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Research on the Development and Service Model of University Information Center Based on Big Data

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ABSTRACT. *McKinsey, a famous consulting company, first proposed the arrival of the era of "big data". Today, "big data" has been closely related to every industry and every business function field in the industry, and has become an important production factor. The rise and rapid development of "big data" will certainly have a significant impact on the work of University Information Center. This paper analyzes the influence of the application of "big data" technology on the service function of the information center of Beijing Vocational College of technology, studies the innovative service mode of the information center under the big data environment, and strives to explore the ideas for the University Information Center to better expand its service and development in the era of big data.*

KEYWORDS: *big data; Information Center; service mode*

Big Data is a kind of data collection which is large enough to exceed the capabilities of traditional database software tools in terms of acquisition, storage, management and analysis. It has four characteristics: massive data size, fast data flow, diverse data types and low value density.[1][2] The application of big data technology in modern society has obvious significance. Mastering huge data information is the basis of the application of big data technology. The cleaning and analysis of "data" are the core of big data application. Simply from a technical point of view, big data is highly related to cloud computing and is often inseparable in the specific application process because in the analysis and processing of large datasets in any industry application scenario, a framework like MapReduce is required to assign computing tasks to the server computers of each node, thus locking in large data totals. The distributed architecture of computing, which uses non-relational database, cloud storage and virtualization technology, ensures the spread of distributed data mining for large data.

In 2014, big data was first written into the government work report, which also became the actual "Year of Big Data in China". [3] The flourishing development of our big data industry also started. From 2014 to 2017, the "Big Data" appeared in

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government work reports many times and was interpreted and emphasized as an important role. At the first meeting of the 13th National People's Congress on March 5, 2008, Big Data entered the government work report for the fifth time. From this, we can see that "Big Data" will play an important role in the construction of scientific socialism in the new era of our country in the future.[4]

Each University Information Center is an important functional department of the latest information technology application, research and practice in each university. The application of "big data" technology is an effective way to innovate the service work of university information centers. At the same time, as an information center that grasps the core of information technology in Colleges and universities, it is time to take advantage of this rare opportunity, strengthen research efforts, and strive to explore how to improve the information service ability under the background of "big data", and gradually become the big data collection center, computing center and storage center of schools. Beijing Industrial Vocational College is one of the most influential higher vocational schools in the country. It is a national model higher vocational college with excellent grades, a top 50 university with typical employment experience, and a construction unit of "characteristic high-level vocational colleges" in Beijing. The Information Center was established in November 2009 on the basis of the original network center. The Information Center of our university is the leading unit of the informationization construction of the industrial and technical institutes. At present, all the software and hardware devices in the center can acquire and store the large data of the schools, so as to make full use of the large data technology in the information center, and to provide comprehensive and high-quality services in many aspects such as school teaching, scientific research and management. Technical support has been provided.

1. Big Data on University Information Center

At present, the business and service focus of most university information centers is to maintain the network facilities and existing data storage of "digital campus". On this basis, it can be extended to the acquisition and storage of information resources, as well as the later cleaning, processing and analysis and utilization. For the school information center, if it only locates itself as a resource center for collecting and storing information for the whole school, it will not be able to cope with the arrival of the era of big data, nor will it be able to realize the transformation from "network information center" to "data center" based on big data. Under the background of big data, teachers, students and management departments at all levels not only require information centers to visualize in network environment, equipment and facilities maintenance, information collection, storage, publication, etc., but also hope that information centers can quickly and accurately perceive teachers and students'education, teaching and life work by relying on a large amount of unstructured data, such as "one-card" behavior of teachers and students. Aspects of the demand, and these large data will be processed accordingly to provide specific services. Therefore, on the basis of data collection, the business services of Information Center should extend to the field of analysis, processing and processing

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of large data. Some key technologies of large data can be utilized, such as: Distributed Storage System (HDFS), MapReduce Distributed Computing Framework, YARN Resource Management Platform, Sqoop Data Migration Tool, Hadoop-based Data Warehouse, etc. Source analysis, processing and visual push, to provide a more targeted comprehensive information service for teachers and students. At the same time, we can use big data technology to expand new service projects, and create a technical basis for schools to store and analyze data, integrate resources, provide personalized services, and enhance service capabilities, so that the broad masses of teachers and students can better experience the high-quality services that big data brings to everyone's business and life.

