Research on the Development of Educational Technology Based on the Big Data

Yan Li
Xi’an FanYi University Xi’an, China

Keywords: Big data, Educational technology, Teaching.

Abstract. The continuous development of modern educational technology is not only the result of modern education, but also the product of the era of Big Data. As a result, educational technologies under the era of Big Data have been given more missions. The coming of the Big Data era has triggered the revolution in technology and thinking in the entire society and has also played an important role in promoting the development of educational technology. This article demonstrates what Big Data and its features are, the impact of Big Data on traditional education, and the exploration of the ways in which educational technology can promote education in the context of Big Data.

Introduction

Today's society has stepped into the era of Big Data. The data in the world are exploding. The understanding of digitization is also constantly improving by people. Every day, a great variety of data will be produced faster and faster. General Secretary Xi Jinping has said: “Today's world is witnessing changes in science and technology, ever-changing modern information technologies such as the Internet, cloud computing and Big Data that profoundly change the way of thinking, producing, living and learning. It also can dramatically demonstrate the prospects of world’s development.”[1] That is to say, Big Data is affecting every aspect of mankind and it has penetrated every industries.

The era of Big Data is a further development of the Internet era. Big Data, the upgraded version of the Internet, plays an important role in the development of the Internet itself and the future of the Internet. Under the environment of “Internet +”, exploring how to integrate Big Data technology with educational technology is of great significance to the development of education. However, there is a natural relationship between Big Data technology and educational technology. This will inevitably have a profound impact on educational technology. Many domestic and foreign researching institutes and experts have made great achievements in studying the impacts and changes brought by Big Data on education and putting them into practice. How to promote educational technologies in colleges based on Big Data is the question that college educators in China should think about.

Overview of Big Data

Definition

Big Data is a collection of huge amounts of data. The definition given by the McKinsey Global Institute is a collection of data that go far beyond the capabilities of traditional database software tools in terms of acquisition, storage, management, and analysis.[2] Big Data is just like infrastructure, becoming a foundation resource, not a sample of data, but a complete set of data. Depending on technologies such as data storage, statistics and analysis, people can have disruptive understanding of things from the vast amounts of data, and even can understand and predict the trend of things. This can be said to be a revolution to economy and society. So Big Data is not only a resource and a technology, but a new subject and a new thinking. Big Data also have 4 major characteristics, which is quantity, diversity, low-value and celerity.
Technology of Big Data

The technology of Big Data is based on the database technology, but far beyond the scope of the traditional database. Big Data technology can't simply be considered as a combination of “Big Data” and “database technology.”[3] Big Data technology mainly deals with meaningful data in the specialization, not accumulating the huge data information. Its innovation is based on the existing technology system, not abandoning the original technology system.

The Impact of Big Data on Traditional Education

Since “Internet +” plan put forward by Premier Li Keqiang in 2015 for the first time, “Internet +” has become an important driving force for the innovation of education and culture in China. It has also changed the traditional teaching mode of education. With the trend of “Internet + Education” and Big Data technology, great changes have been taken place in the communication and knowledge. The connotation and denotation of education also changed during time passing. Its connotation is to improve the efficiency and convenience of spreading and updating knowledge by using of digital technology; the extension of changes is focus on digital tools and online virtual classrooms between teachers and their audiences.[4] A sample data gradually loses its strengths, replacing by deep digging of Big Data. The “sample data=overall data” model will lead people to realize that once a related object is found, future of education will be changed. Big Data education diagram is shown in Figure 1.

![Big data education diagram](image)

Figure 1. Big data education diagram.

Reconstruction of Teaching Organization

Generally, traditional education does not pay much attention to the capability of teaching subjects, instead of conducting partial, sampling and even one-sided surveys. Without all the data as a support, the teaching processes which are often subjective, casual and idealistic design can only be planned based on experience and assumptions, even run counter to the actual teaching. While Big Data will collect data that is nearly close to the full sample, so the analysis which will facilitate the reorganization of teaching and learning will be comprehensive, systematic and objective based on this. The implicitly-embedded online learning tool records each student's learning performance, evaluates the teaching process, assesses learning habits, and defines how to control learning progress, how to access electronic resources, what types of problems are most likely to be mistaken, and which ones do not master, etc., After that, it will determine the appropriate learning methods, develop appropriate teaching design and configuration of appropriate teaching resources.

