

## Research on the Mode of Open Educational Resources Sharing Based on Cloud Computing Technology

Hong Ma

Department of Education Science, Heihe University, No. 1 college road, Heihe city, China

707314219@qq.com

**Keywords:** Cloud Computing, Open Educational, Informatization, Shared Optimization

**Abstract:** Since the introduction of cloud computing technology in China in 2008, Chinese scholars have done a lot of research on infrastructure construction, effective utilization and sharing of resources in cloud computing. The 13th Five-Year Plan of the People's Republic of China also regards cloud computing as an important field of IT industry research and development and application, so as to realize the entry into education information 2.0 era. Based on the existing research results, this article summarizes the advantages of cloud computing technology, proposes the model of open educational resources sharing and co-construction based on cloud computing technology, and makes specific analysis of its architecture, in order to provide reference for the research on open educational resources sharing.

America business weekly published "Google and its cloud intelligence" in February 2008. It states that "this new and ambitious strategy aims to spread the power of computing beyond our wildest imagination," and the technology is wide-ranging and will bring fundamental changes to the economy, culture and education. Among them, the sharing of educational resources, co-construction has also played a role in reference, for the sharing, co-construction has a strong practical significance.

### 1. Introduction

Cloud computing technology refers to the delivery and usage patterns of services, and refers to obtaining the services that are demanded in an easy and extensible way. The "cloud" refers to a cluster of hundreds of thousands or even millions of computers that aggregate and distribute information and then serve users through the network. In cloud computing, users' processing data is stored in the Internet data center, the users required applications are running on a large-scale server in cluster on the Internet, cloud computing service providers are responsible for the management and maintenance the normal operation of data centers, users only need access to the Internet, and then they can be convenient to use instant data and services. Therefore, the introduction of this technology changed the traditional pc-based mode, and then changed the way and method of education resource acquisition, sharing and co-construction.

Open education resources include professional teaching plan, teaching syllabus, learning guidance, integrated teaching design, text teaching materials, audio-visual teaching materials, CAI courseware, as well as digital interactive teaching media, online teaching, online tutoring, VBI teaching information and online courses. The continuous enrichment of open education resources has provided effective help to promote students' autonomous learning. Looking at the development of open education these years, one of its basic goals is to build a variety of media curriculum resources with unified quality standards, share these resources in a wide range, and give full play to the practical role of quality education and teaching resources. Therefore, the open education resource sharing in cloud computing environment aims at open and high-quality education and combines the "cloud" of open education resources in a wider range to create a new suitable education resource sharing mode.

## **2. Optimization of Educational Resource Sharing Mode by Cloud Computing Technology**

As far as the application of open educational resources is concerned, the utilization rate of most educational resources is low. The reasons for the low utilization of open educational resources have been summarized by many scholars and practitioners in two aspects: first, the technology system of resource construction and sharing; second, the organization mechanism of jointly building and sharing resources (YingLiu2017). The construction of organizational mechanism can be improved by improving relevant policies. Most of the research still focuses on constructing a reasonable technical system of resource sharing. Through the construction of the shared platform, the related digital resources can be reasonably planned to avoid the current situation of resource construction in its own way, repeated construction, redundancy and waste. The goal of cloud computing is to aggregate resources scattered over the Internet to provide easy access to queries. Distributed storage resource databases can also be managed and stored uniformly, this helps learners to efficiently share and access resources on a large scale.

### **2.1. Reduce Sharing Costs**

To reduce the cost of sharing the shared model based on cloud computing technology will be provided by the cloud service provider to provide related hardware configuration and related software services, such a model has relatively low requirements for learners' clients. Learners can use their low-configured computer equipment, even A cell phone with Internet access or PDA to achieve autonomous learning. Avoid prior technology sharing required for high-configured computers, dedicated servers, and other hardware and related software licenses. As long as they pay a small fee to rent services in the cloud, learners can get the technical support provided by tens of thousands of servers in the cloud model, and can easily build their own shared platform. To maximize the efficiency of the use of open educational resources with lower cost input.

### **2.2. Improve Sharing Ability**

China's existing open educational resources still have the situation that the resource data is nonstandard and non specification, and there are still a large number of "resource islands" in the process of construction, which have brought great inconvenience to data sharing, exchange and updating, and also caused a large amount of waste of manpower, material resources and financial resources (HongMa2017). The construction of the contribution model based on cloud computing technology will integrate the scattered heterogeneous open educational resources in different physical locations and store the resources in a huge "cloud" cluster of computing and storage. The cloud will be responsible for centralized management and scheduling, realizing the distributed storage and centralized management of open education resources and creating a good information sharing space.