2. Service Innovation Model of School Information Center in Two Data Era

The Information Center of Beijing Industrial Vocational College has been continuously exploring how to make use of the existing technical advantages of the Information Center to seamlessly link up the application of big data with information technology services under the new situation of "big data age".

2.1 Realize data resource reorganization and sharing.

The application of large data technology is based on the acquisition of large and interrelated datasets to complete a series of business processes such as data resource storage, analysis and decision-making. However, in the process of building their own systems in previous years, departments did not fully consider the functions of large data services, which makes the data resources stored in the existing systems have very large personality differences, and can not achieve the interconnection of data resources, which is often referred to as the "information island" phenomenon. The application of big data touches all business systems in schools, and its impact is all-round. Such as: network structure and communication, data resources construction, educational system and scientific research management system construction, school administration system construction, etc. However, in the previous stage of "digital campus" construction, in the process of the system construction of each business unit itself, there exists the phenomenon of overlapping system functions and blurring function boundaries, which leads to a large amount of data redundancy and splits the data sharing and exchange among independent systems.

"Data Isolation" will inevitably lead to the formation of "Information Isolation". From the technical level of data resource construction alone, "Data" lack of correlation, and the database can not be interconnected. Each secondary unit has its own information processing system, each defines its own data storage format and data exchange protocol. Each secondary unit's data resources operate independently, and it is unable to achieve data connection and exchange between the units of the whole school.To solve the above problems, we need to open up all "information islands" from the school level, connect each "data islands", and build a data sharing center based on the school level. In order to analyze, process and process the data, it

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is necessary to integrate the existing data into valid data before it can be used for statistical analysis and data mining to extract data information related to the individual development of teachers and students and the overall development of schools.

At present, there is less data interconnection and communication among the various units of the school, which is basically in an isolated operation state. Although major functional departments such as student management, educational administration, personnel management and financial management have established a relatively complete information management system, data exchange among the systems has not yet been achieved, and the comprehensive ability of data at the school level still needs to be improved. Only breaking the "information island" and realizing data sharing can help the application of big data technology in the comprehensive management of schools.

2.2 Building a Big Data Platform

With the construction of digital campus in Colleges and universities, the information center has accumulated a large amount of data related to the operation of the school, such as data of teaching operation management resources, data of teachers and students' consumption behavior, information of dynamic operation of various large instruments and equipment, data of business systems of management departments, etc. It also includes students' query results through the campus network, changes in school status, selection of courses and participation. Individual needs information such as registration for social examination; teachers query teaching feedback through the campus network, suspend class information, exchange data traces of answer between teachers and students in the course center, teaching reform and progress query of scientific research projects, check and accept of questions, and other teaching and scientific research data. These data are complex and can be divided into structured and unstructured data types that will be used to build large data platforms.(as shown in Figure 1)

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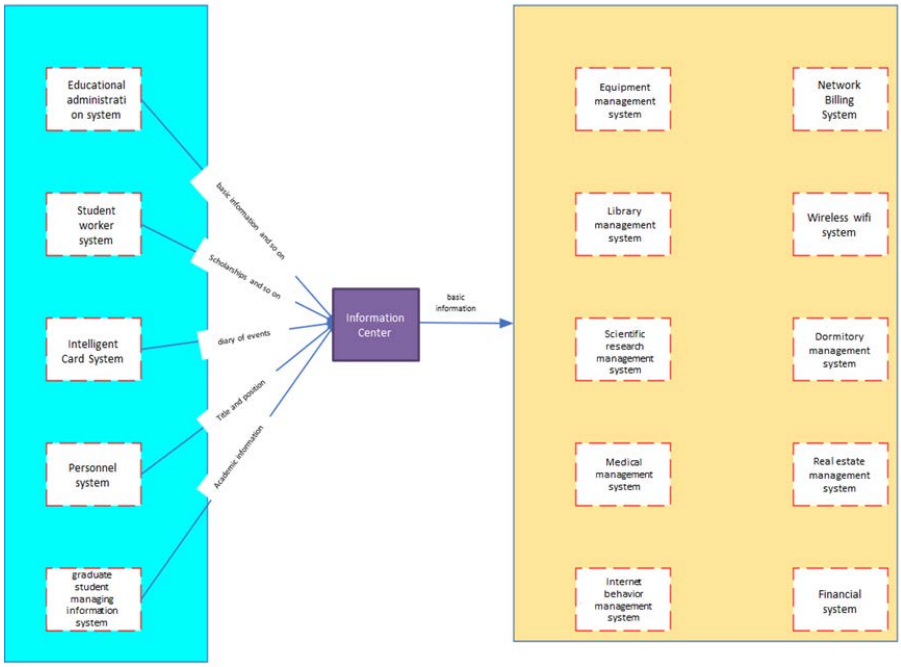