Reconstruction of Teaching Evaluation Methods

Teaching evaluation should focus mainly on the whole process of teaching. If you evaluate the effectiveness of teaching only in the outcome period, then the best time to influence and intervene will be lost. The traditional teaching activities are mainly based on the marks as the only evaluation criteria. However, Big Data can have multi-dimensional analysis, multiple evaluations in order to
change the evaluation method. Teaching evaluation is divided into formative evaluation and summative evaluation. Formative assessment is mainly through the analysis of students' learning behaviors such as online time, clicks, and times of exchanging ideas, so that teachers can get the relevant data of students accurately and quickly. For example, teachers found that 40% of students watched a certain video at a rumination ratio of 220% when watching a video. That is to say, nearly half of students viewed this video up to 2.3 times. This shows that students generally consider this knowledge point more difficult. Based on this data, teachers can focus on this knowledge point in the classroom so that students can better grasp it. Therefore, teachers can understand these students' learning dynamics through this Big Data so as to better improve their teaching methods and supervise their learning behavior. Summarizing evaluation can be shown through resulting report, semester exams and other forms. Teachers can quantify the students according to the given marks by formative evaluation and summative evaluation.

Reconstruction of Educational Technology Form

Big Data brings the world into an era characterized by data, data analysis and forecasting. The micro-curricula in educational technology, the flip-class, the MOOC and other Big Data era changes in education also come one after another. The concept of education and resources will also change, and it should be faced new technical challenges. For example, MOOC has been designed and implemented to achieve the functions and efficiencies of interaction and feedback that are not available in open classes, resource networks and general learning platforms in the past.

Reconstruction of Educational Coverage

If the data of education is transparent and open, it will bring greater impact on teaching practice and make the education decision more credible and persuasive. On the one hand, the mode of education will no longer be confined to the traditional teaching under the line, but will be to realize the online and offline double-line attack, double-line collaboration and mixed teaching mode. On the other hand, the role of teachers and students will exchange in assimilation and transposition. New interactive degrees of freedom and iterative patterns will emerge constantly in the construction of new-typed teaching relations.

The Development of Educational Technology in the Background of Big Data

In the era of Big Data era, the change of modern educational technology level will have a beneficial effect on the education, teaching modes and classroom teaching forms. A more intuitive and convenient education mode will surely stimulate students' interest in better learning. Teacher-oriented “spoon-feeding” teaching no longer simply become the main teaching method, but teachers and students to use modern educational technology to innovate classroom teaching methods and methods.

From “Data” to “Digitization”

Digitization is a normal state of current social development. It uses “0” and “1” to characterize things. There is a close relationship between data and digitization. However, digitization is not data. Digitization is a digital development, even more a product of informationization. In the development of information technology, more attention is paid to the function of data and the use of data. It can be said that digitization is the basis of data; data is a new product of digitization. Since the last century, with the rapid development of information technology, educational technology in China has also opened up a new era of digital development. The rapid development of educational information has also led to a qualitative leap in the form and function of educational technology, making education resources and educational media more multimedia, virtualized and digitized, which will effectively promote the development and reform of education.

Big Data technology can effectively promote the deep development and application of educational technology. One of them is that Big Data technology can make educational technology develop intelligently. In the environment of intelligent educational technology, teachers can obtain
real-time data in the process of student learning, and can grasp the students 'learning behavior and psychological status in time, so as to fully understand the difference of students' learning. Second, when Big Data technology makes educational resources, the concept of building teaching process has been changed. Big Data technology can fully tap the inherent relationship between various educational resources, making a variety of high-quality educational resources integration and optimization in order to form a fully shared, virtuous circle of educational resources; Third, Big Data technology can break the limitation of single technical method. According to teachers and students' teaching and learning behaviors, it can excavate the hidden educational resources demand of teachers and students so as to push the resources to teachers and students and transform the “supply-oriented” into the “demand-oriented” Model, teaching and learning to provide more choices.

