Design on Personalized Teaching Platform Based on Virtual Desktop

Jiang-Hui LIU\textsuperscript{a}, Wei-Bo HUANG\textsuperscript{b,*}, Ling-Xi RUAN\textsuperscript{c} and Zhi-Feng CHEN\textsuperscript{d}

Guangdong University of Foreign Studies, Guangzhou, China

\textsuperscript{a}247031690@qq.com, \textsuperscript{b}ljh@oamail.gdufs.edu.cn, \textsuperscript{c}man@mail.gdufs.edu.cn, \textsuperscript{d}172564946@qq.com

*Corresponding author

Keywords: Virtual Desktop, Teaching Platform, Individualization.

Abstract. In order to promote the deployment of individualized teaching environment, safe and reliable experimental environment is realized through the construction of the virtual resource pool. It realizes the automatic application, recovery, monitoring and management of experimental resources. Design on personalized teaching platform based on virtual desktop, can effectively ensure the security of experimental environment and reduce the complexity and workload in operation and deployment of teaching environment. The experimental results show that the platform can meet the needs of teaching, experiment and practice well.

Preface

In recent years, higher education reform has emphasized teaching evaluation and quality of engineering construction more and more. And it has paid more attention to the cultivation of students' practical and innovative ability. In particular, the construction of digital campus integrates information technology into higher education teaching and management. Its teaching model has become an important part in the national education system reform. Cloud computing, as a new way of resource sharing, can be applied to teaching management, student exchanges and management, laboratory construction and management and so on. It can effectively reduce the cost of laboratory construction and the difficulty of deployment, and improve teaching efficiency, openness and the reliability of the system. \cite{1} Existing studies are mostly using cloud computing technology to manage virtual desktop laboratory. Based on these advantages, the research can help explore an open laboratory teaching model to improve the students' autonomous learning and their innovation ability. And it can construct open the personalized teaching platform based on virtual desktop. \cite{2}

Development Status of Virtual Desktop

Virtualization and cloud computing are technological bases of cloud desktop products. These technologies have improved the reliability of the whole system. At the same time, it has improved the utilization rate of existing resources. Thus, it reduces the cost of investment and has good technical superiority and cost performance. Not only does it enable the users to use software and hardware resources freely, but also it can make IT simplify and automate thousands of desktop management. And it is delivered to the users’ desktop safely from data center in the form of desktop services. It achieves a high level of security, availability and reliability, which traditional PC can’t provide. It provides the users with security access to applications and data whenever and wherever, which also provides them with the highest level of mobility and flexibility.

IBM, CISCO and HUAWEI have also launched cloud desktop schemes, such as VXI of CISCO. Usually these schemes are combined with the existing cloud desktop technology and products. Combined with their respective advantages, they have made progress in the infrastructure, the network architecture, the deployment process, management platform and so on. \cite{3} The important goal of cloud desktop development in the future is to make it easy for users to connect their personal computers to remote desktop services. VMware View uses virtualization to cut off the connection between the desktop and associated operating systems, applications, and hardware. By putting desktop operating systems, applications, and user data encapsulation into mutual isolation
levels, it allows IT personnel to change, update, and deploy each component independently and gain higher business flexibility and shorten the response time. With the virtualization of View desktop, complete desktop environment, operating systems, applications and configuration can be built in the use of VMware ESX, a software virtualization server.

Therefore, the application of cloud desktop technology to an open personalized teaching platform has certain research prospect and challenges. To solve these problems, we need to study the existing problems from the perspective of the whole. And we need to plan and implement the construction of university informationization. The perspectives of the researches at home and abroad are mainly on virtualization, cloud storage, networking, Cloud Desktop, diversified office, VMware, service outsourcing and cloud desktop system. And they have made important achievements in the field of technology. [4] This article will apply the existent cloud desktop technology at home and abroad to practice. And it helps design an open personalized teaching platform based on cloud computer which is suitable for our school. It integrates the cloud desktop technology with college education in depth and improves students’ personalized practical ability. The experimental teaching condition will open to all teachers and students. It promotes the establishment of autonomous learning mode, so it has a broad prospect. Analyzing from the perspective of platform function, the personalized teaching platform based on the cloud desktop can effectively help the teachers focus on experimental teaching. And it helps make students focus on experimental training, realize the student-centered teaching and improve the teaching effect.

**Overall Framework of Virtual Desktop Teaching Platform**

By standardizing the deployment of environment construction can realize the teaching environment. By constructing virtualization resources pool can realize safe and reliable construction of experiment environment. Autonomous application can realize the application, recycling, monitoring and management of experimental resources. The virtual desktop can realize the remote access. Therefore, it can effectively ensure the safety of experimental environment and reduce the complexity and workload in the deployment and operation of teaching environment. It can satisfy the requirements of teaching, experiment and training. Therefore, teaching interaction also needs to have a reform based on virtual desktop environment, in order to realize the new transformation of college teaching and learning mode under the current network information technology environment.

Based on the objectives of our university on scientific innovation ability, engineering innovation ability and application integration innovation ability, a personalized teaching platform based on virtual desktop is constructed, as shown in Fig. 1.

