and meaningful dialogue, learning will no longer be boring, but become children's game, truly realize game teaching and improve students' interest in learning.

3.1 Intelligent Tutoring System

Intelligent teaching system is one of the important applications of artificial intelligence technology in education, and it is the further development of computer-aided instruction (CAI) related research. The purpose of intelligent teaching system is to create a good learning environment for students, so that students can easily and quickly transfer all kinds of resources and receive all-round learning services to obtain the success of learning. The current intelligent teaching system mainly relies on the intelligent subject technology to construct. Through the establishment of teachers, students and teaching management subjects, the corresponding teaching strategies can be formulated and implemented according to the characteristics of different students, so as to provide personalized teaching services for students. The distributed intelligent teaching system based on network is the latest development direction of intelligent teaching system.

It can make students in different areas learn together in the virtual environment, make full use of network resources, give full play to the initiative of learners, and bring better teaching effect. The biggest difficulty of traditional teaching is that it is difficult for teachers to accurately grasp the real learning situation of each student, which leads to the teaching design and process, difficulty in focusing on the real learning needs of each student, resulting in the waste of time, energy and teaching resources. The intelligent learning platform can comprehensively and accurately record the learning status and effect of the whole class, quickly and accurately help teachers analyze the gains and losses of each link, so as to timely and effectively adjust teaching strategies, help teachers realize hierarchical teaching and accurate teaching, change from empirical type to scientific type, effectively solve the core problems of both teaching and learning, and truly achieve teaching Long.

3.2 Intelligent Network Examination System

At present, paperless examination has become an important new form of examination. In a broad sense, paperless examination includes the use of computers to establish and manage the question bank, topic selection, examination and marking. It not only innovates the traditional paper examination in form, but also improves the design and evaluation of the examination. The intelligent network test paper system has the advantages of low cost, low efficiency, good confidentiality and high consistency. Even in the case of many restrictions, it can still generate the test paper according to the given strategy. At the same time, the test question bank based on the network can collect the classic exercises written by teachers, centralize and share the success of teachers' labor, and ensure the high quality of test papers. The paper marking system based on artificial intelligence can effectively identify test papers, reduce the possibility of errors, and greatly improve the efficiency of marking process.

3.3 Intelligent Decision Support System

Intelligent decision support system is one of the important applications of artificial intelligence. It combines artificial intelligence with decision support system. The application of expert system enables decision support system to make full use of human knowledge, such as descriptive knowledge about decision-making problems, process knowledge in decision-making process, reasoning knowledge in solving problems, and helps to solve complex problems through logical reasoning Decision making. The intelligent decision support system is mainly composed of database, model base, method base, man-machine interface and intelligent components. At present, the intelligent decision support system has become the main development direction of the decision support system, and shows a strong development potential and bright prospects in the application of network education.

3.4 Intelligent Simulation Technology

In the distance education teaching, experimental teaching is an indispensable teaching link, but at present, the network teaching platform based on teaching and educational

administration management rarely involves the experimental teaching content. Intelligent simulation technology is a high integration of artificial intelligence and simulation technology. It strives to overcome the limitations of traditional simulation models and modeling methods, as well as the problems of modeling arduous, monotonous interface and inexplicable results. To some extent, intelligent simulation system can replace simulation experts to complete the steps of modeling, designing experiments, understanding and evaluating simulation results, and has certain learning ability. Using intelligent simulation system to develop experimental teaching courseware can greatly save manpower and material resources, reduce development cost, accelerate development speed and shorten development cycle.

4 The Role of Artificial Intelligence in Teaching

4.1 Artificial Intelligence Makes Traditional Classroom More Intelligent

The application of artificial intelligence to education can make teachers free from the tedious and repetitive mechanical work, so that they can have more time and energy to pay attention to the cultivation of students' high-level thinking and innovation ability, and make "teachers" become real "masters" and "coaches". Teachers are no longer merely imparters of knowledge, but teaching service providers to meet students' personalized needs and growth consultants who design and implement customized learning programs.

When the machine can think, what kind of ability should we cultivate students?

