Research on Teaching Reform of Computer Laboratory Based on Cloud Platform

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Abstract: With the deep integration of network technology and education and teaching, the standard and standardized computer laboratory has become the basis of education and teaching in colleges and universities. In recent years, many colleges and universities in China are actively exploring and thinking about how to apply cloud computing technology to computer laboratory teaching in colleges and universities in order to bring better learning experience to students. Cloud computing technology is a kind of computer technology, which plays an important role in improving the management level of laboratories. Based on this, the author first analyzes the concept and classification of cloud computing, then introduces the management status of university computer laboratories, and finally discusses the application of cloud computing technology in computer laboratories.

Keywords: Cloud computing; Colleges and universities; Computer lab.

1. Introduction

With the progress of the times and the development of science and technology, more and more multimedia devices have entered the classroom, enriching the teaching content and making the classroom no longer rigid and monotonous as before. At present, most computer laboratories adopt the mode of purchasing multiple independent hosts, which is costly, power-consuming and inconvenient to maintain.There are many problems in the teaching practice of the existing computer laboratory teaching device, which are mainly manifested in the lack of teaching resources, outdated content, unreasonable examination methods and poor teaching effect. Therefore, we propose the teaching reform of computer laboratory based on cloud platform. In recent years,Due to the limitation of management level, resource sharing level and equipment renewal, the computer laboratory in colleges and universities gradually has some problems, such as equipment aging, low equipment utilization rate, backward management, untimely technical renewal and waste of

teaching resources. Cloud computing technology has the advantages of convenient information acquisition, high reliability and versatility,In order to improve the management level of the laboratory, it is necessary to apply cloud computing technology in the laboratory.

2. Overview of cloud computing

Definition of cloud computing With the continuous innovation of information technology, as a new computing technology, "cloud computing" has developed rapidly in the "internet plus" era compared with the traditional single processing method. Cloud computing is the product of integration of distributed computing, virtualization, network storage and distributed computing. In practical application,Cloud computing can provide corresponding resources for computers or other devices according to corresponding instructions or actual needs, so as to realize rapid processing of information [5]. The "cloud" in cloud computing can be divided into cloud users and cloud service providers. With the emergence of cloud computing technology, the vast number of cloud users in the Internet can use the "cloud" mode,Get the services provided by convenient cloud service providers, and you can quickly access the Internet resource repository. The main access ways of cloud computing.

Classification of cloud computing is divided according to the service providers providing cloud computing and the deployment mode of resources, and the cloud can be divided into public cloud, private cloud and hybrid cloud. Public cloud refers to the fact that enterprises need to outsource some applications due to practical factors, which are deployed on the "cloud platform", which is held and operated by third-party cloud vendors.Third-party cloud vendors provide storage space and server virtual resources for cloud users in need. The characteristics of public cloud are that third-party cloud vendors provide all infrastructure and applications and manage them, while cloud users only need to log in to the corresponding accounts as Internet terminals to access the corresponding resources.Private cloud means that storage space and server virtual resources are deployed inside the enterprise, and infrastructure and applications are built inside the enterprise. Hybrid cloud is a combination of private cloud and public cloud, which is between private cloud and public cloud. Hybrid cloud improves computing efficiency by allowing enterprises and third-party cloud vendors to share data and applications.According to service levels, cloud computing can be divided into infrastructure cloud IaaS, platform cloud PaaS and application cloud SaaS. Infrastructure as a Service (IaaS) is one of the common types of cloud computing services [6]. When choosing infrastructure as a service, cloud users need to pay enough fees to cloud computing providers, who are responsible for providing virtualized computing resources for cloud users.Such as VM,

storage space, network and OS. Because cloud computing providers can provide the environment needed for R&D according to actual needs, Platform as a Service can make cloud users not consider the servers, networks, storage resources and OS needed in the R&D process. Software-as-a-Service means that cloud computing providers provide software, and cloud users only need to pay for it.You can access the required applications through the global Internet. Cloud computing service classification.

Characteristics of cloud computing

You can use the cloud at any time after paying for it. After purchasing the corresponding services, you don't need to pay attention to the specific hardware requirements. You only need to ensure that the devices are connected to the network, and you can access the data and resources of the cloud platform anytime and anywhere. Even if the connected terminals are lost, you can access them through other terminals.

High-availability cloud platform can provide external services 24 hours a day. In addition, the scale of "cloud" can be dynamically changed to meet the needs of different users. At the same time, cloud users can easily access various resources without deploying large-scale infrastructure, so that cloud users can focus on core business and ultimately improve productivity.

3. The status quo of computer laboratory teaching in colleges and universities

The use time of computers in computer laboratories in colleges and universities is too long. Running for too long will shorten the service life of computers, and students will easily crash when using computers, which will affect the efficiency of computer experiment courses. At present, there are more and more kinds of computer experiment courses, more and more requirements for application standards, more and more complicated software installation restrictions,The requirement of computer experiment course for computer laboratory is also higher and higher. By introducing cloud computing technology into computer laboratory teaching and making full use of it in computer computing and storage, we can take advantage of the advantages of cloud computing to reduce the pressure of laboratory managers and save the time for students to visit online resources in class.The application of cloud computing technology can effectively solve the construction and management problems existing in traditional computer laboratories, and can create a convenient and economical computer teaching platform for colleges and universities.

4. The purpose of the project research

The purpose of this project is to provide the teaching reform of computer laboratory based on cloud platform, so as to solve many problems in the teaching practice of the existing computer laboratory teaching devices mentioned in the background above, which are mainly manifested in insufficient teaching resources, outdated content, unreasonable assessment methods and poor teaching effect.