Modern Education to the Scientific Development

In the context of Big Data, modern education needs to be upgraded to a scientific level, which is a necessary condition for modern education to improve itself. As a result, there are the new types of educational technology represented by the MOOC. MOOC not only has the explicit value that enables students to learn independently, but also has the value of promoting teachers' qualities and promoting their professional development. MOOC is characterized by large-scale participation and open learning, and large-scale participation will lead to the low completion rate of MOOC, while the era of Big Data provides a new opportunity for the development of MOOC. Big Data can make teachers more objective and accurate grasp of the learning characteristics and effectiveness of students. Through the data analysis results to predict the level of knowledge of students and in order to find students with learning difficulties, timely and aptly teach students to reduce the loss of students. For example, the introduction of Big Data-based learning and analysis technology into the construction of large-scale online courses will help each student to choose the most appropriate learning method and process in order to provide students with personalized analysis, push and service purposes.

New Category of Educational Technology Development -- Analysis

With the continuous application of Big Data technology to education, the new attention will be put on learning and analysis techniques, which brings the development of educational technology into a new developing realm. Therefore, it can be considered that the new category of educational technology research is “analysis”. Learning analysis is a new form of educational technology under the development of information age. With the informatization of learning resources and the popularization of online learning, students' learning behaviors, processes and results can be recorded completely and truly. The analysis and application of these large amounts of data have become an important task in the development of educational technology. Learning analysis process can be decomposed into several stages of data acquisition, analysis and data application and intervention; learning analysis technology can automatically track records and statistical analysis of students' learning, and display results in an “obvious” visual way, Complex learning data is presented to teachers and students in a more intuitive and expressive way. Therefore, through the study of analytical techniques, teachers can better master the learning process of students, and then implement the students' aptitude according to their aptitude.

New Mission of Educational Technology Development -- Wisdom Education

By the continuous penetration of a new generation of smart technology and Big Data in education, education technology has promoted wisdom education and led the transformation of the entire education picture at the same time. Wisdom education provides a new opportunity for the development of educational technology. It takes the idea of personalized education as the guide and the intelligent education information technology environment and a support to promote students' wisdom learning.

In the era of Big Data, students learn differently from multimedia and web-based digital learning, and are no longer limited to books and classroom learning. The rapid development of mobile
technology and cloud computing makes the important way for students to learn as intelligent learning. Wisdom learning is the inevitable result of the development of information technology. Compared with the traditional learning methods of step by step and time-space limitation, Wisdom Learning can make full use of all kinds of smart mobile devices and seamlessly access to the students' learning process so as to give students provide a more intelligent, more humane learning context. Teachers, students can use a variety of intelligent devices and technologies, real-time recording and tracking of student learning process based on the analysis of the data to make timely changes in response. Furthermore, Wisdom Learning is a smart learning approach at anytime anywhere that greatly enhances student autonomy and learning efficiency and greatly helps students develop their practical and innovative IT skills.

Conclusion

The trend of education development in the information age is Big Data analysis and education reform. The application of Big Data makes decision-making more efficient and precise. Teachers can grasp the learning process of students in real time and dynamically, make teaching and learning more intelligent, service more personality and provide personalized resource recommendations and services. In the era of Big Data, personalized education will be expanded in the digital environment through in-depth analysis and excavation of education data. The students' thinking mode, autonomous learning and innovation ability will be improved, and the growth of students will move in a personalized direction. Better development.

All in all, today's society offers tremendous opportunities for the development of the Internet under the era of Big Data. The continuous development of modern educational technologies is both an outcome of modern education and a product of the era of Big Data. The advent of the era of Big Data has posed a formidable challenge to the development of modern education while giving unlimited impetus and opportunity to the development of modern education. Therefore, it is necessary to actively combine the technical forms of new-type education in the context of the Big Data era, by deepening the reform idea of education, implementing the reform measures of education, changing the thinking of education and teaching from “data” to “digitization”, reconstructing the quality system of modern education, and promoting the development of modern education by means of modern educational technology.

References