

# Challenges of Higher Education Management in the Era of Big Data and the Countermeasures

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**Keywords:** Big data; higher education management

**Abstract:** In the era of big data, college education management has formed a close relationship with big data, which brings convenience to college education management and also poses many challenges to colleges and universities. For examples, how to change the traditional education management mode of colleges and universities? How to effectively make use of big data to improve their management? How to analyze the data in depth? This paper analyzed the challenges faced by higher education management in the era of big data and then explored corresponding countermeasures.

## 1. Introduction

With the continuous development of the Internet, people have stepped into the era of big data and the advantages of big data itself have made the education management of colleges and universities closely related to it. However, there are still many problems in the application of big data in the education management process in China. In order to be able to keep up with the pace of the times, colleges and universities must take effective measures to address these problems and promote the smooth development of China's higher education management.

## 2. What is the era of big data

At present, there is still no accurate definition for the term “big data”, and different people and different institutions in different fields have different definitions for it. Tu Zipei defined big data like this: big data is a large-volume data whose size exceeds the traditional data and that traditional software cannot easily acquire, manage and analyze, and the unit it commonly uses is “Ether Byte”<sup>[1]</sup>. The definition of big data in the relevant report of the McKinsey Global Institute is like this: Big data is a data group that goes beyond all the functions of traditional database software, such as the speed of information extraction, the storage capacity of information, the management and analysis of data, and so on. Big data has an increasingly clear definition with the advancement and development of the Internet era. At present, the definition of big data generally accepted in the society is: it is a large amount of information that cannot be processed, managed and handled by the traditional technology within a certain period of time, and it is the data collection with huge data volume and complicated structure. Big data has its own characteristics, such as large amount of data, rich data types, sparse data values, fast processing of data, and so on<sup>[2]</sup>.

## 3. Specific challenges of higher education management in the era of big data

### 3.1 Inadaptability of traditional education mode to the development of the times

As a place cultivating talents, colleges and universities should have a comprehensive and in-depth understanding of the meaning and purpose of education. People usually understand “education” as propagating doctrines of the ancient sages, teaching knowledge and answering questions, but its fundamental purpose is to enable students to establish correct values, outlook on life and world. It is not one-time activity, but requires colleges and universities to apply systematical train on students. However, most of teachers in Chinese colleges and universities teach students simply in accordance with the syllabus, and they do not improve the teaching content and

teaching methods according to the actual situation of students. Teachers only rely on feedback from students to adjust their teaching mode. The information they get in this way cannot reflect the real situation and feelings of students' learning, which makes their teaching mode not really meet the students' actual situation. If colleges and universities use big data in the teaching process, teachers can thoroughly understand students' learning situation through various effective data provided by big data, and then predict the problems in teaching. Although this new teaching mode can effectively improve the quality of teaching in colleges and universities, it is a great attack on the traditional teaching mode. In this sense, the use of big data puts forward higher requirements for the comprehensive quality of college teachers. In the era of big data, a series of questions have become specific challenges faced by college education in the age of big data, such as whether college teachers can transform the traditional teaching idea, whether they can establish a correct view of big data, whether they can improve their use of big data-related skills, and so on <sup>[3]</sup>.

### **3.2 Insufficient informationization of higher education management**

The management in colleges and universities relies on the construction of information platform. However, the informationization degree of education management in China is not high at present, which can mainly be attributed to two factors. Firstly, there is a lag in the information infrastructure equipment owned by colleges and universities. Although people are now in the era of big data, many colleges and universities are not well prepared for coping with big data. Specifically, the construction of information platform in colleges and universities is not perfect; some information platforms are too slow in terms of data update and the collected data is distributed in various departments without being concentrated; some colleges and universities have not even established corresponding information management platforms, and thus they have no way to obtain and analyze relevant data, which brings great difficulty to college education management. Another factor is the lag in the construction environment of information platform in colleges and universities <sup>[4]</sup>. When building their own educational management information platform, some colleges and universities do not highly value the talents of big data application, resulting in the lack of related talents. For big data, collecting, organizing and analyzing data is very important. Especially in the process of analyzing data, various kinds of professional techniques such as calculation and modeling are required, which requires professional talents mastering related content of big data to perform corresponding operations. However, most colleges and universities in China do not highlight talents in this field at present, and this has led to the shortage of professional talents skilled in handling big data in colleges and universities, seriously affecting the education management of higher education institutions in China.

