



# Research on the Improving the Information-based teaching Ability of Local Normal University Students under the Background of Big Data

Shwu Li<sup>1</sup>, Mengdi Wang<sup>2</sup>, Hongmei Leng<sup>3\*</sup>

<sup>a</sup> Guangxi Science & Technology Normal University, Laibin, Guangxi, China 546199;

<sup>b</sup> Guangxi Vocational College of Technology and Business, Nanning, Guangxi, China 530000;

<sup>c</sup> Nanning College for Vocational Technology, Nanning, Guangxi, China 530008;

419097818@qq.com

13297806268@qq.com

\* Corresponding author: 524229315@qq.com

**Abstract.** Countries around the world are experiencing an important digital change and digital competition. All countries are vigorously developing the new generation of broadband mobile communication technology (5G era) with high speed, high stability, low delay and high connection characteristic of integration with their own industries, and are actively preparing for the digital competition and game in the 6G era. The advent of the Internet, smart mobile devices, the Internet of Things, social networking, and connected objects all generate large amounts of data. The amount of data continues to grow geometrically, so that predictions use ZB, YB, GB and so on, such new storage units and storage requirements. In the big data environment, the information system involves complex information exchange, often collecting heterogeneous, symmetric and asymmetric, and unstructured data from the outside for operation. At the same time, the era of big data has been fully explored and utilized during the 14th Five-Year Plan period, which has become the direction of informatization and industrialization integration of all walks of life, and for normal colleges to fully apply information-based teaching to improve their teaching ability and management ability to open up a new research road. Through some characteristics of big data and some application models of big data, this paper provides some ideas about how to apply big data to improve the information-based teaching ability of normal university students, and to lay a solid foundation and a new path for the future stage of prospective teachers.

**Keywords:** big data, normal university students, local universities, data mining and data analysis

## 1 Introduction

With the development of science and technology and the continuous deepening of information technology, Internet of Things technology and Internet technology, today's

society has entered the era of big data era with rapid development, advanced science and technology, information circulation, close communication and convenient life [1]. Big data contains a large number of diverse, high-speed generated but very low value density from around the world [2]. In the era of big data, any small data may produce incredible value. Analyzing a large amount of data, quickly extracting effective information and reliable knowledge, obtaining data value and solving key problems are an important link of whether can be widely used in the era of various industries [3].

Information technology is constantly updated and applied to all walks of life. Colleges and universities, as the main position of education and the "cradle" of scientific research talents, how to cultivate the talents needed by the society is the problem that educators need to think about during the 14th Five-Year Plan period and also the problem that realizes the road to a strong education country. In the spring of 2020, Wuhan was taken as the center of the pandemic outbreak, and then extended across the country. All walks of life facing COVID-19 challenges, was forced to stop production. The school was not immune, such as traditional classroom teaching by the classroom to online, the school teachers including primary and secondary school teachers by offline teaching mode, then all into online. In February of the same year, the whole country without exception, live classes, air classes, Tencent classroom, Dingding class and other online classes have appeared. Although MOOCs and various information-based teaching platforms were vigorously promoted in the early stage, many of these are of "cognitive" level, and only a few schools use it. With the outbreak of the Covid-19 and the new teaching background, each school can only quickly change the "thinking" mode and try new teaching mode boldly. At this time, front-line teachers encountered the confusion of information-based teaching ability in network teaching practice. Online teaching problems, online teaching management and evaluation problems, a series of new teaching problems occurred endlessly. In the face of massive information and knowledge resources and dazzling platform technology, most teachers could not effectively obtain valuable information resources that met the actual needs of their own courses, and how to fully integrate platform resources and curriculum resources made teachers and school administrators suffer. At the same time, the depth of teaching activities and information technology integration was not enough, teachers could not use information technology to solve the practical problems in teaching, and thus improve the teaching effect. Teachers' own information-based teaching ability and curriculum integration ability needed to be improved urgently. Normal university students are the backbone of future teachers and the reserve force of primary and secondary school teachers. Local normal colleges may think about how to cultivate the information-based teaching ability of normal university students and how to effectively organize and carry out teaching in the intelligent teaching environment with rich technology in the future. Based on big data modeling, this paper proposes how to better apply massive teaching information resources, improve teachers' classroom teaching efficiency, and improve the "cognition" of the application of information-based teaching ability between teachers and students.

