Research on the Construction of University Computer Service Platform Based on Cloud Computing Technology

Haiyan Wang*
Jiangxi Industry Polytechnic College, Nanchang, Jiangxi 330095, China

*Corresponding author: 313433937@qq.com

Abstract. Compared with the concept of campus network, the concept of digital campus is much richer in connotation, covering a wide range of contents, including not only the construction of hardware facilities and network systems, but also providing digital services for teaching and research, management, life services and other aspects. Traditional daily teaching and educational administration is mainly carried out by hand, which has disadvantages such as heavy workload and trivial things, and it is difficult to improve the management effect and level. The development of big data technology can more effectively guide teachers and students to learn independently. The cloud service teaching environment based on big data can not only monitor teachers' teaching process, but also analyze students' learning process and predict each student's learning effect. This paper analyzes the problems existing in the traditional computer service environment, the common difficulties of working in different places, and the new situation faced by teaching organizations, and discusses the construction scheme of university information service platform based on cloud computing technology.

Keywords: Digital; cloud computing; service platform

1. Introduction
With the advent of the era of big data, the past construction of digital campus has been unable to meet the needs of the times. Colleges and universities need to actively carry out the construction of smart campus service platform. The Internet, cloud storage and other technologies contained in the smart campus can provide assistance for college education [1]. With the development of the new generation of mobile communication technology, the construction of digital campus meets the new opportunity. The traditional digital campus is only a part of education informatization, which realizes the management and application of campus information resources, but it is not really intelligent [2]. Using big data technology can better represent heterogeneous data and analyze data, analyze a lot of valuable knowledge, and build a student behavior knowledge base with set retrieval, calculation and analysis [3]. Through data mining and intelligent analysis, we can timely grasp students' learning dynamics, and comprehensively evaluate students' learning process, learning effect and learning ability [4]. In the smart campus, various computer networks, cloud computing and mobile Internet technologies greatly facilitate the daily life and learning work of teachers and students in the school [5]. All kinds of big data sharing and exchange platform, unified identity authentication management and other functions
provide assistance for school management [5]. The era of big data needs a campus service platform with better data processing ability and higher integration. How to build a smart campus service platform in the era of big data is the dilemma of every university [6].

With the continuous improvement of the level of social science and technology, the construction of university campus begins to move towards the construction of smart campus in the era of big data. In the past, the form of digital campus construction was single, and the content was relatively scarce. Most of them were based on the construction of information education, mainly for the unified management and application of various resources of campus education [7]. Digital campus is to build a digital space on the basis of traditional campus, so as to expand the dimension of time and space of real campus, so as to improve the efficiency of traditional campus, expand the functions of traditional campus, and finally realize the comprehensive informatization of campus activities [8]. Colleges and universities, as the processing plants of cultivating talents and the gathering places of high-quality talents, should not delay the development of education informatization and management informatization, and should make their own unique contribution to this [9]. The development of cloud computing, big data storage and mobile Internet technology provides new ideas for the construction of university computer service platform [10]. Using the advantages of big data and cloud computing technology, this paper introduces the advanced concept of big data and cloud services into the construction of university computer service platform. This paper analyzes the problems existing in the traditional computer laboratory, the common difficulties of remote office, the new situation faced by the teaching organization, and discusses the construction scheme of university information service platform based on cloud computing technology.

2. Overall requirements and objectives of network system

Smart campus is an upgrade of digital campus, which uses new information technology, including mobile internet, sensing technology, knowledge management and social network, etc., to build a service platform that can perceive the campus environment and intelligently identify teachers and students. Nowadays, the archives of every university keep such a large amount of dead information, and a large number of academic papers, various reports and achievements of teachers and students in colleges and universities have been accumulated because they have not been disseminated and released in a timely and extensive manner. If it can't be fully utilized, it is a huge waste of both school resources and social resources. With the rapid development of modern information technology, archives work has been brought into a new stage of automation and networking. The construction of Internet, Chinese education and research network and university campus network has brought severe challenges to the archives work in colleges and universities, and also brought rare opportunities for the network construction of university archives [11]. To realize efficient social functions, we must attach importance to the construction of this information platform. Under the background of big data era, massive information gushes out, which puts forward higher requirements for the transmission speed and timeliness of information processing.

