

Exploration of the Teaching System of Basic Education in the Era of Artificial Intelligence

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Abstract. Artificial intelligence technology is a strategic technology produced by the information age. It is the key technology to lead scientific and technological innovation, promote industrial transformation and accelerate economic development. The development and application of artificial intelligence has provided a good opportunity and technical support for the reform and innovation of basic education in China. In this context, it is necessary to accelerate the reform of basic education curriculum teaching system and adapt to the development of the era of artificial intelligence. This paper briefly introduces artificial intelligence, points out its role in promoting basic education curriculum teaching in China, and discusses the reform of basic education curriculum teaching system from different perspectives, which has guiding and reference significance.

Keywords: artificial intelligence; basic education; teaching system; information literacy; change.

1. Introduction

For China's basic education cause, the arrival of the era of artificial intelligence is both an opportunity and a challenge. The application of various intelligent and digital technologies provides more possibilities for the basic education and teaching reform, but it also puts forward new requirements for the basic education and teaching from the aspects of teachers' literacy and information security^[1]. In order to give full play to the advantages of artificial intelligence and accelerate the development of basic education in China, it is necessary to promote the reform of the teaching system and make artificial intelligence become a major boost to the modernization of basic education.

2. Overview of artificial intelligence

Artificial intelligence, also known as AI technology, belongs to a new branch of technology and science in computer science. It is mainly for the research and development of the theories, methods and technologies of how to simulate human intelligent behavior with the help of computer software and hardware. The concept of artificial intelligence can be understood from the two aspects of "artificial" and "intelligence", among which "artificial" mainly refers to the creation of human itself or artificial intelligence, while "intelligence" includes thinking, self, consciousness and other aspects. Artificial intelligence involves a wide range of disciplines, including computer science, linguistics, psychology, etc. With the continuous deepening of research, artificial intelligence has gradually been widely used in machine vision, intelligent control, face recognition, fingerprint recognition, mechanical recognition and other fields. China's "Internet +" three-year AI Action Implementation Plan issued in 2016 and the Development Plan for the New Generation of Artificial Intelligence issued in 2017 both stressed the need to accelerate the development of AI technology and lead scientific and technological reform and industrial transformation. In this context, when carrying out basic education work, we need to seize the development opportunities, keep up with the development pace of The Times, accelerate the integration of artificial intelligence and basic education, promote the reform of teaching system, and cultivate social talents with the ability to explore and practice and innovation^[2].

3. The promoting effect of artificial intelligence on the teaching of basic education courses in China

For the teaching of basic education curriculum in China, the introduction of artificial intelligence is of great significance, and its role is mainly reflected in the following aspects:

3.1 It is conducive to improving the teaching quality

The construction of a high-quality education system is an important task proposed in the 14th Five-Year Plan. The use of artificial intelligence technology can build a modern basic education system, which is conducive to the improvement of teaching quality and teaching level^[3]. Artificial intelligence technology can be introduced in the whole teaching process: before class, with the support of intelligent system to help teachers prepare lessons, improve lesson preparation efficiency and quality, the intelligent interactive system can master the specific learning situation to facilitate targeted teaching, the teacher can correct the homework, students can also conduct independent learning, truly realize the improvement of teaching quality in each link. For example, when conducting lesson preparation and teaching and research, teachers can collect lesson preparation materials from the Internet through the intelligent lesson preparation system. While integrating online education resources, they can also carry out online collaborative teaching and research, break the space-time limitation, greatly shorten the lesson preparation time, and can also obtain high-quality and comprehensive lesson preparation resources.

3.2 It is conducive to accelerating the reform of teaching methods

The "artificial intelligence + education" model can promote the teaching reform of basic education in China and make great changes in teaching methods. In the field of basic education into artificial intelligence technology, can break from the perspective of time and space, the traditional education mode of the restriction of teaching activities, changed the role of teachers and students, more highlight the central position in the teaching activities, emphasize students' active learning, independent inquiry, hands-on operation, the teacher from the guide, and help students to form a systematic and comprehensive knowledge system. Moreover, students' learning style will also change. Artificial intelligence technology can be used to build learning situations, attract students' attention, arouse their learning interest and enthusiasm, and lay a good foundation for the occurrence of learning behavior. Meanwhile, students' learning characteristics and learning needs, so that students can get substantial improvement^[4]. All these have changed the traditional teaching methods, in line with the requirements of quality education and people-oriented education concept.

