The Sharing Mode of High-quality Teaching Resources in Colleges under the Environment of Cloud Computing

Dapeng Zhou, Yong Zhu

Gongqing College, Nanchang University, Gongqingcheng City, Jiangxi, 332020, China

Abstract: With the promotion and popularization of information technology in the education and the promotion of educational informatization, people pay more and more attention to the co-construction and sharing of high-quality teaching resources in colleges and universities. The development of cloud computing and its advantages provide an opportunity for information resource building and sharing. Based on the author's learning and practical experience, this paper first analyzed the motivation and foundation of high-quality teaching resources sharing in colleges and universities under the cloud computing environment, and then put forward a scheme of high-quality teaching resources sharing in colleges and universities. Using cloud computing theory to manage the teaching resources of colleges and universities and to establish the sharing mechanism of teaching resources based on cloud technology and to realize the sharing of resources on the basis of data security is helpful to promote the construction of digital teaching resources in colleges and universities.

1. Introduction

The construction of educational informatization has become one of the key contents in the construction of colleges and universities. It has gradually become the "highland" for each university to seize the high-quality teaching resources. The construction and sharing of high-quality educational resources is an important field of the development of educational information. It is the key to improve the quality of education and students' comprehensive ability. At present, under the environment of uneven distribution of high-quality teaching resources and imperfect resource sharing mechanism, the problem about how to reasonably construct the sharing mechanism of educational and teaching resources in colleges and universities in order to meet their own development and school-enterprise cooperation has become an important issue concerned by the vast number of educational information technology workers with the need for the development of cooperation between schools.

2. The Motivation and Foundation of High-quality Teaching Resources Sharing in Colleges and Universities under the Cloud Computing Environment

2.1 Construction motivation of regional cloud sharing

First, subjective motivation. Broad teaching resources include three resources: human resources, information resources and physical resources. The narrow teaching resources refer to the curriculum teaching resources, the university teaching materials resources and the library and information resources. This paper classified and chose the narrow sense. University teaching resources in the teaching resources belong to the upper class, and sharing long-cherished wish is the call of the public, social needs and development strategy. These resources carry a wealth of human, technological and cultural information. These resources are optional, scarce, reusable and value-added, constituting the theoretical basis for the sharing of teaching resources. Second, objective motivation. *The outline of the national medium and long-term education reform and development plan 2010-2020* reiterated that it is necessary to integrate education informatization

into the overall strategy of national informatization development and to plan ahead of the education information network. We should establish an open and flexible public service platform of educational resources to promote the popularization and sharing of high-quality educational resources. Cloud computing assisted teaching technology has created unlimited possibilities for high-quality teaching. This technology life cycle and influence will be closely related to the strategic orientation and future development of educational institutions, forming the trend of leading the deep transformation in the whole field of education.

2.2 Basic preparation for building sharing cloud platforms

First, the integration of teaching resources should be aimed at optimizing the allocation of teaching resources. High-quality teaching resources are not only limited but also unevenly distributed. The sharing of high-quality teaching resources should be based on the premise of effective integration and follow the principle of lean integration, which is suitable for national conditions, and is easy to obtain and to be moderately advanced and flexible and diverse, so that to establish distributed and centralized style in different levels, regions and scope. We should integrated excellent teaching resources sharing mode, so that to realize the balanced allocation of high-quality teaching resources in higher education. Second, the sub-domain cloud sharing should be systemically linked. The sharing of teaching resources should be reflected in the organic composition of the national macro-level, the provincial meso-level, and the micro-level of university. The national macro-management is the national control of the public teaching resources management in colleges and universities. The purpose is to coordinate the balanced sharing within the coordinating country; provincial and regional meso management is the provincial deployment of the management of public teaching resources in colleges and universities, which is in accords with the development of education in this region and satisfies the balanced sharing within the province. The micro management of colleges and universities should pay attention to the construction and management of specialized resources and carry out dynamic optimization of the high-quality resources provided by the upper level. The foundation of the three-tier structure is in the universities, and the emphasis is in the provinces and districts, and the decision-making is in the country. Third, the scientific integration of teaching resources requires the integration of technical customization, integration of standards, service forms, and management mechanisms. With the help of the cloud platform, we should build a structure system of mutual necessity, so that to complement each other and balance the allocation of resources; through the construction of common vision, the implementation of resource norms, the formulation of mechanism strategies, and the development of performance evaluation, the scientific integration of high-quality teaching resources in universities can meet the following aspects: Scientific reality and authoritative principle of scientific integration and standardizing system; principles of meeting the network interaction and interface friendliness; principle of facing the front and foundation and the principle of overall planning diversity and standardization; pay attention to the principle of audience evaluation and dynamic advance; the principle of fully satisfying the public interest demand and the balanced distribution of property right benefit.