Figure 1

To build a large data platform for schools, the first thing to complete is the top-level design of the large data application system for schools, whose core work includes the requirements and goals of building the platform. Requirements refer to the establishment of a work information base by the functional departments of a school according to their respective functional positioning, in accordance with the unified big data standards and interface requirements of the school. On this basis, a unified public service platform for management information of the school is gradually established, which enables the integration and sharing of management information among departments and lines. At the same time, this platform can also provide big data support for "one-stop service" for teachers and students, campus-level management, and school-level analysis and decision-making. During the whole construction process, the school information center is the designer and leader of the construction task. The construction of large data platform in schools mainly solves three core problems:

First is the collection of large campus data. On the basis of integrating the existing large data of the school, comb out the large data categories of the school, and integrate the data of each business system needed under the premise of ensuring the normal operation of the school business system. At the same time, large data collection tools are selected to allow users to collect large data free from the system, such as Excel, dbf, txt, centrally according to the template, and then use big data

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cleaning tools to form a relationship with individual teachers and students and business departments, and then build the basic large data set. The second is to establish the application scope of big data. Set up a large database of topics and conduct multi-level comprehensive theme analysis. It is especially recommended that the main body of big data application should participate in the construction of large data service system, so as to ensure that the target of big data application is clearer. The third is to condense the big data application strategy. In the new multi-level service system of large data, it is necessary to clean, process, transform and reorganize all kinds of large data generated by business departments, and to realize data interaction in the large data platform of the information center so that the data application process of each department can directly dock with the large data center platform, thus reducing the overall operation pressure of the system (as shown in Figure 2).