## 2 Big data-related concepts

There is no unified and standardized definition of "big data", which is literally "big data". this "big" 's massive, and technology keeps growing over time. McKinsey said: " Big data has begun to penetrate into all industries, increasingly becoming an important factor of production, and will bring about a new change."[4] Schoenberg (Viktor Mayer. Sch nberger) and others believe that big data is all data that doesn't use shortcuts like random analysis (sampling). Big data focuses on correlation and does not pursue causality. "Big data focuses on correlation rather than causation. "To analyze huge amounts of data in a way that has never been done before to gain products and services of great value, or insights [5]." Big data refers to the collection, storage, analysis, integration and control of massive data, as well as related technologies and industries [6]. Big data has "7V" characteristics (see Figure 1), namely diversity (Variety), high frequency (Velocity), variability (Variability), bilabundance (Volume), authenticity (Veracity), value (Value) and Visualization (Visualization). These features can be further grouped into big data (BD), fast data (FD), and big computing (BC).

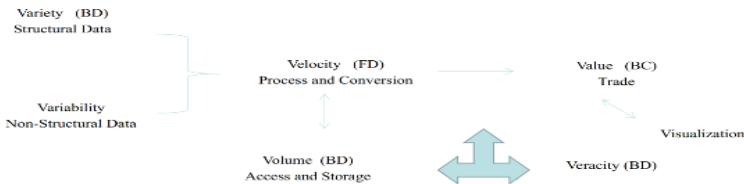


Fig. 1. "7V" characteristics (By Wang Yang)

### 2.1 Characteristics of big data technology

Big data provides high-quality resources. High-quality educational resources are the key to improve the level and quality of college education, and also the key to obtain the benign and sustainable development of colleges and universities. The emergence and application of big data technology provides rich and diversified high-quality resources for local universities, reduces the burden and tasks of educators, meets the personalized needs of learners, and improves the management level of university administrators.

### 2.2 Application of big data technology

In the information age, learners can access high-quality educational resources on the Internet anytime and anywhere, break through the time-and space-time limitations of traditional learning, and ensure the efficiency and personalization of learning. Educators can use Internet information technology to collect, organize, produce, share and disseminate high-quality resources on the Internet, and provide them to learners in the form of PPT and video, or the teaching plan resources, textbook resources, teaching videos, etc., to be electronically uploaded to the network and to realize online and personalized learning.

As a school administrator, we can make full use of the information related platform to reduce the management process, letting the data run more, and making the management more scientific and humanized. Online learning methods can also strengthen the interaction and communication between teachers, students and students. We together discuss and analyze problems together, overcome various obstacles in learning together, and lead students to improve quickly. At the same time, as a teaching manager through a variety of teaching feedback information, greatly improves the scientificity and objectivity of teaching management, rather than too subjective and ineffective teaching management. Under the big data technology, it has brought great advantages to the improvement of the education, management and scientific research level in local universities. Through big data technology, various and complex data and information can be collected, sorted out, summarized and applied, which improves the efficiency of data analysis and application. See Fig 2 Big data analysis cycle.



**Fig. 2.** Big Data Analysis Cycle (By author)

In data analysis and application, it can help universities to formulate scientific and reasonable development plans and goals, and promote universities to move into the correct, reasonable and long-term direction. In addition, it can also realize the storage and sharing of data and information, strengthen the interaction and communication between various departments and systems, improve the utilization efficiency of university resources, and promote the rapid development of colleges and universities. Creating a good environment and excellent educational environment can promote teachers and students to participate wholeheartedly in teaching and learning, so as to improve the teaching and learning efficiency of teachers and students. In the timely application of big data, it provides great convenience for the creation of an excellent educational environment. The reform and development of colleges and universities need to change from teaching mode first.