3.3 It is conducive to the deep sharing of educational resources

In the era of artificial intelligence, data transmission and data sharing are more convenient. And the deep sharing of high-quality educational resources can be realized with the help of artificial intelligence technology, which is of great significance to improving the unbalanced distribution of educational resources and breaking down educational barriers. The shared education mode formed and supported by artificial intelligence technology can build a learning bridge inside and outside the school, and broaden the reception area of students' knowledge. At the same time, it can also establish a resource sharing channel, so that educational resources can be more widely used, which is conducive to the balanced development of basic education. For example, the introduction of artificial intelligence technology in remote rural areas and the building of VR virtual classrooms can build teaching situations such as museums and cultural centers in Chinese classrooms, so that students can get a more real learning experience and deepen their understanding and mastery of the knowledge they have learned. In addition, AI technology can also enable teachers to form a double-teacher education model in remote and backward areas such as rural and mountainous areas, realize the sharing of high-quality teacher resources, and improve the teaching level and teaching quality.

3.4 It is conducive to promoting students' personalized development

The combination of artificial intelligence and basic education has repositioned the roles of teachers and students, and highlighted students' active position in class, which helps to cultivate their independent learning ability. At the same time, it can also provide students with targeted learning methods and learning resources, and promote their personalized development. Artificial intelligence technology can be used to analyze students' learning situation, provide personalized learning plans according to their learning characteristics and learning dynamics, and accurately push forward educational resources, so as to meet students' actual learning needs, so that students can learn something and gain something. At the same time, teachers can assign targeted homework according to students' individual differences through the personalized homework system, so as to achieve the phased and hierarchical teaching effect and promote the growth and development of students^[5]. In addition, in terms of educational evaluation methods, students' learning information can be collected and recorded through intelligent hardware equipment, and monthly and quarterly reports can be formed to ensure the objectivity and effectiveness of teaching evaluation, facilitate teachers to adjust the teaching programs, and realize the personalized development of students.

4. The path of reform of basic education curriculum teaching system in the era of artificial intelligence

For the teaching of basic education curriculum in China, the promotion and application of artificial intelligence technology is in line with the needs of education reform and development, and can accelerate the transformation of basic education towards informatization and modernization. In this regard, it is necessary to actively explore a scientific path, promote the reform of the basic education curriculum teaching system, and improve the teaching level and teaching quality of the basic education.

4.1 Repositioning of the talent training objectives

"Cultivate all-round development" is the goal of basic education, usually in the sense of "comprehensive development", refers to the beauty of various aspects of coordinated development, but "comprehensive development" concept of general, broad, and different period background of talent training requirements are different, "cultivate all-round development" should conform to the development of The Times, to meet the social demand for talents. Therefore, starting from the era of artificial intelligence, it is necessary to reposition the goal of talent training in promoting the reform of the basic education curriculum teaching system in China. First of all, having a high information technology literacy is a necessary ability for new talents in the 21st century, and it is also the basic requirement for talent training in the era of artificial intelligence. When setting the teaching objectives of basic education courses, we should not only pay attention to the cultivation of students' subject and cultural literacy, but also help students to accumulate rich information knowledge, master information technology skills, so that they can have high information literacy. Secondly, in the basic education course teaching, the cultivation of students' general literacy is particularly important, including critical thinking ability, innovation, problem solving ability, critical thinking is the basis of innovation, and innovation and creation is artificial intelligence background requires students have a ability, in the teaching process should respect students' ideas and personality, guide it through distinctive ideas, language, action, make students form critical thinking, to create favorable conditions, meet the requirements of artificial intelligence era of talent^[6]. In addition, in the artificial intelligence environment, more emphasis is placed on the importance of learning ability, and all countries pay special attention to the cultivation of students' lifelong learning ability. This requires helping students in the basic education stage to establish a strong sense of lifelong learning, develop good learning habits, master scientific learning methods and learning skills, and then improve their lifelong learning ability, which is also one of the goals of basic education curriculum teaching in China in the era of artificial intelligence.

