

# Digital Transformation of Basic Education: Current Situation, Dilemmas and Countermeasures

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**Abstract.** Digitization is a global trend, and in the current context of information technology, and education, as a part of which is shown, its digital transformation is necessary. Supported by such a background, this study draws the current situation based on the digitalization of education at the current stage by reading the literature. It is found that the digital transformation of education at this stage faces several dilemmas, and this paper is a targeted discussion of the lack of teachers' digital technology skills and the communication problems of online education, it is found that the main reasons are the lack of teachers' training in digital technology, the unequal distribution of teaching resources, and the fact that online courses are not face-to-face teaching. This study addresses these issues by proposing training for teacher teams before new technologies are introduced to campuses and the use of AR and VR technologies to create real classrooms.

**Keywords:** Digitization of education; digital transformation of education; online education; technical training for teachers.

## 1. Introduction

Information technology has been changing the way of human life since its introduction. The emergence of new technologies such as cloud computing, big data, artificial intelligence, and the Internet of Things has pushed the world of mankind to the climax of change, and it can be said that all of mankind needs to deal with the opportunities and challenges brought about by digitization. The 19th National Congress of the Communist Party of China proposed to promote the deep integration of the Internet, big data, artificial intelligence, and the real economy, and to build a digital China and a smart society [1]. In the current context, China vigorously promotes digital China, trying to digitalize the use of advanced information technology and digital means to promote economic growth, enhance social services, optimize the governance system, strengthen the ability to innovate, and so on. Digitalization not only affects human production and life but also affects the progress and development of the education system. Since the 21st century, with the popularization and application of science and technology, the entire education industry has crossed into the digital era, digital technology has gradually become a very important learning tool, digitalization of education improves the motivation of students to learn, but also makes the efficiency of teaching greatly improved. Whether it is from digital initially used in the basic classroom projectors and other teaching tools, or a few years ago by the impact of the epidemic was vigorously developed to online education, are sufficient to prove that the digitalization of the education industry to the increasingly close links. At this stage, digital education has achieved a lot of results. Digital education technologies can provide a personalized learning experience based on students' individual needs and learning styles, and these technologies allow teachers to easily adjust the content and learning modes based on students' performance and feedback [2,3]. Many universities and educational platforms offer free or paid online courses, making learning resources more common [4]. However, there are still many shortcomings in terms of how to ensure the quality of teaching and learning, i.e., digital technology is a necessary but at the same time insufficient condition for improving the quality of educational work and morale-building activities [5]. The research theme of this paper will be to point out the dilemmas and try to give suggestions to solve the above-mentioned shortcomings while describing the current connotations and status of digitization in education.

## **2. Connotation and Current Situation of Education Digitalization**

### **2.1. Connotation**

The so-called digitization is the process of transferring information into digital format and digital resources are electronic resources [6]. As the whole society becomes more information technology-based, teaching and learning also become more information technology-based. During the teaching and learning process, most digital learning resources are accessed and shared by connecting to the internet. Technology in the classroom is becoming more and more prevalent, from projector devices more than a decade ago to SmartBoards becoming more and more prevalent in many classrooms nowadays, are witnessing that digitization of teaching and learning is changing the learning conditions and that the digitization of education is having a huge impact on the way students learn new information. The digitalization of education is a change based on technology and innovation that aims to improve the quality, accessibility, and adaptability of education, creating broader opportunities for students and educational institutions [7].