### **2.3. Ensure sharing security**

The security of information and data is always an important problem in educational resources construction (GuobiaoXiao2018). The model based on cloud computing technology can solve this problem effectively. Most of the current sharing system often store relevant data in a unified server, which is managed by users themselves. If the server break down, the system will be affected. The security and integrity of some data is not guaranteed. In cloud computing mode, cloud computing service providers can provide a safe and reliable data storage center, which can conduct unified management of data, allocate resources, balance load, control security and ensure reliable and safe real-time monitoring during the system operation. Besides, cloud computing technology can manage the user's rights effectively and reduce the risk of educational resources data sharing. The exist cloud computing service providers such as: Google, Amazon are all provide a security system which integrates the technologies of data encryption, redundant backup and secure storage to ensure the security of cloud platform and the quality of services.

## 2.4. Ensure the Expansibility of the System

With the large-scale distributed file system, the information resources are dispersed and stored in the "cloud" in the way of block and multiple copies backup, the analysis and processing of the data in the "cloud" is also realized with the large-scale parallel computing and distributed computing technology. Cloud computing technology can provide various opened API to support heterogeneous access, and can expand flexibly according to learners' needs, automatically synchronize and update information resources in real time, for further expansion of the system to realize the sharing of open educational resources in a wider range creating favorable conditions.

## 3. Construction of Open Education Resource Sharing Mode Based on Cloud Computing Technology

Combined with the problems existing in the construction of open educational resources and the advantages of cloud computing technology in the construction of resources, cloud computing technology should be adopted to construct the sharing mode of education resources. Its architecture is divided into physical layer, platform layer, resource integration layer, application layer and access layer from bottom to top.

See Figure 1 for details.

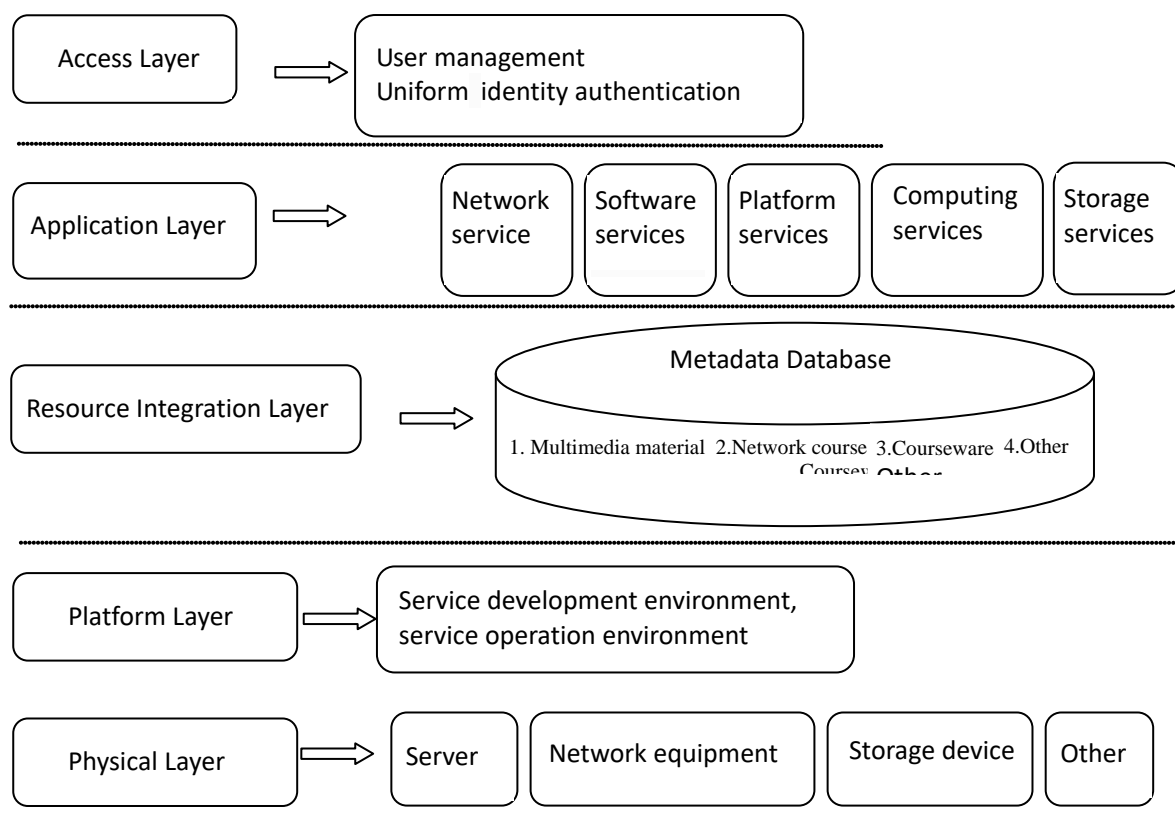


Fig. 1 diagram of open educational resources sharing mode based on cloud computing technology

