

# The Development of Network Education in the Age of Big Data

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**Abstract**—Nowadays, information technology is changing with each passing day. Big data technology, multimedia technology and network technology have penetrated into all aspects of education, and have a great impact on network education. It is very important to study the influence of big data era on education for the future development direction and mode of network education. This paper introduces the current situation of the development of network education, expounds the new changes of network education in the era of big data, and analyses the development trend of network education under the background of big data. It can be believed that innovation-driven and intelligent learning will become an important development direction of online education in the future.

**Keywords**—big data, network, education mode, information technology

## I. INTRODUCTION

Education is the national strategy and the foundation of national development. Therefore, China has always attached great importance to the development of education. In order to meet the needs of the information age, schools are also trying to explore new educational models and methods. In recent years, with the rapid development of big data technology, Internet technology and multimedia technology, network education in China has shown a rapid development trend. With the continuous progress of information technology, this new education model has also presented new development. The data age is changing our world step by step, and the traditional teaching mode is being quietly broken. Teaching by means of data technology and information network resources has become an inevitable trend of modern education development.

## II. THE CONNOTATION OF NETWORK EDUCATION

### A. What is Network Education

Network education refers to an educational mode in which students and teachers can interact multilaterally and multi-directionally by using Internet and multimedia technology, and through the network platform, multimedia teaching resources can be processed, transmitted, shared and collected to achieve teaching objectives. This kind of education mode comes into being under the guidance of advanced educational thought, learning theory and teaching theory. Its learning process has the basic characteristics of interaction, collaboration, autonomy, openness and sharing. Network education mainly includes the following aspects:

(1) Network education regards network as a kind of teaching environment, which breaks the traditional bondage and transcends the limitation of time and space. So that people's education and learning can not be constrained by traditional geographical space, so network education is a new educational environment. In such an open environment, network education can not only replace the traditional way of teaching, but also have more advantages in educational function and teaching efficiency.

(2) Network education is the process of developing and utilizing network knowledge and information resources. In this sense, network becomes a learning resource, and network teaching is the development, utilization and regeneration of this resource [1].

(3) Network education fully reflects the main position of students, students have full freedom of choice, do not have to study passively at the same time and in the same place. Instead, network technology is regarded as an organic factor to form a new learning ecological environment, which is convenient for students to make better active choices.

### B. The Characteristics of Network Education

First, the advancement of educational methods. Compared with the traditional passive acceptance learning method, network education is helpful to promote inquiry learning. Students can determine their own learning methods, learning content, learning arrangements, and can get the help of experts in relevant knowledge fields through the computer network. Compared with the passive mode of education, this mode of education is obviously advanced.

Second, the richness of educational content. Network teaching resources are very abundant, no longer limited to textbooks, students can choose learning resources independently and expand their own areas of knowledge [2]. Compared with traditional education, which mainly uses paper as the medium of knowledge transmission, online education resources are extremely abundant. Video, image, graphics and so on can be used as auxiliary resources for teaching, which can be used by educators and greatly improves the learning effect.

Third, the sharing of network education resources. Network teaching breaks the time and space limitations of traditional classroom teaching, and all educational resources can be obtained through the Internet. Even students in different schools, different time zones and different geographical locations can get the same teaching materials.

Depending on the connectivity of the network and the sharing of educational resources, students can search the learning information they need anytime and anywhere.

Fourthly, the forms of teaching organization are diversified. The form of network teaching is not only the unified teaching of large classes. The flexible teaching methods greatly meet the requirements of differentiated and targeted teaching. One of the aims of teaching reform in contemporary countries is to explore the teaching activity mode that can make every student get the greatest development to meet the different learning requirements of different students, so as to realize the individualization of teaching. Network education realizes the individualization of teaching, which is conducive to cultivating students' independent learning ability.

### III. THE CURRENT SITUATION OF NETWORK EDUCATION

#### A. Increasing User Size

With the rapid development of internet technology and big data technology in China in recent years, the development of network education is also in full swing. It has formed a situation that covers large, middle, primary and secondary schools, and people of different ages and needs [3]. Many well-known educational and training institutions have recognized this trend, and have set up their own online courses, such as New Oriental, Peking University Bluebird, and secondary school education, so that ordinary people can enjoy the high-quality resources of famous schools without leaving home and spending little tuition [4]. However, the main force of network education is still at the level of University and adult education. Their existence is an important cornerstone of the rapid development of network education.

