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Shaping the Future: Implementing Artificial Intelligence in the Shift to Education 4.0

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Abstract:

With the rapid advancement of the Internet and smart terminal devices, human civilization has transitioned from the 'machine industry civilization' era to the 'information intelligence civilization' era. Within the conventional educational framework, educators are tasked with both conducting scientific research and fulfilling frontline teaching responsibilities. This dual role imposes certain constraints on the exchange of information between teachers and students and hampers the advancement of educational research. Addressing the challenge of balancing these responsibilities, minimizing the hidden costs associated with teaching, and enhancing the societal benefits derived from educational research has become a critical and pressing issue. This paper explores the application of artificial intelligence in education and proposes the 'Education 4.0' model, aiming to offer innovative solutions for contemporary educational reform.

Keywords:

Artificial intelligence, Education 4.0.

1. The definition of Education 1.0-4.0 [1]

(1) Education 1.0

At this time, after human being entered the era of ‘agriculture and husbandry civilization,’ papermaking and printing have also developed and popularized, accompanied by the formation of the 1.0 era of education. The teaching methods during this period were mainly face-to-face teaching and independent reading activities. The main institution in education were teachers and students. The main educational organizations were government-run institutions and old-style private schools.

(2) Education 2.0

After mankind entered the era of ‘industrial civilization’, the emergence and popularization of radio, television and paper media played a certain role in promoting the development of the education industry. In addition to face-to-face teaching and independent reading in the 1.0 era, the teaching methods of this period also added methods such as listening to radio and watching videos. The main participating organizations of its educational activities are mainly national modern schools, supplemented by private educational institutions. The direct participants in the education process are still teachers and students.

(3) Education 3.0

With the rapid development and popularization of Internet technology and multimedia technology, the education industry has changed again. The teaching methods of this period increased online learning, intelligent terminal learning, etc. in the 1.0 and 2.0 periods. In addition to the National schools and private educational institutions, the direct participation in education also increased the freely created organizations such as the learning community. Learning methods have increased online teaching based on the face-to-face approach, but the direct participants in education are still teachers and students.

(4) Education 4.0

With the rapid development of intelligent terminal technology and artificial intelligence technology, the education 4.0 model refers specifically to a new type of education model with artificial intelligence technology as the main carrier. Under this model, the education organization and teaching methods are basically the same as those of education 3.0. The direct participants in education become artificial intelligence and students. The role of "teacher" created through the network database replaces the original human teaching workers, frees teachers 'manpower, enhances teachers' scientific research energy to the greatest extent, and enhances social scientific research power.

2. Development status of artificial intelligence industry

2.1 Opportunities for the development of artificial intelligence in China

2.1.1 Macro planning of national strategies

China has issued corresponding policies and regulations at the national level to support the development of artificial intelligence. The release of the national development plan for the new generation of artificial intelligence, the three-year action plan for promoting the development of the new generation of artificial intelligence industry (2018-2020) and the white paper on the standardization of artificial intelligence (2018 edition), all reflect the great importance attached by the Chinese government to the development of artificial intelligence technology. Of the three years to foster a new generation of artificial intelligence industry action plan (2018-2020) [2] points out that in market demand, for traction, actively cultivate artificial intelligence and innovative products and services, promote the industrialization of artificial intelligence technology, to promote intelligent products in the industry, medical treatment, traffic, agriculture, finance, logistics, education, culture, tourism and other fields of application integration. By the end of 2018, more than 20 provinces have issued special ai support policies, and China has formed a development pattern of regional head traction and blooming flowers in ai. From the top-level design of the country to the special support of local governments, it is not difficult to see that China's artificial intelligence development plan is being seek improvement in stability, gradually implemented.

2.1.2 Relevant technologies advance by leaps and bounds

China's computer operation speed, Internet technology and big data analysis technology have made rapid progress and made great progress. At present, China's independent research and development of ‘Sunway taihulight’ supercomputer, its computing speed ranked first in the world, the highest speed of 1.25 billion times/s, continuous computing speed can be stable at 930 million times/s, for China's artificial intelligence technology research and development to provide technical support; China's Huawei has its own research and development of 5G technology, and has the world's first 5G base station core chip -- Huawei tiangang, committed to creating a minimalist 5G, boost China's 5G technology in the forefront of the world, to provide rapid network support for the further development of artificial intelligence technology; The reality of China's large population base determines that China has a large number of resources in big data analysis, which provide data support for the progress of artificial intelligence deep learning technology. In a word, the development of these technologies provides technical support for the implementation of China's ai strategy, and enhances the confidence of scientific research workers who struggle at the forefront of AI.

