Distance Education Platform for Mental Health Courses in Secondary Vocational Schools Based on Cloud Computing

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Abstract. In order to solve the problem of the limited response ability of the remote client terminal of the distance education platform, this study proposed a cloud computation-based distance education platform for secondary vocational mental health courses. This method first establishes the hierarchical structure system of the education platform, optimizes the connection of typical functional modules and completes the design of the platform application architecture based on the established platform structure system, then completes the construction of OpenStack cloud environment based on the cloud computing service model, and finally configains the data center system based on the relevant mental health course information. Realize the application of various platform technologies. The experimental results show that the application of this platform can make the remote client terminal instantaneous response rate reach the maximum value within 20 min, which is 8.6Mb/s. The response speed and the client terminal instantaneous response rate are superior to the comparison method, which has certain application value.

Keywords: Cloud Computing · Mental Health Curriculum · Distance Education Platform · Hierarchy · Function Module · Openstack Environment · Data Center

1 Introduction

In recent years, secondary vocational school "campus events" caused by mental health problems have increased year by year, and the mental health problems of secondary vocational school students have increasingly become the focus of attention of schools, society and parents. The psychological quality of contemporary secondary vocational school students not only affects their own development, but also relates to the improvement of the quality of the whole nation, and more importantly, to the cultivation of trans century talents. For contemporary secondary vocational school students, having a positive and optimistic attitude towards life, good interpersonal skills, and healthy psychological quality are important factors to ensure their growth and success, and are also

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the basic requirements of the society for high-quality talents. Therefore, it is increasingly important to set up courses for students' psychological health education in secondary vocational schools [1]. The curriculum of mental health education for secondary vocational school students generally takes scientific, systematic and focused teaching of mental health knowledge to students, and timely education and guidance of students' mental confusion and psychological problems as the main teaching task, so that students can learn to adjust their own emotions appropriately while mastering relevant knowledge and theories, and promote the development of physical and mental health.

At present, more than one hundred countries and regions have carried out distance education. Since 1998, China has successively carried out pilot work of distance education in many key universities. After more than ten years of development, distance education has trained a large number of talents for the country, and more and more people have benefited from distance education. The construction of the national network education platform has also made great achievements. Each distance education pilot unit has its own network teaching platform to provide online independent learning services for distance education students. However, China has a vast territory, and the informatization level in remote and poor areas and rural areas is limited, and the software and hardware resources are scarce. As a result, the investment in distance education in colleges and universities is uneven, and the education scale and development speed are different, which makes the country unable to establish a unified standard for distance education in colleges and universities. Although the remote education platform based on virtualization and the remote education platform based on mobile embedded terminal technology can keep the core network host running at a high speed for a long time, it is difficult to improve the instantaneous response rate of the customer terminal to a high level due to the particularity of the mental health course and the limited connection of the lower level device terminals. Therefore, it does not meet the practical application needs of strengthening the construction of the secondary vocational mental health curriculum in the education platform system.

Cloud computing is an emerging network architecture with outstanding computing and storage capabilities, which can be used to deal with various complex problems. This research combines cloud computing technology with distance education system, which can give full play to the advantages of cloud computing technology [2]. Use cloud computing technology to uniformly manage the infrastructure resources required for distance education, form a virtual resource pool, and provide cloud services for users through the network. Distance education institutions can rent infrastructure in the cloud at a lower cost, which is equivalent to having their own servers and other equipment, and can easily deploy their own applications in the cloud. The on-demand service and elastic expansion characteristics of cloud computing enable distance education institutions to use cloud infrastructure according to their actual needs. When leased equipment is not enough to support the growth of user access, it is only necessary to increase the lease of equipment in the cloud without changing the application architecture, effectively avoiding the waste of hardware resources, reducing development costs, thus significantly increasing the scalability of the development platform.

2 Architecture Design of Distance Education Platform

The design of distance education platform architecture needs to first solve the problem of platform demand analysis, and establish the connection relationship between typical functional modules with the help of the hierarchical structure of each platform.