Erie Consulting Company has conducted a survey on online education of higher education in China, and published the Research Report on China Online Education Platform in 2015. The report shows that the market size of online higher education in China reached 60.19 billion yuan in 2014, and it was expected to reach 10.96 billion yuan in 2018 [5]. As shown in table 1.

TABLE I. MARKET SCALE OF ONLINE EDUCATION DEGREE PROGRAM IN CHINA'S HIGHER EDUCATION, 2013- 2018

Year	2013	2014	2015	2016	2017	2018
Scale (\$100 million)	516.4	601.9	705.7	830.7	965.9	1096.3
Growth rate	18.4%	16.6%	17.2%	17.7%	16.3%	13.5%

The report of Erie Consulting also shows that the number of users of online higher education in China was 17.575 million in 2014, an increase of 18.1% over the same period last year, and it would reach 32.056 million in 2018[6]. As shown in table 2.

TABLE II. USER SIZE OF ONLINE EDUCATIONAL ACADEMIC DEGREE PROGRAM OF HIGHER EDUCATION IN CHINA, 2013-2018

Year	2013	2014	2015	2016	2017	2018
Scale (\$100 million)	1487.8	1757.5	2056.5	2416.5	2804.5	3205.6
Growth Rate %	19.0%	18.1%	17.0%	17.5%	16.1%	14.3%

#### B. The Rapid Development of Network Technology

The rapid development of information network technology has also promoted the network education to be more and more perfect. In today's social environment, various technologies are developing rapidly. For example, the innovation of big data technology, artificial intelligence technology, cloud computing, face recognition technology, personalized recommendation technology has also brought tremendous changes to network education. The use of these technologies can make online education exist in a more free and convenient form. It will also make students' learning more and more relaxed and humanized, and these changes constantly enhance the user's experience. Network education is supported by the development of information technology. Without information technology, there will be no network education. The change of information technology has also led to the rapid development of network education, which has led to the birth of new education models and methods. The constant change of education mode also puts forward new demands for the progress of technology. The two promote each other, which makes the progress of information technology bring new and better experience to network education.

### IV. NEW CHANGES OF NETWORK EDUCATION IN THE AGE OF BIG DATA

#### A. Cross-border Integration

With the rapid development of big data technology and artificial intelligence technology, information technology has penetrated into every field of life more and more widely. People have put forward various demands such as "big data +" and "Internet +". In "big data +", the expression of "+" is a kind of cross-border, which is a connection from one to the other, and produces a new form on the basis of cross-border connection [7]. For network education, it can be either '+' teaching or '+' course, or more elements according to the needs of '+'. "Big Data + Education" seeks not simply the technicalization or internetization of education, but cross-border integration and qualitative leap towards the original education model. This cross-border pursuit is to establish a new educational ecological system through the development of data technology and information technology. Through the connection of data, we can break the original rigid connection between elements, so that different fields can promote each other, blend with each other, and promote cross-border integration. Through advanced big data technology and Internet technology, with the help of human-computer interaction mode, artificial

intelligence and other means, China's online education can carry out real-time or non-real-time interactive teaching through the network. The teaching method can span time, space and region, which greatly improves the ecological carrying capacity of the educational ecological system [8].

### *B. The Sublimation of Educational Model*

With the development of big data technology and its introduction into the field of education, the teaching mode of online education is changing from fully autonomous online learning to mixed learning, research learning, collaborative learning and classroom turnover. Mixed learning is a popular term in the field of education, especially in the field of educational technology after people's reflection on online learning. Its main idea is the integration of face-to-face teaching and online learning, in order to reduce costs and improve efficiency of a teaching method [9]. Mixed learning is the mixture of discovery learning, collaborative learning, autonomous learning and acceptance learning, the mixture of online communication and offline communication, and the sublimation of educational model. The realization of this learning mode is also based on the emergence of big data technology and new network technology. Its outstanding feature is that it can realize large-scale personalized learning.