The data stream is characterized by fast speed and obvious real-time. In the era of big data, we need to face a lot of rapid data transmission. It is necessary to consider whether we can control the data flow in such a state for the construction of smart campus service platform in colleges and universities. With the continuous expansion of the scale of colleges and universities and the continuous improvement of the level of running schools, colleges and universities have increasingly become the high-concentration center of human resources and scientific research resources. It not only plays the traditional functions of dispelling doubts, preaching, teaching and training talents, but also shoulders important scientific research tasks, is the base of knowledge innovation and growth, and has a large number of scientific research and academic resources output. The opening of campus network provides advanced technical means and brand-new network environment for school teaching, scientific research and management. Teachers and students can cooperate with domestic and foreign experts in scientific research projects, inquire about information, exchange academic information, prepare various meetings, etc. without leaving school or going abroad, which saves money and wins
The core idea of cloud computing is to manage and schedule a large number of network-connected computing resources in a unified way, form a computing resource pool to provide users with on-demand services, complete the processing and analysis of large data sets, and provide users with efficient cloud services. In the cloud computing environment, users can use terminal devices at any time and any place, and directly obtain the resources they need from cloud services through the network. The network platform and resource providing mode are shown in Figure 1.

![Network platform and resource provision mode](image)

**Figure 1** Network platform and resource provision mode

With the extensive use of computers and the rapid development of the network in colleges and universities, a group of computer system development, maintenance and application talents have been trained. These provide favorable conditions and strong technical guarantee for the network construction of archives. Smart campus has changed the lifestyle of all teachers and students, organically combined campus physical space and digital space, improved the level of school information services, and truly realized the new generation of information services centered on teachers and students. Smart campus can identify the study, life, work and individual characteristics of all teachers and students, and realize the expansion of digital campus. Big data usually adopts distributed storage, distributed architecture and distributed data mining, which relies on cloud storage, distributed database, distributed computing and virtualization technologies of cloud computing.

Although the application in the field of education has just started, the sharing and cooperation of data and platform has become a hot spot of educational informationization based on the strong support of the state for educational informationization. Students need to use the campus network to choose courses, but because of the sudden increase in the number of students, the campus network server can not afford higher clicks in a short time, which leads to many problems in students' course selection. In the era of big data, students can work on the Internet through mobile phones, but some tasks cannot be completed on the mobile phones, and the lack of campus network construction will cause inconvenience for students to use computers.

### 3. Construction of smart campus big data service platform based on Cloud Computing

#### 3.1. Construction of public data integration platform

As the basic platform of the smart campus, the public data integration platform is responsible for collecting all relevant information and data in the campus, and providing assistance for the school to carry out educational work and management by screening and sorting out valuable information. In the construction of university smart campus service platform in the era of big data, it is emphasized that the construction of public data integration platform can provide necessary educational resources for all teachers and students on campus, and strive to complete resource sharing. Virtualization is the key
technology of logical division of physical resources, allocation and management of cloud system resources, isolation of different users' operating systems and cloud application systems, and separation of physical hardware and operating systems. Smart campus big data service platform should give full play to the value of smart platform, provide decision support for school management, and establish a bottom-up management mechanism. Carefully analyze users and managers related to the platform, determine use cases, and embody intelligence. According to different activities needs of users, an efficient cloud system resource allocation algorithm is adopted. According to different application system requirements, different levels of software and hardware, transmission networks and data storage resources are separated, and cloud system resources are allocated according to different needs of users, thus forming a centralized logical management and dynamic allocation of cloud system physical resources.

In order to adapt the big data integration platform to the changes in the era of big data, it is necessary to continuously optimize the hardware infrastructure to ensure the normal development of educational information in processing, collection and dissemination. The interactive cloud platform of teaching resources is shown in Figure 2.

