Research on the digital education resources of sharing pattern in independent colleges based on cloud computing environment

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Abstract. Cloud computing was first proposed by Google Company in the United States, which was based on the Internet center, providing a standard and open network sharing service approach. With the rapid development of the higher education in China, the educational resources provided by colleges and universities had greatly gap in the actual needs of teaching resources. therefore, Cloud computing of using the Internet technology to provide shared methods liked the timely rain, which had become an important means of the Digital Education on sharing applications in the current higher education. Based on Cloud computing environment, the paper analyzed the existing problems about the sharing of digital educational resources in Jiangxi Province Independent Colleges. According to the sharing characteristics of mass storage, efficient operation and low input about Cloud computing, the author explored and studied the design of the sharing model about the digital educational resources of higher education in Independent College. Finally, the design of the shared model was put into the practical applications.

1 Introduction
In recent years, the computer technology and Internet technology had been rapidly made, so as to promote the fast development of cloud computing. At the same time, with the expansion of China's college students, education resources was rapid construction, the powerful function of digital education in colleges had been penetrated into the various fields of university education, but the gap about the educational resources provided between the colleges and the universities and the actual needs of teaching resources were very large. Therefore, the colleges were eager to seek a sharing mechanism about the digital educational resources. Cloud computing was an important way to share services in the Internet age. It became a popular means and hot technology of educational resources in colleges and universities.

As the rapid development of computer technology that stimulated the blooming of cloud computing, while the level of tertiary education had been enhanced. Digital of university education had been penetrated into a range of fields in higher education. Cloud computing as the current popular technology was applied to the sharing of educational resources in colleges and universities, which affected the aspect in teaching methods, teaching resources, management and sharing pattern of Cloud computing. It had eventually changed the teaching of higher education, especially under cloud computing environment. Based on the characteristics of Independent Colleges, how to build a digital education resource sharing model had become an urgent need to solve the problem, but also with the Independent Institute was an important research topic.
2 The Concept and Characteristics of Cloud Computing

The concept of cloud computing was first proposed by Google, which was an Internet-oriented, large-scale server cluster in the provider of massive storage capacity and processing capabilities that could help users provide fast, convenient, safe and effective large-scale data storage services and network computing services.

Cloud computing was based on computation, centers on customers’ needed and featured predominantly on cloud computing. A shared platform-cloud computing gathered mass resources, meet the requirement of its clients, provided an open, standard resource-sharing service for its user and made full use the Internet resources. The following Table 1 depicted the technical features of cloud computing including datas, users, server and function.

3 The Current Situation and Existing Problem of Digital Education Resources Sharing in Independent Colleges in Jiangxi Province.

Digital educational resources were the main educational resources in colleges and universities, almost all of the independent colleges had their own scientific research, teaching and administrative office-specific campus network. However, there were many complications in the construction of digital educational resources sharing in independent colleges. According to the survey and analysis of independent colleges in Jiangxi Province, the vast majority of independent colleges had created remote network education resources, they could be provided to the off-campus users, which mainly included online courses, excellent courses and other resources. The majority of digital educational resources, such as college campus network of multimedia resources, discipline construction resources, they were limited to internal users in colleges and universities. It could be not accepted to external users. Even some of the resources, whether the user in internal or external both could not access it, so it led to the repeated construction of resources.

| Table 1: the technical characteristics of cloud computing |
|----------------------------------------------------------|
| **Technical characteristics** | **Characteristics explanation** |
| Cloud data characteristics | The data stored in the "cloud", through the Internet, data could be simultaneously by multiple users accessing different regions; the data stored in the "cloud" was safe, reliable, we did not need to worry about data might be damaged by a virus, hackers and so on. We also did not need worry that the problem of network hard disk would lead data loss. |
| Cloud server features | The cloud server could be dynamically expanded. For the virtual resources could be constructed by the virtual technology so that provided users with low, dynamic, high performance service platform; The platform could also carry out real-time backup services and expansion, and other operations by virtual technology. |
| Cloud user features | There was not any requirements of cloud computing to cloud client devices. The users could use mobile phones, computers and other devices accessing to cloud services by networks. Users did not think about software installation, service upgrading, system maintenance. |
| Cloud performance characteristics | Cloud computing environment platform had a strong versatility, which could provide users with a huge amount of storage space, super computing power and unlimited expansion capabilities, and it also could demand a variety of users’ needs. |
The purpose of educational resource sharing was to improve the utilization of digital educational resources; it was also to promote the information management of education, and it was to optimize the allocation of educational information resources. Therefore, the use of cloud computing environment about virtualization technology and distributed storage system advantages, we explored and studied the independent college digital resource sharing model were to make the digital educational resources between schools or between the various departments to enjoy. It effectively improved the independent college information resources and infrastructure utilization, it could achieve a simple unified management model, so that incomplete, decentralized digital educational resources could optimize the integration.

4 The advantage of Cloud Computing for the Sharing of Digital Educational Resources in Independent Colleges in Jiangxi Province

Using virtualization technology and distributed storage system to break through hardware bottlenecks and regional barriers was the most prominent feature of cloud computing. Giving full play to the characteristics of the cloud computer could make the independent college education information resources and infrastructure to share, to improve their educational resources and infrastructure utilization, to reduce the cost of building resources. We created a simple and unified management model for the cooperation of the school, cross-sectoral, school-enterprise and campus management. So that educational resources were integrated and used.

