

Dilemmas and Opportunities Facing China's Educational Development in the Digital Era

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Abstract: *With the rapid development of today's era and the increasing level of Internet technology and digitization, how to promote the digitization of education and the construction of a learning society is an issue worth exploring. At the traditional campus stage, the teaching mode is very limited, and the digitalization of education requires the collaboration of all parties in society, schools and families to create a digital learning environment, make full use of multimedia, computers and other forms of online learning to achieve the development of teaching and learning across regions and time, and to effectively give full play to the advantages of digital technology to promote the high-quality development of digital education, and to a certain extent to promote equity in education, and to enhance the efficiency and quality of teaching and learning.*

Keywords: *Digitization of education; learning society; digital skill; Educational equity*

1. Introduction

The report of the 20th Party Congress states, "Promote the digitization of education, and build a learning society and a learning country with lifelong learning for all ^[1]." The digitalization of education refers to the use of computers, multimedia and other online learning tools, teachers and students using non-face-to-face teaching methods, guiding students to active learning, and realizing a new mode of teaching across regions and time, which is an important part of the strategy of building a "digital China". With the introduction of "China Education Modernization 2035" and other documents, standards and specifications have been made for digital education to ensure the effective implementation of the national education digitalization strategic action, which is conducive to the long-term development of China's education digitalization. For example, at the beginning of the first lesson of "Tiangong Classroom" in 2021, the astronauts of the Chinese space station Shenzhou 13 conducted space lectures, demonstrated the movement of objects under microgravity conditions and other phenomena, and interacted with the ground classroom in real time, and the development of science and technology has made education achieve a great transformation across time and space. At present, China's wisdom education infrastructure environment is basically completed, primary and secondary school campus network access rate reached 100%, 99.5% of primary and secondary schools have multimedia classrooms, in Tibet Mutuo elementary school classroom, also equipped with multimedia equipment, "smart classroom" to achieve full coverage, so that everyone learns, everywhere can learn, can learn at any time to become a reality. The "smart classroom" has achieved full coverage, making learning for all a reality. The digitization of education is conducive to the realization of educational equity and the high-quality development of education; it is conducive to the building of a learning society for lifelong learning, and it is conducive to accelerating the transformation of education and promoting reform and innovation. At the same time, however, it should be noted that learning resources in some areas are backward and there is a certain digital divide; there are also some teachers who have not mastered the correct use of multimedia teaching in a timely manner, and their digital teaching ability needs to be improved; and online classes may lead to distraction of students' attention, making it difficult for them to carry out effective learning. The development of digitalization in education faces various difficulties and requires tripartite collaboration among society, schools and families to create a digital learning environment; teachers should update their teaching concepts and society should strengthen its overall planning. We should effectively bring into play the advantages of digital technology, to achieve clear standards, strong foundation, grasp the content, strict supervision, security, vigorously promote the digitalization of education, and promote the development of modernization of education^[2].

2. The five components of digitization in education

2.1. Digitization of educational content

Educational content is the core of teaching and learning, and the first element of digital education is the digitization of educational content. Traditional education content is mainly based on paper textbooks, digital education content can be presented in the form of online courses, multimedia, etc., so that students can intuitively feel the teaching content, teachers in the classroom can be used in electronic textbooks, video images, online teaching resources and other methods, students can access learning at any time, which increases the convenience and flexibility of students' learning.

2.2. Digitization of educational methods

The traditional education method is based on teachers' lectures and students' passive acceptance. Driven by the digitalization of education, the teaching method has shifted to a student-oriented approach, emphasizing teacher-student and student-student interaction, and adopting new teaching tools, such as online classrooms, virtual classrooms, and distance education, to allow students to participate in the courses. China is also now promoting intelligent tutor systems, which use artificial intelligence to simulate experts and teachers to carry out teaching activities, enabling one-to-one teaching and improving students' interest and motivation.