![Interactive cloud platform for teaching resources](image)

Figure 2 Interactive cloud platform for teaching resources

In order to provide higher quality educational information to teachers and students on campus, we can classify and store educational information and learning information, and then emphasize the construction of smart campus for students, so that students can actively use smart campus to obtain educational information. Virtualization technology ensures users' demand for specific resources, reduces the occupancy rate of irrelevant resources, and improves the scalability and dynamic management of resources by logically isolating users, applications, resources and loads. In addition, virtualization technology can build flexible application system architecture according to load status and user service requirements, and realize rapid deployment, management and scheduling of resources according to service object requirements. To give full play to the service function of archives, we must combine the characteristics of archives resources and the requirements of clients, and make full use of all conditions and forms, so as to give better play to the service function of archives [14]. Most of the living spaces of teachers and students are based on schools, so the services in schools must meet the needs of teachers and students. Only in this way can teachers work normally and students improve their learning efficiency. With the help of the school management platform, the internship information and employment information of each student can be effectively integrated, and teachers can obtain the detailed information of a student in time.

3.2. Construction of school management platform

A high-quality network system must be safe, reliable and efficient, and the network management system is an essential tool to achieve this goal. When designing the network, the fault tolerance of the network system should be fully considered. If the network does not have this capability, it should at least inform the managers that the network has failed, so that the managers can handle it in time, thus
reducing the downtime of the system. Because the traditional service mode of archives is to consult, it is necessary for employers to send people, which is not only time-consuming and laborious, but also because the cost is too high, many units do not send people, resulting in blocked information channels and opaque information, which provides some people with low awareness with speculative opportunities. The data source layer effectively integrates distributed software and hardware resources, and forms a virtual resource pool for scheduling through virtualization technology, which is provided to the upper layer service, and at the same time, forms an independent data source service for other layers to use independently. According to different data sources, different data extraction methods are adopted. For the data of well-structured information systems, the data is extracted into the database by common tools. For the unstructured data such as web pages, courseware and videos, the data is indexed by data capture and stored in the database to form a distributed database [15].

Using the school management platform, students' majors, genders and specialties can be used as indicators to sort out the data. Teachers can also learn about different students' pursuit of work through the collected students' internship information, which can provide a reference for the school to hold job fairs and screen units in the future. The supply relationship of teaching resources in cloud platform is shown in Figure 3.

![Figure 3 The supply relationship of cloud platform teaching resources](image)

It has become a common understanding that science and technology are the primary productive forces in the development of modern society, which leads to the unsatisfied social needs and the great waste of scientific research resources in universities. If we build an open information platform for scientific research archives in colleges and universities, and build it as a smooth channel for information output in colleges and universities and information collection in society, we can break through the limitation of time and space, provide these information to the society, and give play to its better social service function. The school management platform will also store the financial data of the school for many years, and the school administrators can make more valuable financial policies by analyzing the input and output of these data. School management platform will also provide discipline construction data, which can give guidance for school discipline design and arrangement. Through data management, data resources can be scheduled and allocated more effectively. Data analysis mainly provides an effective analysis method for upper-level data mining, and calls different data analysis methods according to different requirements. The application service layer provides personalized resources and information for students' learning effects, learning interests and living conditions through data mining, which effectively improves teachers' teaching efficiency and the efficiency of educational administration.

4. Conclusions
Big data has a wide range of applications, and it is an inevitable trend for colleges and universities to build a smart campus service platform. Through the smart campus service platform, we can share and exchange big data, optimize the allocation of information resources in colleges and universities, and
provide more convenient services for teachers and students. With the continuous advancement of digital teaching in colleges and universities, building a big data teaching service platform based on cloud computing with big data concept and cloud computing technology can promote the sharing of teaching resources, intelligent access to resources, sharing and cooperation of scientific research and other applications, and individualized and diversified teaching methods, and provide more efficient and convenient cloud services for teachers and students, which has a good application prospect. The society is in a state of continuous development. For the construction of colleges and universities, efforts should be made to adapt to the changes of the era of big data, and it is the general trend to actively carry out the construction of smart campus service platform in colleges and universities. By building a smart campus service platform, all kinds of information and resources on campus can be organically integrated, and the problems of teachers and students in learning work can be understood in time. The information obtained through the feedback of teachers and students can also provide assistance for campus management. With the expansion of university scale, teaching, office and scientific research urgently need a convenient and sustainable supporting environment. Only by relying on information technology, using cloud computing technology, relying on convenient and high-speed campus network, and building a full-service information service platform, can this supporting environment be realized.

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