### **2.2. Current Situation**

In recent years, with the deep integration of digital technology and the education industry, the era in which today's students are born is a digital era, with major changes in society, and digital education is an inevitable development trend to comply with the trend of the times and the development needs of the main body of education as well as the students. the digitization of education has continued to progress in the industry, and the digitization in the education industry is now mainly reflected in the abundance of digital teaching materials and teaching resources and the widespread use of online learning and distance education platforms. Traditional paper textbooks have been digitized to take on a digital form, making teaching resources easier to communicate and enhancing the learning experience. In higher education, universities provide free online resources for students to read literature, and students can learn and communicate with people around the world by reading various resources that have been shared. In basic education, digitalization brings more life to the classroom. The richness of digital teaching resources allows teachers to flexibly use the pictures and texts provided by digitalization to enrich the teaching content. At the same time, it can interface with teaching resource libraries, courseware libraries, interactive classroom systems, etc., to support the teaching needs of teachers at different stages, such as before, during, and after class [8]. Digital resources improve the efficiency of teachers' lesson preparation as well as students' initiative. Under the impact of the 2020 New Crown Pneumonia pandemic, global education, both basic and higher education, entered a period of unified online learning. software such as ZOOM and Tencent Conferences formed teachers and students into new online classrooms, and school websites or pinned (apps) were used to check assignments. Because of the pandemic, many foreign teachers have left China, but taking foreign classes is still a need for many Chinese children and parents. In this case, many online English tutoring platforms like 51talk VIPKID got a big boost. English tutoring classes have become a necessity for many middle-class families to raise their children. These platforms existed before the outbreak, and in response to the sudden changes brought about by the outbreak, schools took steps to increase the use of distance learning platforms, and students familiarized themselves with them for a short period all shifted to full use of these technologies quite smoothly. A representative of the Finnish educational administration also stated that the sudden blockade posed some challenges to the use of all devices and forms of distance learning, but the transition was very quick and smooth [9]. Overall, the prevalence of digital education at this stage is mainly reflected in the abundance of digital teaching and learning resources and the prevalence of educational platforms for online courses.

### **3. Analysis of the Problems and Causes of Digital Transformation in Education**

#### **3.1. Problems**

##### **3.1.1. Teachers' digital education technology needs to be improved**

However, in the face of the current stage of digitalization in education, the digital transformation in education encounters two more tangible obstacles, one of which is that the use of new pedagogical technologies may be difficult for some teachers. Even though a variety of new technologies and tools, including e-textbooks, online courses, and teaching platforms, have been popularized, teachers, schools, and educational administrations are ill-prepared to act as change agents for digital transformation [10]. At the same time, the enactment of a single policy can update and reform a technology in an instant, which may occur shortly after a teacher has just familiarized himself with the previous technology, making it difficult for teachers to keep up with the new technology while conducting their teaching and learning, even if this new technology is designed to address the vulnerabilities of the previous technology. For ordinary educational institutions and teachers in ordinary districts, more time and resources are needed to adapt to and master these new technologies, and solving the problem of teachers' difficulties in using new technologies will make the process of digital transformation a big step forward.

##### **3.1.2. Poor communication between teachers and students**

Similarly, the difficulty of communication between online learning educators and recipients is also a dilemma in digital transformation. In the same case of online courses during the epidemic, many students would wake up only a few minutes before class, which prevented them from being in a state of active class attendance, or worse, not attending online classes in time and not completing their assignments on time, which posed a great challenge to teaching and learning. They are far less interactive with each other than in face-to-face classes.

In a traditional classroom, educators can establish an intuitive connection with students through sight and sound. However, in an online learning environment, this connection is usually established through digital tools and screens, which can lead to several communication barriers. The teacher cannot know the status of the student resulting in the student being inattentive or doing something else.

#### **3.2. Causes**

##### **3.2.1. Lack of technology training for teachers**

In Chinese classrooms during the pandemic, most teachers had the embarrassing experience of forgetting to mute a classmate or giving permission to a student, and many similar situations delayed the progress of the lesson. The problem is that teachers are not proficient in the use of the equipment, so improving their digital skills is essential. Adopting new technologies requires time and resources, including training teachers to use the new tools. This may also affect teachers' workload and readiness to teach. There are also older teachers, as the traditional mode of teaching is deeply entrenched in the education sector, and teachers may be accustomed to traditional teaching methods and find it difficult to change their habits to adapt to digital teaching. These need to be followed up and popularized for them so that they will feel the importance of the new technology and thus actively apply it to their teaching. Then, for districts with the conditions, will teachers receive professional technology training? Districts with these conditions usually encourage and support teachers to receive professional technology training to improve the quality of education and adapt to new trends, but while encouraging them, they should also pay attention to observing the implementation before they can help promote the modernization of education and improve the learning experience of the student.

##### **3.2.2. Uneven distribution of teaching resources**

Another important reason is that because of the uneven distribution of teaching resources, some teachers may not be in a position to learn digital technology at all. For example, schools in poor places

so lack sufficient technological background and skills to be familiar with the operation and application of new digital tools, leading to difficulties in using them. For example, in some poor mountainous areas in Guizhou, China, schools with projectors are good enough, let alone for teachers to use new technologies to enhance their teaching experience. Since these teaching resources are unevenly distributed, it is difficult to secure some hardware facilities to ensure that they have access to the latest digital technology for learning. Therefore, these teachers are in great need of some external conditions to ensure that they can learn the new technologies.