### 2.3 Teaching reform and big data technology

The teaching mode under big data technology has gradually changed from indoctrination to personalization, initiative and group cooperation, which provides a great role in promoting the cultivation of students' good habits and innovation ability. Theoretical knowledge can be in the form of graphic, video, music, animation, etc, to ensure the teaching content of the novel, advanced, practical, diversity, interactive learning platform, to create a good environment, improve the teaching quality, cultivate more excellent talents for the society, eventually avoiding the waste of more education resources to the nation.

### 3 Multi-party joint efforts to improve the information ability of normal university students

#### 3.1 The Construction of the teaching platform

At present, although local colleges and universities own their own big data resources, they lack of investment in hardware and software systems in the later stage. The utilization rate of their data resources is not high, and the lack of deep mining and analysis of data. Taking teaching evaluation as an example, big data technology can realize the multi-directional, multi-dimensional, whole-sample and whole-process evaluation of teachers, students, teaching process and teaching results, that is, the digitalization and visualization of teaching evaluation process and teaching results. Through these data and information, teachers can accurately understand the students' learning process and results to adjust the teaching process; managers can determine the effectiveness of teaching and understand the students' learning status in real time; students can realize self-diagnosis and improve the self-consistency of learning based on information feedback. However, although most local universities have collected evaluation data, they do not deeply mine and analyze the data in the process of data management. It is difficult to provide the mined data with deeper decision-making basis and reference, because it is too simple. Figure 3 is according to the author's experience in teaching management in recent years. Big data analytics has three purposes: to analyze the current situation, to analyze the reasons and to predict the future. Sufficient data volume is the foundation of big data strategy construction of enterprises, so data collection becomes the precursor of big data analysis. Collection is an important part of big data value mining, and the subsequent analysis mining is based on collection.

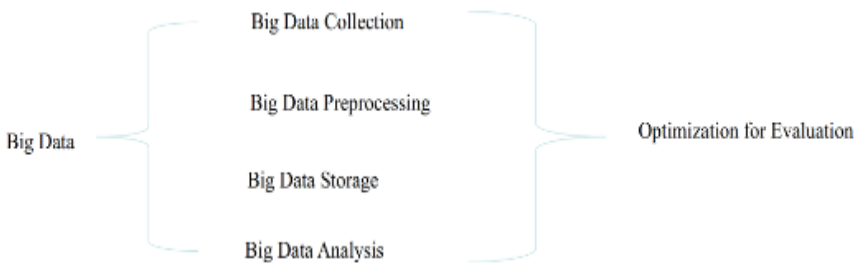


Fig. 3. The Model for Application of Big Data (By author)

#### 3.2 Integration of the campus management platform

Colleges and universities are composed of functional departments and secondary colleges, each with its own characteristics and management priorities, and all have their own information management system of the department. Although the school has also established an operation system dominated by business flow, such as the academic administration system of the Academic Affairs Office, the personnel management system

of the Personnel Office, the student management system of the Student Affairs Office, and the one-card system of the Finance Office, etc., the data ownership of each system is independent and incompatible with each other. Sometimes when the system is updated iteratively, the statistical results of the old and new system data are different. Different systems produce different types of data due to the different use of software and cannot directly connect, forming a physically isolated "data fault". That is to say, the current information barriers between the internal business departments of universities still exist, which cannot fully connect the whole process and the whole process of the business inside and outside the university. Therefore, building unified data center has become the trend of The Times. Both teachers or teaching managers, can be more intuitive understanding of the students and our teachers, such as teachers can access to the integration platform, much understanding their students 'growth experience, and students' characteristics from the experience, which can be more personalized counseling to students according to the characteristics.