(1) The ability of autonomous learning. The most basic ability of human beings is autonomous learning. In a rapidly changing society with constantly updated knowledge, machines have learned to learn autonomously. If students lack the ability of autonomous learning, they will be difficult to adapt to the challenges of the intelligent age.
(2) Ability to ask questions. It is not difficult for machines to ask simple questions based on experience, but it is difficult to replace human beings with deep-seated problems in the short term, especially driven by curiosity and interest.
(3) Interpersonal skills. Machine to machine communication is mainly realized by machine language, and the core quality of interpersonal communication is mainly based on self emotion control ability and judgment ability of others' emotion.
(4) The ability of innovative thinking. Innovative thinking is reflected in the innovation of methodology to a great extent, while the methods and rules of machine learning are artificially prescribed, so it is difficult to transcend and realize self innovation.
(5) The ability to plan for the future. How to balance the reality and the future is an important embodiment of human wisdom. Artificial intelligence can help us solve many existing problems and provide good services, but it may not be able to make a good judgment on the future.

4.2 Sharing High-Quality Teaching Resources Across Time and Space

International surveys and studies have been conducted to analyze the possibility of more than 360 occupations being replaced by artificial intelligence in the future, ranking all walks of life. The results show that the education profession is very backward, and the possibility of teachers being replaced is only 0.4%. This shows the particularity of education, teachers have the uniqueness that is difficult to be simply replaced by machines. However, if we fully consider the impact of the deep development of artificial intelligence, this situation may change significantly. If intelligence develops further and personalization is realized, it will be a completely different situation. It can be predicted boldly that in a few years, if a highly integrated and personalized robot like intelligent assistant is realized, the teaching team will face another prospect, and many teachers may be replaced. Of course, this replacement is not absolute. The combination of human and computer may be a common form in the intelligent era, and the education of human-computer integration may be the general form of education in the future.

Through information technology to achieve the sharing of high-quality education resources, improve the quality of teaching, which is also the evidence of further promotion of information-based teaching mode in China.

4.3 In the Open Education Environment, the Educational Scene is no Longer Limited to the Classroom

Artificial intelligence can bring unusual experience to teaching. Applying artificial intelligence to education can make education no longer limited to classroom, but also organically connect schools, society and enterprises, so that students can get more open and diversified education.

5 Research Status and Development Trend of Artificial Intelligence Education

Artificial intelligence has been developed for more than 60 years. It is widely used in all walks of life, especially in the education industry. Companies are using AI technology and big data to help students learn and explore personalized education. For example, Polaris uses AI to build an AI assisted teaching system “Polaris AI”, ape tutoring has launched AI marking product “little ape mental arithmetic”, and homework box has released all AI course products “small box classroom”.

In 2018, Yixue Education released the “squirrel AI” intelligent adaptive system. The product will focus on online general practice counseling in primary and secondary schools. With the help of squirrel AI intelligent adaptation system, students can scan knowledge loopholes according to students’ online learning data, help students find and fill in the gaps, and improve learning efficiency. This year, the technology president of Tal said that the construction of open and innovative platform for intelligent education has made initial progress Under the framework of the new generation of AI open innovation platform of smart education country, tal education open platform will unite

industry partners with continuous and in-depth openness to create a better future for the education industry. On August 12, 2020, the Artificial Intelligence Education Alliance was established in Qingdao. Hisense will contribute to the in-depth integration of "Ai + education". Nowadays, AI intelligent adaptation education is no longer a new thing. Up to now, there are more than 100 companies and more than 100 million users in the world. Enough to see the rapid development speed.

Under the condition that the quality of innovative education is determined by new technology, the education and teaching system must thoroughly reform the traditional education concept. The technology applied in the field of education should not be just cold, auxiliary and non connotative machines and equipment, but should be interactive partners with temperature, connotation, individuality, emotion, thinking, vitality and creativity. [2] With the rapid development of big data, cloud computing and the blessing of 5g, it can be predicted that artificial intelligence technology will play an immeasurable role in the future education world, and will completely change the teaching situation, so that individualized teaching and precise teaching will become a reality.

6 Conclusion

In fact, the essence of artificial intelligence education is to simulate an excellent super grade teacher and give students one-to-one personalized counseling. In the future, artificial intelligence will certainly help all people to carry out lifelong learning. Future education is the cooperation between human and artificial intelligence. The new technology with artificial intelligence as the core will be integrated with teaching and become the next core driving force. [2] New technology not only changes people's study, work and life, but also brings new opportunities for the innovation and development of education. In a word, with the continuous progress of artificial intelligence, artificial intelligence in the future education world will have broad prospects for development and more extensive application, so as to continuously promote the development of education in China.

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