2.1 Platform Demand Analysis

The distance education platform for mental health courses in secondary vocational schools mainly uses the advantages of cloud computing technology, which can provide powerful computing and storage capabilities with the help of ordinary devices, to develop a distance education platform on the cloud platform built by the OpenStack project. In this way, we can reduce the waste of resources and reduce the development cost of the distance education platform. In reality, physical devices are decentralized and independent of each other. Virtualization technology can say that these decentralized devices can be unified, and virtualization technology can be used to build a unified virtual resource pool. The same type of physical devices can be integrated as a whole [3]. The open source components provided by cloud computing system can uniformly manage resources and provide infrastructure resource services for distance education institutions.

The functional requirements of the platform are as follows:

(1) The platform should have the characteristics of cloud computing, which can provide IaaS functions externally, organize distributed physical resources such as computers, servers, etc. to form a hardware resource pool, and conduct unified management and configuration. At the same time, a visual management interface should be provided to simplify management operations.

(2) The platform should have a visual interface to facilitate user operation. Users can register on the cloud platform, obtain certain permissions after verification, log in to the cloud platform to rent resources in the cloud, and customize the resources they need. The platform should have the authentication function of identity and authority to ensure the security of the platform.

The solution expression of platform security application conditions is:

$$O = \sqrt{\frac{1}{\alpha\tilde{p}}\left[1 + \left(\beta\dot{I}\right)\right]} \tag{1}$$

In the formula, $\tilde{p}$ represents the registration characteristics of remote education end users in the cloud platform system; α represents the response parameter indicating the connection behavior; β represents the cloud resource sharing parameter; $\dot{I}$ represents a customized vector of mental health course resources.

(3) Users can rent cloud devices, customize services and deploy remote education platforms according to the actual needs of their applications.

(4) The main function of the distance education platform is to provide different functions for ordinary users of the distance education platform, such as teachers, students and administrators, respectively corresponding to the teaching, learning and management functions of the distance education platform.

The applied function expression of distance education of mental health course in secondary vocational schools is:

$$U = \chi \cdot \sum_{\substack{i=1 \\ u=1}} \left| \frac{y_i \cdot y_u}{\delta \overline{y}} \right|^2 \tag{2}$$

In the formula, i and u represent two randomly selected function approval vectors, y_i represents the parameter i based remote education platform response indicator, y_u represents the parameter u based remote education platform response indicator, $\overline{y}$ represents the average value of the remote education platform response indicator, δ represents the deployment permission of educational functions, and χ represents the validation coefficient of educational resources.

Formulas (1) and (2) are used to derive the demand analysis expression of distance education platform as follows:

$$Y = \left(\frac{1}{\gamma^{-\varepsilon}} \right)^3 \times \left[\phi R^2 - (O \times U) \right] \tag{3}$$

In the formula, γ represents the utilization parameter of educational resources, ε represents the development authority of the educational platform, ϕ represents the Partition coefficient of mental health curriculum resources, and R represents the real-time accumulation of educational resources.

For student users, they can use the distance education platform for independent learning and various learning support services, such as learning exchange services such as learning forums, homework resource download, score viewing, course selection and other functions. For teacher users, the platform should provide teaching functions and the function of communicating with students. For administrator users, it provides various management functions, such as user management, score management, student information management and other management functions, as well as related data statistics and summary.

2.2 Platform Hierarchy

The distance education platform for mental health courses in secondary vocational schools can be divided into two parts, one is the learning platform used by student users, and the other is the management platform used by various administrators. The learning platform mainly includes the functions of personal information management, video on demand, course evaluation, learning exchange, information retrieval, etc. The management platform mainly includes the modules of student information management, course selection management, score management, resource management, user management, etc. The specific function module diagram of the platform is shown in Fig. 1.