2.1.3 Comprehensive cultivation of relevant talents

With China's ‘211 project’, ‘985 project’, ‘double top university’, ‘relying on science and education’ and other related support the policy of our country's higher education development strategy, policies and regulations and the implementation of China's higher education has achieved rapid development, the subject system more perfect, more inter-disciplinary talent, has a large number of good mathematical foundation of talents, all of these provide intellectual support for the development of artificial intelligence technology in our country, the reserve talented person. At the same time, the cooperation between higher vocational colleges and the way in artificial intelligence education plays a great role, enterprise's abundant capital and demand for cutting-edge technology organic combination with outstanding research capacity of colleges and universities, and to cultivate excellent scientific research personnel to provide the financial support and faculty, also promoted the

development of artificial intelligence research in China team's growth and development. For example, Baidu research institute, founded in 2013, focuses on artificial intelligence and promotes the development of artificial intelligence and talent training. In 2017, Alibaba established dharma institute to recruit talents from top universities at home and abroad, increase investment in research and development in the field of artificial intelligence, and cultivate new high-tech talents engaged in artificial intelligence technology.

2.1.4 Increasing market demand

Artificial intelligence as the core power to promote a new round of industry change, integration development, working with all walks of life in the field of intelligent manufacturing, intelligent household, financial, retail, transportation, security, health, education, logistics industry from all walks of life got must apply, occupy a certain market share, power transformation and upgrading of traditional industries. In addition, China's aging population, increasingly prominent traffic congestion and people's yearning for and pursuit of a better life, and other practical needs, are becoming a new market demand for the development of artificial intelligence technology. All these indicate that China's ai market is in great demand with a promising prospect.

2.1.5 The research and development atmosphere are increasingly strong

The large-scale science challenge program ‘smart man’ jointly sponsored by CCTV and the Chinese academy of sciences has aroused a heated discussion on artificial intelligence. The program shows many cutting-edge scientific and technological products to the audience, which not only shocks the audience, but also achieves good communication effect and creates a social atmosphere for the research and development of artificial intelligence. In addition, at the opening of the two sessions in 2019, the CPPCC national committee li proposal, led by government departments, organize experts and representatives, users and the public in the field of related party, for the research of ethics of artificial intelligence and the top-level design, make artificial intelligence in promote the well-being of the people's livelihood improvement, promote healthy development of the industry, etc., can play a bigger role. Baidu's driverless technology, China's construction of a national open and innovative AI platform for urban brain based on Alibaba, Tencent’s intelligent healthcare and other Internet companies' investment in AI research and development all indicate that China's AI boom is taking shape and the research and development atmosphere is getting increasingly thick.

2.2 Challenges in the development of artificial intelligence in China

2.2.1 The development of artificial intelligence is in conflict with the current social development

With the continuous upgrading of artificial intelligence, its use range is more and more widely, it will impact on the traditional industry, make the bed in the same industry upgrading, automation, mechanization of agriculture, industry and service industry and the intellectualized degree is higher and higher, the original the laborers engaged in simple, repetitive will face unemployment risk, due to the comprehensive quality is poorer, this type of laborer is difficult to find a new job, become a hobo, therefore, in quite some time, if the improper disposal, the unemployment rate will continue to rise in our country. In this way, on the one hand, it will aggravate the financial burden of the state; on the other hand, it will bring social unrest, which is not conducive to social stability and national development. Therefore, the development of artificial intelligence is in conflict with the current social development.

2.2.2 Relevant laws and regulations have not been improved

Due to the late start and fast development of artificial intelligence in China, it is difficult to develop relevant laws and regulations at the same pace with its development speed, resulting in a lag. Therefore, in the process of the development of artificial intelligence, there are also some examples that conflict with the current system. For example, in November 2017, robin li, the founder of Baidu, received a fine from the traffic police for taking the fifth ring road in Baidu's newly developed driverless car. This is enough to show that many current regulations and rules are not formulated for

artificial intelligence products, and there are many inconsistencies in them. Therefore, it is urgent to formulate corresponding legal norms for artificial intelligence technology products.

2.2.3 In terms of data platform construction, information islanding exists. [3]

Obviously, if the ai deep learning technology wants to make a breakthrough, it must be based on a large number of data algorithm training. However, at present, China has not yet built an artificial intelligence data platform with a unified national nature. All kinds of information data are owned by various institutions and enterprises, and there are no obvious problems such as fragmentation and islanding of data in the establishment of a unified data sharing platform.

3. The application of artificial intelligence in education

From kindergarten to university, whiteboard teaching has become very common, and multimedia teaching tools have gradually replaced the original chalk and blackboard. With the growing maturity of artificial intelligence development technology, it has produced certain effects in the field of education and will bring more changes in the future.