4.2 Formulate artificial intelligence curriculum standards

When integrating artificial intelligence into the teaching system of basic education curriculum, it is necessary to formulate artificial intelligence curriculum standards in combination with the talent training objectives, so as to provide a reliable basis for textbook compilation and teaching development, and ensure the effectiveness of teaching. At present, for the curriculum of artificial intelligence did not form a unified standard, the existing relevant standard cover scope narrow, is only involves part of the content of artificial intelligence, the artificial intelligence curriculum construction is difficult to guide and standard role, cause artificial intelligence teaching scope generalization, teaching content of good and bad are intermingled, cannot realize the effective cohesion and integration of basic teaching courses. In this regard, in the process of reforming the teaching system of the basic education curriculum in China, it is necessary to formulate scientific standards and unified norms for the artificial intelligence curriculum, and form a systematic guidance for the development of the specific teaching work. From the perspective of students themselves, should follow the law of education, respect students' individual differences, according to the law of physical and mental development, combined with the characteristics of basic education curriculum and teaching objectives, to promote students' diversification, personalized development, make matching artificial intelligence curriculum standards, to ensure that it can meet the needs of students' growth and development. From the perspective of society, we should give full play to the guiding function of the government, comprehensively deepen the school-enterprise cooperation, strengthen the cooperation and cooperation of all sectors of society, and formulate the operable AI curriculum standards based on the needs of social talent training and the employment requirements of employers to ensure its scientific and reasonable. Starting from the background of the era of artificial intelligence, considering the influence of technological innovation, industry changes, policy adjustment and other factors, formulate highly flexible and forward-looking AI curriculum standards, so that they can fit with basic education and teaching, and keep up with the development pace of The Times.

4.3 Integrate into the artificial intelligence teaching content

The reform of the teaching system of basic education must be realized by a good curriculum system, which should pay attention to the integration of artificial intelligence teaching content. On the one hand, artificial intelligence content or digital education content can be integrated based on the existing curriculum content, combined with the characteristics of different disciplines, so that students can learn information knowledge and technical skills while mastering cultural knowledge. Taking the Middle School affiliated to Renmin University of China as an example, driverless driving, deep learning and other contents are integrated into the existing curriculum system, and specific artificial intelligence projects or practical cases are combined to allow students to carry out learning, and thus improve their information literacy. For example, we combine Chinese and information technology subjects to set up natural language processing courses to strengthen students' language ability, and combine mathematics and information technology subjects to set up mathematical modeling courses to cultivate students' mathematical model thinking^[7]. When introducing artificial intelligence teaching content, we can also draw lessons from foreign teaching experience and adjust the basic education courses. Taking Japan as an example, the programming education section can be added to the various subject courses, so that the students can form the programming thinking while learning the subject knowledge. On the other hand, we should accelerate the construction of intelligent education curriculum system and actively promote STEAM education. When carrying out basic education, we should pay attention to the integration of multiple disciplines, including mathematics, science, engineering, technology, art, etc., to help students form interdisciplinary thinking, establish the connection between disciplines, strengthen students' ability to understand the integration and comprehensive application of knowledge of different disciplines, and solve practical problems. For example, can learn from Beijing wisdom teach future technology and limit the success of the company, based on the reform of the basic education curriculum teaching system to build wisdom education curriculum, covering basic theory curriculum, innovative design curriculum, practical courses,

expand application courses, etc., realize the organic combination of artificial intelligence teaching and basic education teaching. In addition, we should give full play to the carrier advantages of the information technology curriculum, integrate the artificial intelligence teaching content into the curriculum system, and improve the students' information literacy. In primary school, graphic intelligent programming and robot learning can be added to form a preliminary understanding of artificial intelligence. In junior high school, students should be added to learn AI. After entering high school, robot programming, computer language, and AI algorithm can be emphasized to cultivate students' ability to solve practical problems.