### **3.3 Lack of systematicity in data acquisition and research**

Without the collection and research of data, colleges and universities will be not able to carry out the education management smoothly. At present, the research and collection of data in Chinese colleges and universities is carried out at the relevant government level. In other words, the collection and investigation of relevant data of colleges and universities is carried out by related superior administrative departments, so the data collected and investigated is obviously too monotonous and seriously lacks systematicity. At the same time, such methods of data research lack the monitoring of a third-party organization, and thus the poor objectivity of data collection and research great reduces the credibility and comparability of data. Although this phenomenon has attracted people's attention, there are still few third-party organizations now. In the process of higher education management, colleges and universities, as the subject, should actively collect and research relevant data. The data collected by the government cannot fully adapt to all school, and thus sometimes the collected relevant data is not comprehensive. This has led to the lack of systematic access to data and research in education management, which has seriously affected the management of college education.

### **3.4 Lack of in-depth mining of the collected data**

Data mining is very important when using big data for higher education management. The

so-called data mining refers to conducting algorithmic search of the collected data in the database to explore the valuable information. In the process of college education management, the use of data mining helps to clearly understand the situation of students' learning and the actual situation of teaching. Data mining plays an important role in college teachers, because it enables teachers to understand the individuality and the actual learning situation of every student. Data mining can display accurate data and reflect real problems. This will make corresponding solutions more objective and persuasive, effectively avoiding traditionally judging the reform of teaching mode by experience and providing effective data support for relevant decisions and educational reforms in universities<sup>[5]</sup>. How can colleges and universities improve their education management after mining data? How to reflect the improved results of education management to students and society? These problems pose great challenges to the teaching staff of colleges and universities in China at the present stage. However, most colleges and universities in China seriously lack professional talents of big data. Therefore, there are many problems in the collection, collation, analysis and mining of data, which leads to the fact that the exploration of data by colleges and universities is not deep. The data without in-depth mining just reflects the surface information and does not bring effective data that can be used for colleges and universities, which is not conducive to the deep decision-making behavior of college education management.

#### **4. Specific countermeasures in response to the challenges that higher education management faces in the era of big data**

##### **4.1 Establishing big data awareness in colleges and universities**

Most colleges and universities in China still perform management with the traditional education management mode. The use of big data is a complex and systematic project. To apply big data into the management of college education, it is needed to first help college educators establish the awareness of big data. The specific method can be summarized as the following three aspects. The first is to increase the publicity of big data. Colleges and universities should enhance the promotion of big data in schools through various means related to big data, such as propaganda, lectures, class meetings, posters, knowledge contests, school journals, and so on. These methods can help students and teachers understand big data and the benefits it brings, making various activities of colleges and universities rely on big data and making the use of big data become a habitual thinking of teachers and students<sup>[6]</sup>. The second is to apply big data into the management of colleges and universities. Universities can apply big data into student management, decision-making, reform of teaching modes and many other aspects, so that it can be fully integrated into the management and education of colleges and universities. This will effectively transform the traditional experience-based and closed teaching into fine, scientific and intelligent teaching, making the management of higher education more scientific. However, it is impracticable to blindly praise big data in the process of using big data, and it is feasible to only take it as a reference data. When making relevant decisions, colleges and universities cannot completely abandon experience and intuition, and they should not violate common sense. At last, it is significant to strengthen the emphasis on data security. Big data can bring convenience to people in management. However, the use of big data is likely to lead to the leakage of personal information, so it has serious information security risks; in this sense, educators should establish data awareness before the big data is applied in the college education management, and it is also necessary to strengthen the education of data security awareness of educators<sup>[7]</sup>.