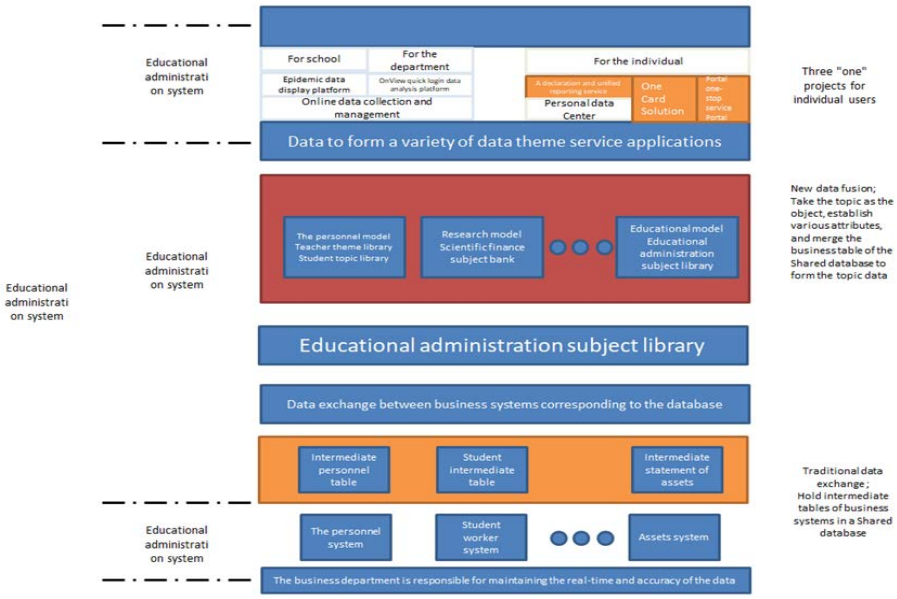

Figure 2

2.3 Big Data Service System Supporting Platform Construction

The large data support platform mainly includes the following three aspects: the first is the construction of large data collection and sharing tools, including large data collection and sharing tools (Exchange), large data synchronization tools (ODI), and distributed large data storage cluster (GP).The second is the construction of large data analysis platform, including Qlik View platform; Dss platform and analysis software platforms such as AS, SPSS, Matlib. The third is the construction

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of data service tools, including workflow engine, table-to-table platform and personal data center platform. Through the above construction process, a benign large data ecological environment is gradually formed (as shown in Figure 3).

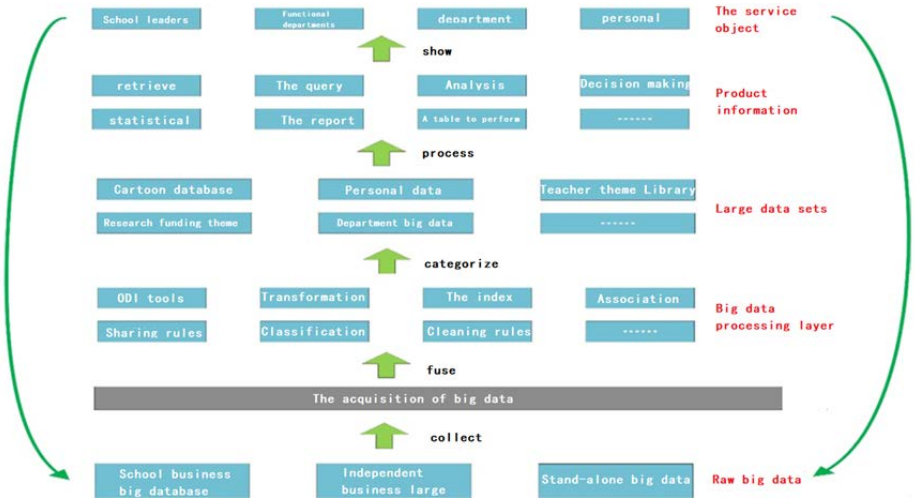

Figure 3

3. Innovative Service Types of University Information Centers

The application of big data technology has stimulated the innovation and development of service types in university information centers. Based on big data technology, it also integrates related technologies such as big data, cloud computing and artificial intelligence, establishes a personalized service system, and provides support for subject construction, scientific research and social services.

3.1 Big Data + Artificial Intelligence

Artificial Intelligence, short for AI. It is a new technological science to research and develop theories, methods, technologies and application systems for simulating, extending and expanding human intelligence.[5] In recent years, with the progress and development of information technology in our country, the intelligence of information industry has become the future development trend. In December 2017, Artificial Intelligence was selected as "Ten Popular Languages of Chinese Media of 2017".2019 is considered the "first year" of many new technologies and technologies.[6]

AI is inseparable from large data. Xu Zongben, academician of the Chinese Academy of Sciences and director of the National Engineering Laboratory of Big Data Algorithms and Analysis Technology, believes that the core of AI is Big Data

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Technology.[7] Big data technology accelerates the development of artificial intelligence, and the gradual improvement of big data collection promotes the extension of the field of "Intelligence Perception". The development of analysis and processing technology of big data accelerates the promotion of "Intelligence Perception". [8] The development of visualization display technology of big data, realizes the progress of "Intelligent Display" and "Human-Computer Interaction" technology. Under this background, university information centers should make full use of the organic integration of big data and artificial intelligence technology to expand service areas and optimize service system. On the basis of gradually establishing and improving the large data service, our center strives to carry out the following research in the field of artificial intelligence: (1) the construction of personalized information service system. Information centers can obtain personalized needs information of teachers and students through existing large data resources. Use data analysis technology to present everyone's preferences and personalized information services for them.(2) Explore how to expand the application of big data technology in the comprehensive management service of schools. With the help of large data technology and artificial intelligence technology, the information center should explore many aspects such as intelligent information literacy education, intelligent voice search service, intelligent resource management service, intelligent campus environment control, carry out data association, data mining and analysis, and set up an integrated management service system of artificial intelligence in Colleges and universities.