![Figure 1. A Framework of Personalized Teaching Platform System based on Virtual Desktop.](image-url)
The platform has a strong technical function. It can provide personalized services, has standard experimental environments and high degree of openness. Platform layer infrastructure, or IaaS, is supported by physical resource pool, virtualization management and cloud management. Virtualization polymerization can be realized through the deployment of the cloud hosting, teacher computers, cloud terminals, storage devices and switches in the physical resource pool. Open, safe and reliable IaaS service layer can be realized through cloud virtualization management system. Cloud desktop virtualization management system, which is based on cloud computing, mainly provides solutions to the optimal virtualization and cloud business services. It has achieved the central management control of the teaching platform, managed all physical resources and virtual resources and reduced the complexity of computing environment and management costs. The infrastructure, or the service layer, can also provide a basic environment for conducting researches on the IaaS layer of cloud computing. Layer construction platform, or PaaS, deploys virtual learning space components. It mainly provides unified identity authentication management, access control, data mining and dynamic tracing, evaluation, statistical services. Construction software, or SaaS, mainly includes basic public services and experimental teaching services. Basic public services integrate the existing ordered and disordered information. It provides a unified information sharing entrance for the teachers and students, which helps them use, share, manage the cloud platform whenever and wherever. The experimental teaching services can provide resources, communication and sharing platform, experimental behavior records and big data analysis tools for teachers in teaching and students in experiment.

On the cloud desktop teaching platform, it deploys a set of virtual learning space system based on the SaaS pattern. It manages virtual resource pool. It provides a set of virtual host management, experimental environment, resource management, ability evaluation subsystems for teachers in teaching and students in experiments. It moves the experiments in the computer rooms in the traditional teaching to the cloud. So it helps the students and teachers get rid of the limitation of traditional computer rooms. And it forms a student-centered personalized teaching platform which is not restricted by time, place or equipment.

Functional Design of Virtual Desktop Personalized Teaching Platform

The Students’ Personal Virtual Learning Space

Virtual learning space creates Personal Virtual Learning Space for each student. It makes the students get rid of the limitation of space and time. And any equipment can access Personal Virtual Learning Space and the functions of the lists on all current experimental projects at any time via the Web or virtual desktop. When students start to do an experiment, the system will automatically create a virtual experiment machine according to teacher's choice. Students’ virtual experiment machines have installed the required software and configured the necessary environment, so students can concentrate on the experiment itself in limited time. The virtual learning space system can assign multiple virtual machine templates to each student according to the need. And each virtual machine template is equivalent to an experimental host. As long as the administrators don't log off the virtual machines, the virtual machines can be used by students for a long time. So students can customize the software of host, configure the development environment, save the experimental operation information and retain process data and learning materials. The virtual machines combine the current teaching needs with teaching requirements closely. They create meaningful problems for students to solve. These support learners to cultivate and improve their professional skills in solving problems effectively. Through instant feedback function, it supports real-time diagnosis and evaluation. And it points out the reasons for the error, puts forward learning suggestions and operates for the students, and corrects students’ wrong operation timely. Under the highly interactive platform, it provides continuously optimized personalized learning services for students.
The Teachers' Virtual Studio

By using the virtual learning space system, the teacher can configure the virtual machine templates according to different experiments. Virtual machine templates contain the operating system, the laboratory development environment and association with course resources and knowledge. A laboratory can provide various kinds of experimental environment for many courses, without taking the resources required for these courses or the differences among the experiment environment into consideration. It is fundamentally different from the traditional laboratory. In addition, teachers can manage all the students' virtual lab desktops and help students solve the problems during the experiments. Virtual learning space system is not only a virtual experiment platform and carrier, but also provides an innovative electronic teaching resources in organizing, editing and gathering the teaching resources. It makes the teachers organize knowledge and to carry out the experimental teaching quickly and efficiently, and improve the students’ learning and operational efficiency.

Experimental Results

Teaching activities are carried out by using the education resources in the platform. The platform is combined with teaching. It provides a platform learning environment for individual teaching on the media and the arts. The platform is combined with the multimedia courseware system to promote the optimization of the teaching process, including the practical teaching of Enterprise Resource Planning (ERP), Video Shooting and Editing, Premiere Video Editing and Processing, Flash MX Animation Production, Basic Photography and Advertising. It can carry out teaching tasks well and provide strong support for teaching and scientific researches. In the learning process, out of the learning subjects are all environments. Ideal environment should be able to support real situation creation, resource sharing, multiple interactions, including human-computer interaction, teacher-student interaction and student-student interaction, collaborative communication, cooperative learning and self-exploration. They bring students' enthusiasm, initiative and creativity into full play, which can greatly improve the learning effect.

Conclusion

Teaching platform combines virtualization technology with personalized teaching mode. Students can carry out video image operation which is larger-resource consumed. Message class instruction will be executed on students' virtual desktop. The teaching platform, which is based on the virtual desktop, can effectively reduce the resource consumption of the server. And it guarantees the rate and quality of video transmission. Besides, the cost for operation and maintenance is reduced. And the scalability is stronger. Teachers can use the platform easily and organize the teaching efficiently. The students' learning efficiency and learning effect can be greatly improved. The platform achieves the 24-hour opening of experimental and experimental projects. At the same time, it is also better to solve the problems of decentralized construction, repeated investment, information isolation, etc. It also realizes the integration and sharing of various resources, and provides all-round support for the reform of teaching management.

Acknowledgement

This research was financially supported by the 2017 Higher Education Teaching Reform Project of Guangdong University of Foreign Studies.

References