##### **4.2 Continuously improving the existing data platforms**

At present, some colleges and universities in China are lacking in basic equipment related to big data due to the constraint of human and finance. However, the education management of colleges and universities in China is closely related to big data now. In order to effectively carry out education management and keep up with the times in the era of big data, colleges and universities should strengthen the construction of information platforms, and constantly enhance and innovate in

relevant information platforms according to the actual development situation of their own. It is necessary to effectively integrate relevant resources on the platforms with the knowledge scattered in various departments. Moreover, there is a need to continuously add new knowledge based on the original information resources and design a simpler and more reasonable system for students to easily extract information. It is also important to ensure the openness of the information platforms at all times and speed up the update of the data of the newly established information platform. Colleges and universities can also strengthen cooperation with enterprises and integrate scientific research and teaching resources in the platforms with the corresponding technologies of enterprises to jointly build a large centralized database, which will help to continuously promote the platform construction of the college system<sup>[8]</sup>.

#### **4.3 Continuously strengthening teachers' literacy of big data**

That colleges and universities use big data to realize effective management mainly relies on teachers. Therefore, it is needed to continuously strengthen the teachers' literacy of big data, which plays a very important role in the reform of education management in colleges and universities. Colleges and universities should improve the big data literacy of full-time teachers involved in teaching and research. Constant guidance is needed to help these teachers establish the awareness of big data and train them to link related course knowledge with information collection, assessment, statistics, collation, analysis; in this way, they can turn information into teaching practice, making data become the basis for changing teaching method and an important assistant for changing the teaching mode; teachers also need to constantly strengthen the relevant information feedback of the data, so as to continuously improve their teaching and big data literacy<sup>[9]</sup>. Colleges and universities should make use of international exchanges, visits, overseas study and some other methods to speed up the promotion of big data literacy of relevant professional teachers, and meanwhile send relevant professional technical teachers to other schools with higher data technology skills to learn. These methods will help to continuously improve the big data literacy of related professional talents and promote the education management of the colleges and universities themselves.

#### **4.4 Continuously optimizing the data acquisition and research**

The key step in the application of big data in education management is the research and acquisition of data. Therefore, colleges and universities must first put data research in place in the management process. Due to the different focus of different surveys, the results obtained are different. Colleges and universities should conduct a reasonable analysis of the valid data collected by surveys. Then, they can use the corresponding data and combine it with the actual situation of their own development to find the deficiencies in their own education management and explore the targeted solutions in a timely manner, which can effectively improve their education management.

### **5. Conclusion**

In order to comply with the times, college education management is inseparable from big data. While bringing benefits to college education management, big data also poses some challenges to colleges and universities, such as the criticism of traditional education management, subsidies for their own information construction, and so on. To effectively improve the level of education management, colleges and universities must take effective measures to address these challenges, eliminate the obstacles faced in the education management and constantly improve the level of their education management.

### **Acknowledgement**

Scientific Research Project of Education Department of Shaanxi Province in 2017: “*Research on Problems and Countermeasures of Big Data in Promoting the Development of Higher Education*” (No. 17JK1071).

## References

- [1] Tu Xinli, Liu Bo, Lin Weiwei. Research Review of Big Data [J]. Computer Application Research, 2014(6): 1612-1616.
- [2] Chen Xinxiang. How to Use “Big Data” to Serve Education [N]. Chinese Teacher, 2013-07-17(11).
- [3] Zhang Penggao, Zhang Sheng, Li Xuanxuan. Comprehensive Evaluation of Education Quality Based on Big Data [J]. The Chinese Journal of Ict in Education, 2015(5):12-14.
- [4] Cao Lianglin. Research on the Innovation of the Management System of Scientific Research Data in Colleges and Universities under Big Data [J]. CO-Operative Economy & Science, 2016(1): 119-120.
- [5] Zheng Lihai. On Transformation of Educational Management at the Time of Big Data [J]. China Educational Technology, 2015(7): 32-36.
- [6] Wang Jing. Analysis of the Challenges and Countermeasures of College Student Management in the Age of Big Data [J]. Ideological and Political Education Research, 2014(2):128-130.
- [7] Xu Wenxun. Present Situation and Countermeasures to the Informationization of Student Management in the Era of Big Data [J]. Journal of Mianyang Normal University, 2016, 35(1):53-56.
- [8] Viktor Mayer-Schönberger, Kenneth Cuki. Big Data Age [M]. (Translated by Sheng Yangyan and Zhou Tao). Hangzhou: Zhejiang People's Publishing House, 2013.
- [9] Zhan Yan. The Path of Realizing the Student-oriented Student Service Function of Colleges and Universities [J]. Ideological and Political Education Research, 2013(6):120-122