2.3. Digitization of educational resources

Traditional educational resources are just teachers using the blackboard and textbooks to teach students in the classroom, while the digitalization of education has transformed the educational resources to informatization and networking, where teachers show video pictures to students in the classroom. Teachers can also use VR technology and digital libraries to allow students to immerse themselves and gain knowledge. The current state is also vigorously promoting catechism, the construction of the national wisdom of education public platform, breaking the previous education by the time and space constraints, so that students can learn at any time and any place.

2.4. Digitalization of teacher training

Teachers are an important driving force in the digitalization of education, and the construction of a digital classroom requires teachers to have the ability to apply digital technology and a high level of digital pedagogical literacy, so it is indispensable to provide digital training for teachers. Teachers' colleges are organized in the form of "1+M+N", proposing a collaborative program to improve the quality of teacher education, realizing "dual-teacher" classrooms. Enabling online apprenticeships, traineeships and internships to regularise teacher training, teachers learn the latest technology digital education concepts to enhance their teaching methods.

2.5. Digitization of student assessment

Traditional assessment methods often only evaluate students' learning achievements, while digital assessment can evaluate students' learning process, learning attitudes, and can also provide students with personalized learning programs. Chunhui Primary School in Hangzhou has independently developed the "Digital Intelligence" cockpit for students' comprehensive quality evaluation, which combines students' daily life and learning together, utilizes digital technology to conduct an all-around and all-process comprehensive quality portrait of students, effectively achieves students' quality goals, provides timely feedback on students' learning, and helps to improve the motivation for learning.

In short, these five elements are interrelated and mutually reinforcing, and together they build an overall framework for digital teaching and learning, providing students with diversified learning modes and environments to enhance learning effectiveness and quality.

3. The value and significance of the digitalization of education

3.1. Promoting equitable allocation and sharing of educational resources

The current situation of education in China shows that the level of educational development in various

regions of the country is uneven, the distribution of educational resources is uneven, and the technological gap between urban and rural areas in education is large, etc., and the issue of equity in education is one of the social problems that need to be solved urgently in our country. With the development of society and advances in computerization, new technological means have been used to gradually narrow the regional and urban-rural gaps in quality educational resources and to eliminate the digital divide in the unbalanced and inadequate development of education. General Secretary pointed out, "We will promote education equity through education informatization, so that hundreds of millions of children can share quality education under the same blue sky and change their destiny through knowledge." "This question is answered by the students of Sinqas University." Professor Xu from East China University of Science and Technology asks a question in the class "Inorganic Chemistry". In addition to more than 100 students from East China University of Science and Technology, the screen beside her also shows the classroom of Kashgar University in Xinjiang in real time, which is one of the scenes in the "Mucous Lesson Westbound Plan". The development of education digitization has promoted the full coverage of Mucous Lesson in western colleges and universities, and in 2022 alone, it will provide customized course services to 45,000 courses for western colleges and universities. In 2022 alone, 45,000 customized courses will be provided for western universities, 250 million students will be involved, and 355,000 teachers will be trained in the west. The digitalization of education breaks the limitations of time and space, realizes distance education, and removes the limitations of geographical differences.

3.2. Promoting innovation in the education model and improving the quality of education

The traditional teaching mode is that teachers and students teach face-to-face, with one chalk and one textbook going around the world, while the digitalization of education promotes the transformation of the education model and improves the quality and efficiency of teaching. Through digital tools and platforms, teachers have access to a wealth of teaching resources, including online classrooms, interactive teaching aids, electronic resources, etc., which provide teachers with new ideas and methods of teaching, as well as stimulate the interest of students in learning. Some language teachers like to play the recitation of ancient poems as well as some movie and TV clips in class, which can easily help students immerse themselves in the world of literature and increase the effectiveness of learning; To increase interactivity in the classroom, some teachers use point-and-click software to ask questions that keep students better focused and add interest; Zhu Yaoying, a lecturer at the Writing Center of Tsinghua University, commonly uses the feature of pop-ups in the classroom, which is applied in the rain classroom and sent by students in real time, which helps the teacher explain the course in a more targeted way and improves the efficiency of the classroom. As technology evolves, more and more digital technology will be used in the classroom, thus promoting innovation in educational models and interaction between teaching and learning.