The physical layer is the lowest layer in the cloud computing architecture, which is also called the resource layer and provides basic physical resources such as servers, network devices and storage devices to ensure the normal operation of the architecture. These hardware devices provide hardware support for the normal operation of the entire platform. In this layer, these devices will be virtualized into a large resource pool by using virtualization software to build a virtual resource environment, which can provide learners with the choice of learning resources from the bottom and a unified service interface to the upper layer, thus forming computing resources of different specifications and providing dynamic physical resources upward in the manner of IaaS.

The platform layer provides management of the cloud-based technology platform between the physical layer and the resource integration layer. The main task is to provide the upper application development environment, running environment, database environment, open API and Web Service module.

This open API (application interface layer) is adopted to integrate various scattered resources and related service projects in the system, which is able to conduct relevant resource management, user management and security management, enable educational resources to be shared efficiently, and provide new value for the application of the open educational resources sharing platform.

Resources integration layer is mainly used to manage to open educational resources, is an indispensable part of this model, This layer mainly implements the construction of various meta-databases and index libraries, with the help of a series of standardized auxiliary tools (import and export tools, cataloging tools, metadata generation tools, etc.) for the operating of the resource metadata generated editor, transformation, import, export and so on . The information resources such as video of network course of scattered and heterogeneous multimedia material in the open educational resources are standardized and integrated into a unified information resource view to simplify the management of educational resources. At the same time, it lays a good foundation for the realization of the upper application service.

The application layer is mainly responsible for application management and provides all kinds of application software related to teaching, which is the interface for learners to enter the platform for learning. This layer provides the most basic network services, software services, computing services, storage services and so on. The cloud computing operating system contains various management centers. It is the system software responsible for managing and monitoring the basic software and hardware resources of the cloud computing data center. Application layer can provide open educational quality resource sharing application system, such as resource management system, operating system, file processing system, etc. Students can get access to relevant system software as long as they register and log in through the user interface.

The access layer is the top layer of the sharing mode. System administrators can manage and unify the identity authentication of users who enter the system through SaaS. Users with different identity roles need to enter through this layer. This layer can guarantee the nature of resource sharing to meet the needs of different learners. The biggest advantage of this layer is to have both hardware and software running in the cloud, so it can be accessed directly without requiring the client to install highly configured machine equipment.

In conclusion, this model can jointly promote the co-construction and sharing of open educational resources from infrastructure construction and technology level, and it is the carrier of open educational resource sharing. The construction of the model should take into account the factors of teaching resources. The two are mutually supportive and can't be separated from each other.

#### **4. Conclusion**

The research of resource sharing mode based on cloud computing technology is the technology hotspot and inevitable trend of future education resource construction. Its unique application potential undoubtedly brings unprecedented opportunities for the sharing and exploitation of distributed and heterogeneous educational resources. The successful application of this model will be a kind of across-the-board transformation, not only in resources themselves, but also in ideas, concepts and teaching methods. With the help of this sharing mode, all high-quality educational resources can be centralized and managed automatically by the cloud server, which can realize resource sharing to the greatest extent and effectively solve the problem of low-level Educational Resources Sharing and improve the level of education informatization in China.

## Acknowledgements

This article is one of the periodic research achievements of OUC (The Open University of China) 2018 project *Exploration and Practice Research on the Development Path of Continuing Education Transformation in Colleges and Universities* (Project Number: G18A1143Y).

## References

- [1] Hong Ma. Research on the influence of MOOCs on resources sharing of National Open University, Journal of Heilongjiang College of Education 2017 (1) p7-9
- [2] Xiao Guobiao. Research on big data information security mechanism based on cloud platform. Computer Fan. 2018(11) p48.
- [3] Ying Liu. Research on open educational resources sharing mechanism and construction of quality monitoring system. Adult education. 2017(7) pp.45-47