3. Sharing Plan of High-quality Teaching Resources in Colleges and Universities based on Cloud Computing

3.1 To draw on domestic and foreign standards and realize resource standardization

The outline of the national medium and long term education reform and development plan 2010-2020 pointed out that "it is necessary to strengthen the development and application of high-quality educational resources and to strengthen the construction of network teaching resources system". At the same time, it also pointed out: "by 2020, we will realize the basic completion of the urban and rural schools at all levels of the education information system, so that to promote the modernization of educational content, teaching method." Although the universities and colleges in our country have built a lot of resources in recent years, the utilization rate of resources is very low,

and the most important reason is the lack of a unified standard in the definition of resources. The standards currently available through reference include the ISO 15836-2003 standard. "Standard Construction of Digital Library in China" and "Standard System of Modern Distance Education Technology in China" formulated by the Technical Standards Committee of Educational Informatization of the Ministry of Education, as well as the "Platform and Media Standard Citation Standard" and " Technical Specification for the Construction of Educational Resources, etc. In order to do this, we can first study and establish the metadata identification standard of teaching resource bank by referring to the standards and norms of resource construction both at home and abroad, and then by referring to Interoperability Framework of Educational Resource Management System, this paper studied and formulated the data interface standard of teaching resources according to the teaching characteristics of different colleges and universities.

3.2 Using source cloud storage platform to construct professional resource database

The rapid development of cloud computing technology provides a new way to solve the above problems in the construction of teaching resources. Cloud computing has the characteristics of a large scale, virtualization, high security and strong reliability. The characteristics of on-demand service and cheap price make it possible for colleges and universities to reduce the investment of hardware and the cost of software greatly. College students or teachers customize and create application-oriented services through cloud computing to achieve user personalization, service integration and information aggregation. At present, well-known enterprises such as Google have implemented the corresponding cloud storage system named Google File System. Many other companies use GFS's open source Hadoop Distribute File System to build their own cloud storage platforms. Because of the characteristics of open source and low cost, HDFS has been widely used in many enterprises. Therefore, colleges and universities can set up a low-cost cloud storage platform according to their own resources in order to achieve the school teachers and students to provide resources and services shared by other colleges.
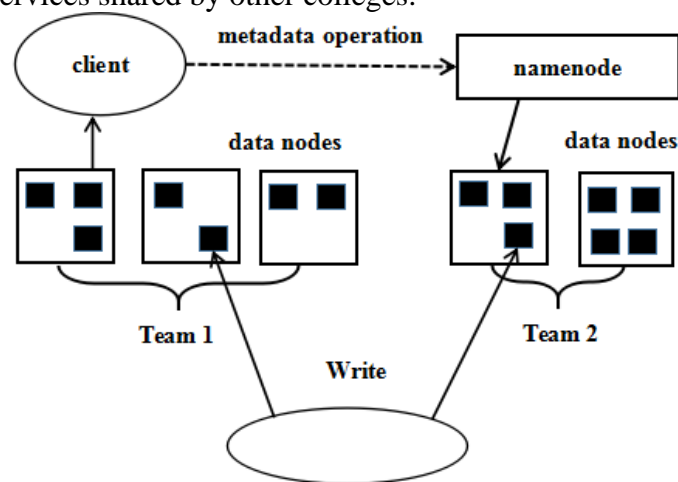