5. Basic contents of the project

The project provides the following technical scheme: the teaching reform of computer laboratory based on cloud platform includes teacher terminals, two-way communication modules electrically connected with teacher terminals, two-way communication modules electrically connected with student terminals and cloud platform respectively, and input terminals of communication modules electrically connected with image acquisition modules and sound acquisition modules respectively.The cloud platform is electrically connected with the teaching server, the online teaching module and the WEB server in two directions respectively, the WEB server is electrically connected with the campus network in two directions, and the campus network is electrically connected with user terminals in two directions;

Computer teaching is conducted through teacher terminals, which are bidirectionally connected with student terminals through communication modules to realize teaching interaction. The cloud platform is used for storage, calculation and management of computer teaching content data, collection of teaching resources and system login through teaching servers, and online teaching through online teaching modules.Users connect to the cloud platform through the WEB server and campus network to share resources. The image acquisition module and sound acquisition module use image information and sound information, which are transmitted to teacher terminals, student terminals and the cloud platform through the communication module for collecting teaching images and sounds.

The communication module includes a wireless communication module, the output end of which is electrically connected with the input end of the Internet, the output end of the Internet is electrically connected with the input end of the core switch, and the output end of the core switch is electrically connected with the input end of the local area network.

Comprises a cloud computing module, a database, a storage module and a data management module, wherein the cloud computing module calculates data resources; the database is used for storing teaching data; the storage module stores teaching resources; and the data management module manages teaching data.

Comprises a user database, a laboratory database, a course database and an

evaluation database, wherein the user database is used for storing user data and the laboratory database is used for storing data related to laboratory equipment.

The data management module is used to manage system files and networks, and realize the distribution of content data, deletion of duplicate data and data compression. It also supports data encryption, backup and disaster recovery.

The teaching server includes a resource collection module, a system login module and a permission management module. The resource collection module is used to collect teaching resources and store them in the cloud platform. The system login module is used to log in to the system, and the permission management module manages the login permission.

Online teaching module includes interactive teaching module, online answering module, online contact module and simulation test module.

6. Basic design of the project

The project provides the following technical scheme: the teaching reform of computer laboratory based on cloud platform includes teacher terminals, two-way communication modules electrically connected with teacher terminals, two-way communication modules electrically connected with student terminals and cloud platform respectively, and input terminals of communication modules electrically connected with image acquisition modules and sound acquisition modules respectively.The cloud platform is electrically connected with the teaching server, the online teaching module and the WEB server in two directions respectively, the WEB server is electrically connected with the campus network in two directions, and the campus network is electrically connected with user terminals in two directions;

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The communication module includes a wireless communication module, the output end of which is electrically connected with the input end of the Internet, the output end of the Internet is electrically connected with the input end of the core switch, and the output end of the core switch is electrically connected with the input end of the

local area network.

Comprises a cloud computing module, a database, a storage module and a data management module, wherein the cloud computing module calculates data resources; the database is used for storing teaching data; the storage module stores teaching resources; and the data management module manages teaching data.

Comprises a user database, a laboratory database, a course database and an evaluation database, wherein the user database is used for storing user data and the laboratory database is used for storing data related to laboratory equipment.

The data management module is used to manage system files and networks, and realize the distribution of content data, deletion of duplicate data and data compression. It also supports data encryption, backup and disaster recovery.

The teaching server includes a resource collection module, a system login module and a permission management module. The resource collection module is used to collect teaching resources and store them in the cloud platform. The system login module is used to log in to the system, and the permission management module manages the login permission.

Online teaching module includes interactive teaching module, online answering module, online contact module and simulation test module.

7. Project implementation plan and implementation plan

Please refer to Figure 1-3, this project provides a technical solution: the teaching reform of computer laboratory based on cloud platform, including teacher terminals, two-way communication modules electrically connected with teacher terminals, two-way communication modules electrically connected with student terminals and cloud platform respectively, and input terminals of communication modules electrically connected with image acquisition module and sound acquisition module respectively.The cloud platform is electrically connected with the teaching server, the online teaching module and the WEB server in two directions respectively, the WEB server is electrically connected with the campus network in two directions, and the campus network is electrically connected with user terminals in two directions;

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student terminals and the cloud platform through the communication module for collecting teaching images and sounds.

Wherein, the communication module comprises a wireless communication module, the output end of which is electrically connected with the input end of the Internet, the output end of the Internet is electrically connected with the input end of the core switch, the output end of the core switch is electrically connected with the input end of the local area network, and the cloud platform comprises a cloud computing module, a database, a storage module and a data management module.The cloud computing module calculates data resources, the database is used to store teaching data, the teaching resources are stored by the storage module, and the data management module manages teaching data. The database includes user database, laboratory database, course database and evaluation database, and the user database is used to store user data.The database is used to store data related to laboratory equipment, the data management module is used to manage system files and networks, and realize the distribution of content data, deletion of duplicate data and data compression, and also supports data encryption, backup and disaster recovery. The teaching server includes resource collection module, system login module and permission management module.The resource collection module is used to collect teaching resources and store them in the cloud platform. The system login includes the login of the system. The authority management module manages the login authority. The online teaching module includes interactive teaching module, online question and answer module, online contact module and simulation test module.

8. Conclusion

The teaching reform of computer laboratory based on cloud platform proposed by the project connects a large number of computing, storage, network and software resources together, forming a huge resource pool, realizing the unified management of resources, realizing the digitalization and informatization of classroom teaching resources, truly making full use of teaching resources and benefiting teachers and students.This project has the advantages of high management efficiency, convenient use and easy expansion of teaching functions, which greatly improves the teaching efficiency.

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