3.2 Big Data + Personal Service

The information center is responsible for the management and maintenance of many information systems, including school teaching operation and management, scientific research management, organization and personnel management, student management, logistics support, and so on. The corresponding database resources of each system are also rich, large data technology can be used for analysis and processing, which can provide a richer personality for departments and teachers and students. Make a selection.

The university information center can train the relevant technical personnel who master the big data technology, so as to realize the comprehensive management of data acquisition, data storage, data transmission, data calculation, data distribution, data mining, data presentation and data security. We take the management of poor students in the student management system as an example. The information center can get the related data of students on shopping platform through the student management platform, such as transaction records in school canteens, supermarkets, etc., the frequency of consumption per semester, the time of visiting shopping websites and the number of visits to determine students' consumption behavior. At the same time, it can formulate a unified data standard. A unified analysis strategy will be used to provide technical support for the application of unified standards by school student management departments to determine whether students are poor or not and their poverty level. In addition, personalized work-study positions can be

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provided for different students.

3.3 Big Data + Mobile Services

Information dissemination based on mobile communication tools has become more and more abundant. People can extract information faster and more conveniently through mobile phones, tablets and other mobile devices, without the restrictions of time and place. Information services in Colleges and universities are also increasingly using the advantages of mobile devices to set up large data service platforms in the background to precisely push information services. For example, an information center can set up a school or its own WeChat public number. Teachers in the center can be responsible for the maintenance of public numbers. In addition to announcements, announcements, news updates and academic updates, they can also develop WeChat applets based on the special work of the information center and current development capabilities to facilitate the collaboration of teachers and students to build a large data acquisition platform on the mobile side. For example, the video material of academic reports of well-known scholars both inside and outside the school can be promoted by public numbers, and the online evaluation of each lecture by students in the platform public space can be analyzed by statistical analysis. The enthusiasm of teachers and students for academic reports can be perceived. Different types of academic reports and lectures can be propagated and promoted by assistant decision-making technology. In addition, the center can also develop evaluation function modules for its own services, keep abreast of the evaluation information of teachers and students, timely improve the work, and continuously improve the accurate push information service.

3.4 Big Data + Subject Services

By collecting and analyzing the data of all disciplines and specialties in our university, we can provide the data information basis for our professional construction work. Information is the basis of decision-making. Without reasonable data and information, relying solely on the traditional empirical decision-making model, the scientificity of decision-making is difficult to achieve.[8] Big data technology is characterized by its comprehensiveness, enormity and diversity. At the same time, big data enables real-time analysis of real-time data, especially data capture and cleaning technology, which enables the classification and collation of all data. Our university's professional construction work can just make use of the special properties of big data technology to grasp the dynamic data of teaching management departments in real time, and provide data and decision support for the school's Teaching Guidance Committee and the leadership of the school administrator.

Combining big data technology with professional construction, and combining regional development needs and industry needs, we can make our professional construction better fit with regional economic development. At the same time, we can maximize the social service value of the school by delivering high-quality

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talents to related industries.

The construction of scientific research platform in our university can not be separated from the large data boost. The construction of disciplines and specialties can not be separated from the cross-integration and mutual support of multi-disciplines, the condensation of scientific research direction under the background of various disciplines in schools, the improvement of scientific research capability, the construction of academic teams, the purchase of scientific research equipment, and so on, are inextricably linked with the construction of disciplines. Under the premise of supporting teaching by scientific research, scientific analysis of existing teaching and scientific research resources in schools and further optimization of the linkage configuration of teaching and scientific research resources will provide more scientific basis for subject construction.

4. Conclusion

Our University Information Center should gradually explore a new service architecture based on large data. Utilize existing equipment conditions and talent technical reserve to build an innovative service mode of information center in the big data age, make full use of big data technology to improve the service capacity of information center, and promote the progress of information center service in our university from data to intellectualization, so as to better protect and protect the construction of high-level vocational colleges.

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