Fig.1 HDFS architecture

HDFS is a master-slave architecture system, as shown in figure 1. It is composed of several data nodes and one name node. The function of the name node is to manage the file namespace and adjust the client to access the main server, such as opening the file or directory. Data nodes are mainly used to store specific data, such as reading and writing requests from customers to blocks, and to perform block creation and deletion operations, or from the name node block replication operation and so on. The professional resource base based on cloud storage system of HDFS has many advantages. First of all, the technology of HDFS is mature and the documents are complete. Most colleges and universities already have the technical personnel and the ability to build the cloud storage platform, saving the service cost of building. Secondly, HDFS can run on cheap servers. Many colleges and universities already have these resources, and can make good use of; thus, it can greatly reduce the hardware cost. In addition, different colleges and universities have different characteristics of running a school, and the focus of the specialty is also different. For this

reason, and according to the need of building up their own professional resources, it will be able to serve the school very well including teachers and students.

3.3 Combining the P2P technology to realize the sharing of teaching resources database

Under the premise of following the relevant interface standards, each university can build the cloud storage platform independently, which can realize the construction of the specialized resource database quickly; however, it also makes the resource database become the isolated island of information. As a teaching resource database under the new technology, we need to meet the needs of users through the unified portal one-stop search, and arbitrarily get access to distributed storage of all kinds of teaching resources. In order to integrate all kinds of high-quality teaching resources to achieve the functions of data sharing, resource application sharing and service sharing, we need to combine some mainstream advanced technical ideas to realize the sharing of professional resources.

There are many fast retrieval technologies in the current cloud computing architecture, such as Map Reduce proposed by Google, Big Table and massive data search and processing technology; however, these technologies are suitable for the same cloud storage platform. The search technology for multiple cloud storage platforms needs to borrow other technologies such as P2P to implement. P2P is an early technology. It can share data, applications and services by connecting clients to each other. Therefore, using P2P technology to realize the resource sharing of each cloud storage platform is an effective mode. The construction of professional resource database needs many aspects of content. First, each professional resource database for sharing resources need to have a unified standard, including the definition of resource attributes, types and so on. Second. The storage and retrieval of shared resources need a unified portal, and the shared resources of each professional resource database and the shared resources of users need to be completed in the same portal. In this way, the quality and quantity of resources can be monitored and the users can be searched quickly. There are many different fast retrieval algorithms in P2P technology. For example, Chord converts each resource HASH into an integer to realize fast retrieval. Therefore, only the unified portal can store and retrieve resources effectively and guarantee the uniqueness of resources.

4. Conclusions

Introduction of cloud computing concept and perspective to achieve the campus, inter-school, school-enterprise teaching resources database co-construction and sharing method can be used in the construction of professional teaching resources in major colleges and universities in China. Because the construction of resource platform based on cloud computing is popular, this method can also be used as a reference for the establishment of cloud storage and sharing platform for all large, medium and small enterprises and government departments.

References

[1] Ran Lilong. Exploration and Practice of Co-construction and Sharing of Distance Teaching Resources [J]. Chinese Distance Education, 2015, (05): 55-60+80.

[2] Ma Wenjie. Discussion on the Construction of University Teaching Consortium Based on Cloud Computing [J]. Journal of the Yangtze University, 2014, (07): 51-53+3.

[3] Tang Xiaoyan, Li Jianxin. Research on University Information Resource Sharing Based on Cloud Computing [J]. Journal of Changzhou Institute of Information Technology, 2013, (06): 23-25.

[4] Wu Yanqing. Design of Laboratory Management Information System based on Cloud Computing [J]. Laboratory Research and Exploration, 2013, (08): 291-296.

[5] Zhang Huainan, Yang Cheng. Research on the Construction of Digital Teaching Resources in Regional Colleges and Universities Based on Cloud Computing [J]. Modern Educational Technology, 2012, (06): 45-50.

[6] Chen Qiao, Hu Xinping, Yuan Hong. Construction of the Platform of Teaching Resources Based on Cloud Service [J]. Modern Educational Technology, 2011, (12): 112-115.

[7] Wang Jian. Using Cloud Computing to Realize the Sharing of Teaching Resources in Colleges and Universities [J]. Digital Technology and Application, 2011, (11): 198-199.