4.4 Change the teaching mode of basic education

In recent years, China has carried out a series of research and exploration on the combination of artificial intelligence and education and teaching, including automatic correction of homework, online photo answering questions, speech recognition assessment and evaluation, etc., which have achieved initial results. By 2019, the Internet access rate of primary and secondary schools in China had reached 97.6%, the multimedia penetration rate had reached 93.4%, and the opening rate of online learning space for teachers and students had reached about 60% and 50%, respectively, creating a favorable external environment for the promotion and application of artificial intelligence technology^[8]. On this basis, it is necessary to timely change the teaching mode of basic education curriculum, and make full use of artificial intelligence technology to carry out teaching activities. First of all, the school can build a virtual reality classroom to simulate the real learning situation in the classroom, so that students can have a sense of immersive experience, and then achieve the purpose of immersive teaching. Taking geography teaching as an example, virtual reality classrooms can be used to build grassland, glaciers, rainforest and other situations, so as to facilitate students to understand geography knowledge, master different terrain and landform characteristics, and improve the geography learning effect. Secondly, speech recognition and semantic analysis techniques can be introduced in basic education subjects to build a language learning context for students and improve their teaching quality. Taking English as an example, we can use the virtual AI assistant to enable students to communicate in the process of English learning, build a more real dialogue scene, correct students' wrong pronunciation, and achieve a more ideal oral teaching effect. At the same time, the teachers can carry out the oral English evaluation in the English context, to ensure the scientific and normative evaluation results, and to make a more objective judgment of the students' English learning situation. In addition, in the teaching of basic education courses, human-computer interaction technology can be used to realize the online tutoring teaching and online q & A for students, changing the limitation of fixed space and fixed time in the past traditional classroom, and making the teaching full of more possibilities. Taking the platform as an example, teachers can assign corresponding exercises and personalized homework in the pre-class preview session and after-class exercises combined with the content of the textbook, and receive the homework submitted by students in real time through the interactive platform, and then make language comments to answer students' confusion in time. In addition, the real classroom can be simulated on the learning platform, and teaching activities such as whiteboard graffiti, hand raising and asking questions, and PK of words can be carried out to achieve a more ideal teaching effect.

4.5 Create a smart classroom teaching environment

The basic education work supported by artificial intelligence should pay attention to the construction of the teaching environment when promoting the reform of the curriculum system. First of all, we should speed up the construction of smart campus and smart classroom to build an intelligent teaching environment. Basic education schools should take the education informatization 2.0 action plan, the Chinese education modernization 2035, the wisdom campus overall framework policy documents as guidance, clear wisdom campus construction goal, from the wisdom environment, wisdom teaching, wisdom management, completes the top-level design, and based on the school actual situation, follow the "adjust measures to local conditions, on-demand construction"

principle, actively use big data, Internet of things, cloud computing and other new technologies to build wisdom campus, provide environmental support for the combination of artificial intelligence and basic education teaching. Secondly, we should give full play to the role of classroom main channel and position advantages, and pay attention to the construction of intelligent classroom teaching culture. In the classroom teaching of basic courses, it is necessary to establish the wisdom-based teaching concept, emphasize the cultivation of students' thinking ability and creativity, develop the wisdom technology, such as big data, Internet of things and intelligent learning platform, improve the digital teaching equipment and facilities, build the intelligent classroom environment, optimize the teaching system according to the characteristics of intelligent classroom teaching system, and reflect the teaching process through the objective data, so as to form the corresponding teaching system to meet the requirements of intelligent classroom teaching. In addition, an intelligent education platform should be built based on artificial intelligence to realize the effect of Internet + education. Basic education schools can integrate the existing information education resources, establish an intelligent teaching platform by relying on artificial intelligence technology, promote the integrated development of education resource service platform and education management service platform, and help the teaching of basic education courses. When carrying out teaching management, the education department can use the intelligent teaching platform to understand the teaching facilities construction and teacher staffing of each basic education school, optimize the allocation of educational resources, and accelerate the deep sharing of educational resources. Schools can master the basic information of students through the intelligent teaching platform, improve the accuracy of students' classification and teacher allocation, and take this as the basis for school asset management and financial management. In the teaching process, the teachers of all subjects can rely on the intelligent teaching system in the intelligent teaching platform to analyze the students' learning characteristics, understand the students' learning process, generate the learners' models, and then develop targeted teaching plans to promote the students' personalized development; they can also objectively feedback the students' learning results through the intelligent evaluation system to improve the accuracy of the teaching evaluation.