3.3. Promoting the development of integrated education and building a learning society

General Secretary pointed out that "China attaches great importance to the impact of AI on education, and gives full play to the advantages of AI to accelerate the development of education that accompanies people throughout their lives, and education that is equally oriented to everyone, suitable for everyone, and more flexible." Everyone here refers to both students and adults, and also includes people with disabilities; everyone has the right to education, and our country is currently vigorously promoting the development of integrated education, so that children with special needs can grow up under the blue sky together with ordinary children. Digital education can be realized to educate everyone equally and provide strong support. For example, digital technology can be used to meet the special educational needs of persons with disabilities and reduce their psychological and physical exclusion. Using digital technology to provide personalized educational solutions to meet their reading and learning needs. Build a barrier-free digital learning environment, enrich reading methods, broaden learning channels, and innovate learning methods, so that people with disabilities can receive high-quality learning resources without leaving home. Through the digitization of education, the diverse learning needs of different people will be met, and a truly learning society will be built.

4. Key issues and challenges in the digital development of education

4.1. Inadequate pedagogical capacity for digital education

In order to carry out the digital curriculum efficiently, teachers need to be equipped with IT knowledge and teaching skills, but so far, in the digital reform of education in many schools, it has been found that there is a lack of awareness among teachers to train in digital technology, which leads to a lack of IT competence. The results of the survey on the constraints of digital teaching for teachers in vocational colleges and universities show that 53.7% of teachers believe that their ability to apply online teaching platforms and related software tools, especially tools and software related to the new generation of information technology, such as AR/VR, has yet to be improved. In a digital education environment, teachers can see student mastery in accompanying tests. However, the system generally gives often the highest score, the lowest score and the average score^[3], this kind of data in fact does not help the teacher to improve the teaching, the teacher should be more concerned about how many students did wrong, how he was wrong, and what are the reasons. Digital technology can give teachers accurate data, but more than that, teachers need to reflect outside of the classroom in order to make instructional progress and pedagogical innovations. Schools should conduct professional training and provide ongoing educational support to help teachers master digital pedagogy and motivate them to integrate digital education more actively.

4.2. Uneven development of digital education

In recent years, the digitization of education has been of great significance in promoting the high-quality development of education and helping to strengthen the country in science and technology. However, due to factors such as uneven levels of economic development and infrastructure development, geographic factors and cultural differences, the level of configuration of educational facilities in different regions still varies, and the quality of digitized educational resources is uneven. Wang Guoren, a member of the National Committee of the Chinese People's Political Consultative Conference (CPPCC) and dean of the School of Computer Science at the Beijing Institute of Technology, said, "Many areas in China, especially in remote rural areas, the network is unstable, the network speed is not high enough, and the network lag phenomenon often occurs in the classroom, which seriously affects the quality of teaching." Schools should actively seek investment in education digitization and build digital education infrastructure, including the updating and construction of computers and network equipment, to bridge the digital divide and promote the process of education digitization in rural areas.

4.3. Digital ethics in digital education

The digital transformation of education raises many ethical issues, such as privacy protection, intellectual property rights, and fairness. First of all, there is negative information pollution on the network, including network false information, spam, network violence, etc. According to statistics, the proportion of negative information in the current global Internet is not less than 50%, and reaches 80% in individual subject areas. Such information adversely affects the healthy growth of young people and jeopardizes the ecological balance of the Internet. Secondly, data security issues. In the education industry, student information, grades, teachers' work records, etc. involved are sensitive information which, if not protected, may trigger information security risks in the education industry. Finally, adolescents may become addicted to the Internet. At present, the number of Internet users in China has reached 99 million, of which 16.5 million, or 19%, are minors under the age of 18, and 2.5 million of them are Internet addicts, which seriously affects the mental health of students. Schools and communities should enhance the popularization of cybersecurity education, teach children how to identify and respond to cyber risks, and pay attention to digital ethics.