Through the pre-survey and analysis of independent colleges in Jiangxi province and the prominent advantages of cloud computing, the advantages of digital educational resources sharing in independent colleges were as follows:

(a) It could be dispersed, for the integrity of the organic integration of education resources. Independent colleges and universities constructed high-quality educational resources across the province.

(b) It could avoid the repeated creation of independent educational resources. The independent college information resources were organically integrated together, which improved the limited use of resources. According to the complication of redundant construction, lack of sharing, lack of cooperation and resource islands in the independent colleges in Jiangxi Province, the high-efficiency data storage and computing service based on cloud computing not only solved the problem of the sharing of digital educational resources in independent colleges, but also provided a proposal to set up sharing of educational resources among independent colleges in Jiangxi province.

Initially, cloud computing to parallel computing as the core, had a strong computing power, on-demand computing resources and task allocation to meet the different characteristics of different areas of computing needs, while achieving large-scale terminal access to ensure data sharing. Furthermore, cloud computing using distributed storage systems, with multiple copies of fault tolerance and massive data storage capacity, there was no space constraints, and safe and reliable. The use of that merits, it could completely meet the demand to enlarge educational resources and diminish the risk of resource storage in colleges and universities.

Finally, the use of cloud computing layer was to meet the external to provide terminal services. This layer contained the independent college digital educational resources sharing platform, management procedures, intermediate procedures and online applications, and their business logicity between the relationship. At this layer, users could use the middle-ware system to create their own shared space, and with other users to share resources. The embodiment layer of cloud computing not only embodied the powerful calculation and storage capacity, but also provided with various network services, such as online software services and online platform services.

(c) It was conducive to office automation, resource sharing, knowledge management and resource sharing as well as knowledge management in digital education resource service platform of college by building cloud service platform. Universities could more effectively store and organize education and teaching resources, and can use cloud service platform to establish cloud computing. It could also solve the problems such as lack of resources, disorder of organization and uncoordinated management in the traditional learning platform. Teachers could use platform services to achieve cross-school
scientific research, technical cooperation projects, technical exchanges, teaching and scientific research to share. Students used the cloud service platform which could be a comprehensive access to quality educational resources in the cloud service environment.

(d) Initiating a cloud service platform was conducive to reducing the independent institutions of hardware investment, saving resources construction costs. With the expansion of the number of college enrolment, colleges and universities were seeking an effective way to create educational resources. The history of independent college normally less than a decade and it had to invest a lot of expense in equipment and software updates. However, computing and storage of educational resources could be used to the way that the user could pay for money in connection with their demand and use the principle of pay-as-you-go within cloud computing environment. Thus it reduced the capital investment and maintenance of the equipment.

(e) Fabricating a highly-integrated teaching management system could promote the teaching management model changes, and improve teaching quality. Basic Internet "Software as a Service" that provided software patterns was one of the core ideas of cloud computing. Cloud platform could provide a comprehensive, high-quality services. Independent College could be based on the cloud environment of online software services, online platform services, such as time and space in the entire line in an information management system for teachers and students to provide one-stop quality service. You could also use the cloud computing platform for colleges and families, government agencies, social institutions, enterprises and institutions linked together to build an open model of distance education resources to achieve school-center, outward extension of a management development system. It had promoted the reform of educational management mode, the reform of educational resources, the reform of teachers' teaching methods and so on, in that the openness and extensibility of educational resources.

5 Analysis of Cloud Shared Model for Digital Educational Resources of Independent Colleges in Jiangxi Province.

Based on cloud computing environment, we explored the independent institutions to create educational resources sharing model, in order to further promote the development of cloud in the construction of colleges and universities. The model can be divided into three levels: shared service layer, platform service layer and infrastructure layer, it shown as Figure 1.

Figure 1: Framework of Education Resource Sharing Based on Cloud Computing
Infrastructure layer: at the bottom of the cloud-sharing architecture, it included physical infrastructure resources and virtual infrastructure resources, and played a supporting role for the sharing platform of cloud-sharing. It was the material basis to achieve cloud sharing.

Platform service layer: It was the core layer of the university digital education resource cloud sharing model, and it was also an indispensable component to realize sharing. The layer was mainly responsible for deployment and scheduling of a large number of application tasks, and the unified management of cloud computing resources to enable efficient, safe and reliable operation.

Application service layer: it was the top of the cloud sharing model, which included the public API interface, Web Service, programming environment and other functions of the application interface layer. Application interface layer was the most flexible part of the cloud sharing model. According to different service types, different application interfaces could be developed to provide different application services.

The idea and model of digital sharing of education resources in independent colleges were mainly embodied in the following aspects:

Firstly, we had to establish a service management organization, improve the policies and regulations.

Secondly, we built a digital education resource cloud sharing platform.

Thirdly, we must create a shared incentive mechanism. To formulate the corresponding incentive mechanism, attracted more institutions, units and individuals to participate in sharing, expanded the sharing of applications and improved the level of shared services.

6 Conclusion

With the development and progress of cloud computing technology, based on cloud computing environment, the independent college educational resources sharing function was more and more overt. In cloud computing environment, the establishment of sharing mode of educational resources could greatly change the existing educational resources sharing limitations, thereby reducing the cost of inputs independent college funds for construction of resource sharing. It improved digital education resource sharing efficiency, and It was really digitized education resources integration and optimized utilization.

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