(1) Teaching class simulation

In the teaching process, the instructor can use AI technology such as VR to seamlessly connect the learning environment with the life scene, provide intelligent teaching services and enhance the teaching effect. [4]

At present, the application of virtual reality technology in education mainly focuses on supporting learning environment creation, skills training, language learning and special children's education. Virtual reality technology can mobilize the learner's vision, hearing, touch, smell, taste, etc., so that learners can be put personally into the scene, thus enhancing the ability to feel. The potential of virtual reality technology in the field of education stems from its advantages in stimulating learning motivation, enhancing learning experience, creating psychological immersion, achieving contextual learning and transferring knowledge.

(2) Teaching resource sharing

Now in the era of big data, after entering keywords in search engines, the network will automatically push the students with problems and knowledge points of the highest search rate. It is conceivable that scholars can directly understand the path and method of self-learning through big data after many years, so that the learning method can be adjusted in time to achieve the effect of multiplying with less effort, that is, to realize personalized intelligent service.

In addition, colleges and universities have now opened online video courses such as MOOC, aiming to break the limitations of time and space through online distance learning, and provide convenient learning conditions for college students and even students all over the world.

(3) Improve teaching fun

The robotic events held regularly by colleges and universities not only add to the fun of college students competing in the same stage, but also encourage students to constantly improve themselves in the process of designing and making robots, so as to gain a sense of accomplishment.

The small robot named ‘Xiao Du’ is the star representative of many other robots. It was born in Baidu Natural Language Processing Department. It was first presented to the public on September 16, 2014. Later, it showed outstanding skills in language communication, information processing and service. It has become extremely popular among the public. Once such robots are put into teaching, it is believed that it will improve the students' curiosity and the convenience of finding answers.

(4) Reduce teaching burden

Nowadays, online scoring has become common, which greatly reduces the burden on teachers, enabling them to free up more time and energy to conduct research on topics, improve the quality of education, and pay attention to students' psychological changes. Moreover, many office software also

comes with functions such as correcting grammatical errors, which reduces the amount of calibration work for teaching staff.

Artificial intelligence is produced by human research in response to human needs. Therefore, artificial intelligence should be used in the field of education to maintain the slogan of 'people-oriented and learning through play'.

4. Research conclusions

(1) Feasibility

With the swift advancement of science and technology, the Education 4.0 model, driven by artificial intelligence (AI), has become an attainable future. The ongoing evolution and reform of educational methods align progressively with contemporary societal needs and trends. AI introduces a novel perspective and potential to education. Surveys conducted by Alibaba and other technology hubs, as well as secondary schools, have substantiated the potential integration of AI into classrooms. Education 4.0 holds significant practical value, and its advancement is likely to be recognized as a pivotal milestone in the near future.

(2) Development

The innovation embodied in Education 4.0 signifies a more comprehensive and deeply customized teaching model. Leveraging powerful data processing systems, AI can tailor the most appropriate teaching methods to individual student characteristics, facilitating more specialized guidance for students pursuing their interests. Early direction in talent development can lead to a more refined educational system. AI also allows educators to devote more energy to scientific research, which is crucial for societal advancement. Professional student training, underpinned by AI, fosters a robust impetus for societal development by continually cultivating talent.

(3) Challenges

The substitution of traditional teaching methods with AI poses significant challenges to the teaching profession. In primary, middle, and high schools, AI can replace the transmission of fundamental knowledge, thereby exerting pressure on teachers to enhance their skills. Educators must adopt a higher-level approach to teaching, focusing on exploration and innovation, areas that remain irreplaceable by AI.

(4) Innovation

Current multimedia teaching exemplifies the synergy between technology and traditional education, marking the transition from Education 3.0 to 4.0. AI teaching can offer personalized, one-on-one learning experiences, increasing student engagement and interest in new knowledge. AI teaching methods, which integrate videos, images, and other visual materials, are more memorable than text-based instruction alone. With technological advancements, tools like holographic projection and augmented reality (AR) can be extensively applied to education, making learning more dynamic and immersive, and providing students with a richer, more engaging educational experience.

(5) Areas for Improvement

Despite the rapid advancements in AI, many tasks that require human intervention remain challenging to automate. While AI can handle fundamental educational tasks, higher-order responsibilities, such as risk analysis and innovative research, still necessitate human cognition. AI relies on continuous data computation and information processing, and not all tasks can be resolved through simple calculations. Educators are still essential for guiding students in conducting in-depth analysis and critical thinking.

The innovation of the Education 4.0 model is an inevitable progression, yet the integration of human intelligence with AI is a complex issue that requires further exploration. This innovative model

provides substantial impetus for scientific research within society.

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