5. Exploring Strategies to Promote High-Quality Development of Digitalization in Education

5.1. Work on education and training to enhance the information literacy and digital skills of teachers and students

China's education digital transformation achievements are remarkable, advanced technology iterative update, boosting teaching equipment, teaching methods to push the new, but in the human digital literacy and skills to enhance the level there is still room to further push the new, the need for teachers and

students to continue to learn and improve digital literacy. The development of research on large-scale online teaching and learning in the context of the epidemic, network lag, and the lack of adaptability of some teachers to the online mode of teaching and learning remain important constraints to the improvement of the quality of online teaching and learning. In the Teacher Quality Literacy issued by the Ministry of Education, it is clearly stated that teachers should make appropriate use of digital technology to acquire, process, use, manage and evaluate digital information and resources, analyze and solve problems, and innovate teaching and learning activities. This requires us to do a good job of teacher training, using online training to solve universal problems, and adopting school-based and regularized training to solve practical problems, and so on, promoting the introduction of cyber security and artificial intelligence into schools and courses, and improve the information literacy and digital skills of teachers and students.

5.2. Work on cooperation and sharing to create a digital education environment with multi-party cooperation

Digital technology is being fully integrated into all fields and processes of human economic, political, cultural and ecological civilization construction with new concepts and modes, bringing extensive and profound impacts on human production and life. Currently, digitalization is leading a new wave of change and innovation in education, with transformative effects on educational infrastructure and teaching tools. Dalian Neusoft College of Information Technology has made great efforts to build an intelligent teaching environment, independently developed information platforms such as "Hybrid Teaching Management System" and "Intelligent Academic Worker", which realizes data collection, statistics, diagnosis and improvement of the whole process of each teaching link. Use intelligence to promote students' differentiated teaching and personalized learning in daily life, and create an information-based education environment.

5.3. Working on innovative development and implementing digital education evaluation reforms

In recent years, many primary and secondary schools have used digital technology to carry out innovation in the evaluation of students' comprehensive quality, explored the longitudinal evaluation of the whole process of students' learning at all grades, and the horizontal evaluation of all elements of moral, intellectual, physical, aesthetic, and labor. However, the evaluation system of some schools, instead of relieving the burden of teachers, has plunged them into the quagmire of filling in and reporting data. This requires schools to achieve a deep integration of digital technology applications and education evaluation reform, and to innovate evaluation tools. In the smart student evaluation system set up by the Affiliated Primary School of Tangshan Normal College, each student has his or her own growth tree, earning a Read Aloud badge in language class and a Calculator badge in maths class. Just as the growth of trees is imprinted on the wheel of the year, these complicated reward stamps record the growth of students, which is truly an innovative evaluation system to help children's all-round development.

5.4. Work on network security and strengthen information security awareness and technical precautions

In April 2022, the information system of Northwestern Polytechnical University was found to have suffered from traces of cyberattacks and data theft; a number of students from Xinyang College in Henan Province had their academic credentials stolen; a university student in Tianjin was infected with a new crown, and students' personal information was leaked. While smart campuses bring great convenience and efficiency, many security management problems have emerged, and, as General Secretary has said, without cybersecurity, there will be no national security, and the people will not be able to live in peace and work in peace and contentment. Therefore, in May 2023, the Ministry of Education launched a cybersecurity attack and defense exercise for the education system, organizing 65 attack teams and 73 defense teams to carry out a 15-day "back-to-back, real" confrontation. When you search for "online class blasting" on social media such as Jitterbug and B-station, a warm reminder to "respect the classroom" will automatically appear.

6. Conclusions

Digital education reforms the traditional education model, broadens the possibilities of education, promotes the development of educational equity to a certain extent, and effectively improves the quality

and efficiency of teaching. The in-depth implementation of the digital transformation of education is the trend of the world's educational change and development, but also the urgent requirements of China's construction of a high-quality education system, with the technological advances and the accumulation of application experience, I believe that the digitalization of education in China will become more and more mature, and provide more students with high-quality educational services.

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