One of the problems of traditional network education is that although the way of access to educational resources has changed, teachers still can not give specific and individualized instructions according to the specific characteristics of each student. Now with the emergence of big data technology, this problem has been solved. Through big data technology, learners' learning behavior, learning characteristics, learning process, puzzles and other data information can be recorded and stored on the network education platform, and then these data and information can be judged and analyzed by big data technology. In this way, on the one hand, learners' learning preferences and needs can be drawn, resources can be pushed and support services can be targeted [8], on the other hand, teachers can understand the puzzles of students in the learning process, solve the problems of students' individualization, adjust the overall arrangement of teaching in time, and easy to achieve teaching in accordance with their aptitude.

As a new way of learning, blended learning has been accepted by more and more schools. For example, Stanford University and Santa Barbara University of California are the first universities to adopt this teaching method. Through this online education method, students' passive learning habits can be changed, and they can establish a good learning mode of autonomous learning. At the same time, teachers can become inspirers and motivators of learning.

### *C. The Change of Education by New Media*

With the arrival of the era of big data, the form of educational resources is no longer confined to traditional books, paper

and other tangible entities. With the emergence of new media supported by big data technology, various forms of

online education resources have sprung up and become a new representative of educational resources in this era. Such as micro-video, Wechat public platform, QQ group and so on have become important carriers of online learning for the public. The common point of these teaching methods is to input key knowledge explanations and methods into videos and share them with students, so as to guide students to effectively use fragmented time, so that they can learn to control their learning progress and nodes [10]. Take micro lesson as an example, compared with traditional teaching video, its characteristics are "small" and "refined". Traditional education and teaching videos usually take 40-50 minutes, while micro-classes usually control the video time of educational resources in 10-15 minutes. This not only avoids the time too long, students' energy is not concentrated, but also very good to highlight the key and difficult points of the course, making students easy to grasp. Micro-lesson is characterized by "refinement" and "efficiency", which can make people easily share on the mobile phone and the iPad. It is conducive to improving the efficiency of the application of network education resources, and can better play the role of network education resources [11]. At the same time, good learning results can be shared through public microblog accounts and WeChat moments, which can further improve students' interest in learning and improves students' confidence in learning.

## V. DEVELOPMENT TREND OF NETWORK EDUCATION IN BIG DATA ERA

### *A. Drive of Innovation Demand*

The rapid development of big data technology and information network technology has given new support to education innovation. One of the characteristics of "Internet +" is new technology, advanced infrastructure, big data analysis and intelligent equipment. These elements provide convenience and possibility for the development and sharing of educational innovation. The emergence of big data technology will also lead to fundamental changes in educational research model. For example, the newly emerging educational form of "Creator Space" makes the innovative ideas of educational subjects attract a large number of creators to participate in collaborative creation and innovation through big data technology, thus forming innovative points conducive to education and teaching. The accumulation of such innovations will eventually lead to qualitative changes in the educational model.

### *B. Guidance of Technology to Education*

The use of big data and other network technologies can not only make our life more convenient, but also bring about new changes in education. In the future, educational activities are no longer the patents of schools. Some big Internet companies have seen the value of downloading them. They are seeking deep cooperation with educational and scientific research institutions. This will inevitably lead to new breakthroughs in network education and teaching mode. In addition, due to the involvement of a variety of technical media, our teaching environment, teaching

methods and teaching methods have also undergone tremendous changes, and new forms of online education are constantly emerging. The emergence of these new education methods can also help teachers and schools to guide students more effectively, and truly achieve the individualized training and teaching in accordance with their aptitude.

### *C. Intelligent Learning*

One of the reasons why network education can be widely developed is that it can free students from the traditional receptive learning mode and transform them into inquiry learning mode and collaborative learning mode. This is only a stage of the development of online education. With the development of data technology, intelligent learning is becoming more and more recognized and paid attention to. Intelligent learning refers to joining a group of learners interested in a certain topic to enhance learners' understanding of the topic by participating in topic discussion and contributing wisdom to the group. In this process, learners should participate in the discussion and contribute their wisdom [8]. In addition, people also put forward learning methods such as interaction with learning elements, producing more abundant situations through continuous refining. It can be seen that intelligent learning will also be the main development direction of network education in the future.

## VI. CONCLUSION

Network education is an important force in modern education. We should constantly promote educational reform and innovation, and strive to build a digital, personalized and lifelong education system according to the development of network information technology. With the development of network technology, network education will continue to develop and change. To adapt to this change is the direction we should continue to strive for.

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