### **3.2.3. Not face-to-face**

In a face-to-face classroom, teachers and students can interact in real-time by asking questions, answering questions, discussing, and so on. Students may encounter problems or concerns during the learning process, but in an online environment, due to the lack of real-time interaction, it may be difficult to get timely answers, affecting the coherence and efficiency of learning, and may need to wait longer for these to be resolved or answered. Face-to-face interactions can convey emotions and intentions through facial expressions, voice tone, etc., but in online learning, these elements may be limited, and it may be difficult for students to accurately understand the teacher's intentions and emotions, and for the teacher to get a positive response from the students. In a face-to-face classroom, the teacher can make timely adjustments based on student responses, ask questions, encourage discussion, etc., but in an online environment, the opportunities for these interactions are often reduced, and the teacher is unable to detect which student wants to answer a question, so he or she doesn't waste time answering the question, which affects student-teacher interactions and collaboration. It is difficult for the teacher to ensure the teaching task in this situation.

## **4. Suggestions**

### **4.1. Strengthen the Training of Teachers**

Problems need to be solved Although new digital teaching technologies can bring many educational advantages, their application may have some difficulties for some teams of teachers, which need to be overcome by the joint efforts of teachers and educational institutions. To solve the problem mentioned above that teachers will always encounter difficulties in applying new technologies, it can be tried to provide uniform training for teachers to learn how to effectively use online education tools before the new technologies are popularized to the campus, and they should be given technical support to solve the problems that may arise. More resources can be given to poorer places to help realize the use of the facility, and then more supervised training can be given to the teachers there. The process is important to make teachers aware of the importance and necessity of digitization, and at the same time to allow students to also acquire the skills and competencies to innovate, design, program, manufacture, and build digital technologies [11].

### **4.2. Incorporating New Technologies: AR & VR**

To solve the communication problems in online courses, new technologies have been tried to be applied in online courses. AR is used to enhance the user's perception and interactive experience by superimposing virtual information into the real world. Also in the field of science teaching, students can access the online lab by connecting to it through their smartphones or tablets to observe and view molecular models, which is a convenient way to address the teaching materials at the same time. While VR has been used in the film industry since long ago to create a real theater effect, VR creates a whole new experience by completely immersing the user in a virtual environment. In the field of science teaching, VR glasses are usually worn by students to create a completely virtual laboratory and scenarios, enabling students to perform virtual experiments without the need for real laboratory equipment [12]. This has significant implications for laboratory education in fields such as physics, biology, and engineering. AR and VR have already had a profound impact on several fields. In the future, they are likely to change the way people interact with their surroundings and access information. Where the technology exists, AR technology can be used to create virtual lecture halls

or meeting spaces where students and instructors can interact virtually. VR can provide an immersive virtual lecture hall experience in which students can interact with educators and peers as if they were in the same physical space. The key to applying AR and VR technologies to online education is to ensure that these technologies enhance the learning experience, rather than just being full of novelty. Additionally, it is important to take into account the geographic location of students to ensure that all students have access to the same level of education and that education is equalized. It is believed that as technology advances, the use of AR and VR in education will continue to be innovated and provide students with a richer learning experience.

## 5. Conclusion

This study has examined the current state of digitalization in education, i.e., online learning and distance education platforms are now widely used and there is a wealth of digital teaching materials and resources, but at this stage of the digital transformation there are still two major problems, i.e., teachers need to improve the use of digital technology and online courses cause problems in the communication between teachers and students. These problems are due to the lack of teachers' training in digital technology, the uneven distribution of teaching resources, and the fact that online courses are not face-to-face. Based on this, this study suggests that the problem of teachers' lack of familiarity with technology has not been solved and that after interviews with new technologies, teachers should be given unified training in technology to create confidence in teaching with new technologies; to solve the problems of online education because it is not face-to-face, AR and VR technologies should be applied to create a real classroom environment. However, this paper has not analyzed more difficulties and situations, which can be used in the future to conduct deeper research based on this field.

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