### **3.3 Building a dynamic and multidimensional shared evaluation system**

In October 2020, the CPC Central Committee and The State Council issued the Overall Plan for Deepening the Reform of Education Evaluation in the New Era, requiring to reverse the unscientific education evaluation orientation, which triggered a boom of building a scientific evaluation system in various localities and universities. The information system has the functions of evaluation, inspection, specification, guidance, supervision and promotion, and has the functions of tracking, positioning and correction. Based on big data technology, using the efficient evaluation system as the criterion, teaching, scientific research, management, teachers, students and administrators and other elements of universities and various information of the external society can be presented digitally through the information platform. Sharing a multidimensional platform can realize the correlation analysis of data in different dimensions and the sharing of business data in various departments. breaking the shackles of internal data in the education industry and the "island" of the internal management platform to put education issues on the social network and data basis to seek the basis, and to solve the problem of data island between different fields, which is easy to conduct comprehensive and real-time evaluation of all links in colleges and universities. Changing the transformation of college evaluation from subjective experience to objective data, from macro ambiguity to micro quantification, changing from results to process, lets teachers, students and teaching management from the traditional education, teaching, management be effectively liberated. Students 'information ability can be effectively improved, and teachers' teaching gives them more enlightenment, interest and visibility.

## **4 The conclusion**

Thanks to the emergence and application of big data technology, the teaching and management ability of colleges and universities has been greatly improved. Based on the popularization of big data technology, artificial intelligence and 5G technology, the

higher education should be developed towards sharing, fairness, objectivity, standardization and visualization. At the same time, educational big data technology makes the improvement of the quality of higher education more objective and accurate, and it provides good support for the school to formulate talent training programs and teachers' teaching programs. Similarly, educational big data also makes accurate prediction, evaluation and correction of students' learning process and future development direction, which is conducive to further point out the development direction for students and helping students to grow into comprehensive and high-quality talents. Application of big data is to further improve the quality of higher education, teachers' teaching level and normal level of informatization. This is a complex process, and needs a certain energy and time. Through the dynamic analysis process to improve the teaching strategy, it provides students with benign learning conditions. Power teaching quality is soared, which still has a lot of development space.

## Acknowledgment

This paper is the phased achievement of 2019 Guangxi Science and Technology Normal University Education and Teaching Reform Project (Key Project): Research and Practice on the Construction of Primary School English Immersion Teaching Model under the Background of "Internet+" (Project No.: 2019GKSYJGA03)

## References

1. Wang Yang. Research on the reform of biology teaching mode under the background of big data [J]. Learning Weekly, 2021 (15): 67-68.  
<https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLASN2021&filename=XZHK202115032&uniplat-form=NZKPT&v=nzQsoBugdDWETyQmnFkWekZjHpxKxQvMcKmm5ub22jFOPblcp6EFwVarU88px->
2. Fang W D. The efficiency of political discipline teaching in the context of big data educational resources [J]. A Successful Way to Compositions (I), 2016 (8): 24.
3. Ding Yitao. Exploration of data mining curriculum reform in the era of big data [J]. Technology Wind, 2021(27): 27-29.  
[https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2021&filename=KJFT202127011&uniplat-form=NZKPT&v=J\\_Jwsd4QdZZEnkBF55bC\\_4MvjW16MOgvp9GXOAjDr3oHw9StleKRqxnphkUmMKd](https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDLAST2021&filename=KJFT202127011&uniplat-form=NZKPT&v=J_Jwsd4QdZZEnkBF55bC_4MvjW16MOgvp9GXOAjDr3oHw9StleKRqxnphkUmMKd)
4. Liu Zhihui, Zhang Quanling. Big data technology research overview [J]. Journal of Zhejiang University (Engineering Science). 2014, 48(6): 957-972.
5. Schonberg, Cukier. The era of big data: Great Changes in Life, Work and Thinking [M]. Sheng Yangyan, Zhou Tao, trans. Hangzhou: Zhejiang People's Publishing House, 2013:4.

6. Chen Qingxiu. Tapping the door of big data opportunity [N]. Learning Times.2014-10-13(3).  
[https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CCND&dbname=CCNDLAST2014&filename=XXSB201410130102&uniplat-form=NZKPT&v=yL\\_fDnos2gw4jol5zYq5PqQc0X2gW5P4KQxR93k2OEFYO Cxr4ShZ7W3X3Qi9cX\\_dI8TgohvFxG4%3d](https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CCND&dbname=CCNDLAST2014&filename=XXSB201410130102&uniplat-form=NZKPT&v=yL_fDnos2gw4jol5zYq5PqQc0X2gW5P4KQxR93k2OEFYO Cxr4ShZ7W3X3Qi9cX_dI8TgohvFxG4%3d)

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