4.6 Optimize the evaluation system of basic education

The Overall Plan for Deepening the Reform of Education Evaluation in the New Era issued in 2020 emphasizes the need to use modern information technologies such as artificial intelligence and big data to innovate evaluation tools. In this context, when reforming the teaching system of basic education curriculum, attention should be paid to the combination of artificial intelligence and basic education teaching evaluation, give full play to the advantages of artificial intelligence technology, optimize and improve the existing evaluation system, and realize the intelligent teaching evaluation. First, in the stage of basic education, schools should establish a student development database to record each student's learning and living status, learning process, academic performance, etc., as the basis for students' academic quality evaluation, combining process evaluation with outcome evaluation, to ensure the objectivity, authenticity and effectiveness of teaching evaluation. And focus on the changes of students' learning, collect the whole process of student learning data, and present it in the form of visual reports and charts, no longer simply take the test results as evaluation indicators, but use the student development database to fully reflect the students' learning situation. Second, integrate the whole teaching process data, strengthen the cooperation of various departments of the school and the communication among teachers of various disciplines, and form an institutionalized information integration mechanism. And the collected information is screened, summarized and analyzed, and the valuable content is mined to evaluate the teaching results. Then, according to the teaching evaluation results, the problems existing in the teaching process of each subject of basic education are found out, and the teaching plan and teaching plan are adjusted in time, and they give full play to the efficiency of the intelligent evaluation system. Third, attention should be paid to the cultivation of teachers' information literacy, so that they can have intelligent evaluation ability, and make accurate and objective evaluation of students' learning results through intelligent teaching

evaluation methods such as fully recording data, online teaching platform and intelligent evaluation system. Schools can use famous teacher workshops, expert seminars, theme seminars and other ways to carry out intelligent education literacy training for basic education subject teachers, change teaching concepts, learn to use artificial intelligence technology to carry out teaching, to meet the needs of intelligent evaluation of basic education curriculum teaching.

Under the background of artificial intelligence to carry out basic education work, need to reposition talent training target, artificial intelligence curriculum standards, into artificial intelligence teaching content, change the way of basic education teaching, build intelligent classroom teaching environment, optimize basic education evaluation system, etc., and realize the modernization of basic education curriculum teaching system, form a new pattern of wisdom, digital basic education.

References

- [1] Gao Li. The Practical Challenge and Path Selection of Basic Education in China in the Era of Artificial Intelligence [J]. Contemporary Education Science, 2020 (06): 86-91.
- [2] Chen Lixuan, Liu Yanxin, Li Xueli. The evolution of teaching forms under the background of artificial intelligence: Characteristics, Challenges and Countermeasures [J]. Contemporary Education Science, 2021 (01): 35-42.
- [3] Hu Qintai, Zhang Yan, Liu Liqing. Research on curriculum Reform of Basic Education: Connotation, Mechanism and Practice [J]. Journal of the National Academy of Education Administration, 2021 (09): 23-30.
- [4] Liang Yanru. Target als of Basic Education in the Era of Artificial Intelligence [J]. Contemporary Education Science, 2019 (01): 15-18.
- [5] , Zhang Guangbin. Understanding and Thinking on the Modernization and Transformation of Basic Education Curriculum in the Era of Artificial Intelligence [J]. People's Education, 2019 (11): 25-30.
- [6] CAI Lianyu, Han Qianqian. Research on the Integration of Artificial Intelligence and Education: a programmatic exploration [J]. Audio-visual Education Research, 2018(10): 27-32.
- [7] Zhang Xi, Pan Zhisong. Current situation, problems and prospects of curriculum reform in the process of intelligence [J]. Shanghai Education and Scientific Research, 2019(09): 87-90
- [8] Yin Rui, Huang Fuquan, Zeng Wenjie, Zeng Yufen, Pan Leiqiong, Chen Siyu, Wu Xiaoqi. Deep Integration of Artificial Intelligence and Subject Teaching and Creative Intelligence course [J]. Research on Open Education, 2018,24 (06): 70-80.