There are two main types of users of the learning platform: students and teachers. Students and teachers have different permissions due to their different roles in the system, but they use roughly the same functional modules. There are six major module functions: login authentication module, learning support module, course module, course selection score module, opinion feedback module, and personal center module. This structure

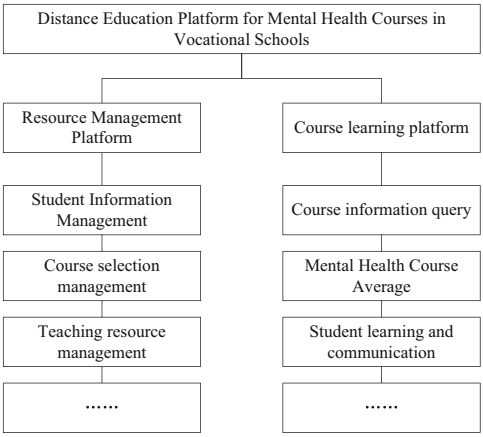

Fig. 1. Functional Structure of Platform

mainly provides students with relevant support for online learning, mainly including learning forums, interest groups, and online Q&A. These three parts provide students with different learning exchanges; Task reminders are mainly used to remind the recent Q&A plan and other information; The assignment resources mainly provide the upload and download services of assignments. Students can view the relevant resources and assignments of the selected courses, download the relevant assignment topics of the selected courses, and submit the assignments online [4]. After submission, you can view the status, scoring and other information of the job. Teachers can view their uploaded resources, assign homework, download student homework, and upload the corrected homework to the system after correction.

For the average application capability of the platform hierarchy, follow the expression shown in Formula (4).

$$E = \left. \frac{\sum_{\iota=1}^{+\infty} \dot{e}^2 |\Delta T|}{\varphi \cdot Y} \right|_{\varphi \neq 0} \tag{4}$$

In the formula, ι represents the upload parameters of remote education resources, $\dot{e}$ represents the functional characteristics of the remote education platform application module for secondary vocational mental health courses, ΔT represents the unit response cycle of the remote education platform, and φ represents the user classification coefficient in the education platform system.

Course selection score mainly completes the function of course selection and score query. Within the specified time for course selection, students can select courses on the platform, view the scores of the tested courses, and view their own course selection [5]. Teachers can view the performance statistics. Opinion feedback mainly provides two functions, namely, the website letter and the dean's mailbox, to feed back the opinions or suggestions of students or teachers on using this platform. The Personal Center is

mainly used to view personal related information, such as posts, messages, interest groups created by users, etc. You can also modify your personal information and platform password.

2.3 Typical Functional Modules

The typical functional modules of the distance education platform for vocational mental health courses based on cloud computing include learning forums and interest groups. The following analysis is made on their application capabilities.

(1) Learning Forum

The learning forum of the distance education platform provides the platform users with a space for learning and discussion, which can solve the problems students encounter at ordinary times, and is an effective supplement to the real-time question answering module. Teachers and administrators can fully communicate with students here. The learning forum adopts the real name system. The forum is mainly divided into three categories: public forum, professional forum and course forum. The public forum includes modules related to system function modules, such as enrollment module, student status module, educational administration module, etc., and information of corresponding departments of major online education institutions [6]. The columns of the professional forum correspond to the majors in the teaching plan one by one, providing professional discussions. The curriculum forum comes from the actual curriculum in teaching, and students and teachers can conduct curriculum learning exchange in the relevant curriculum forum. The functional module division of the learning forum is shown in Fig. 2.

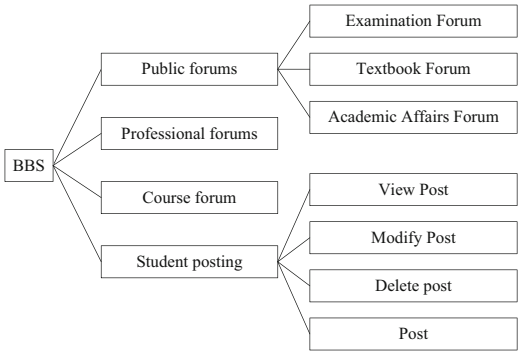

Fig. 2. Functional module of learning forum

(2) Interest Groups

The interest group is set up by students themselves, which attracts students with the same interest to participate in the discussion system. Users can freely create and apply for the participation of users. The number of members sharing resources among members

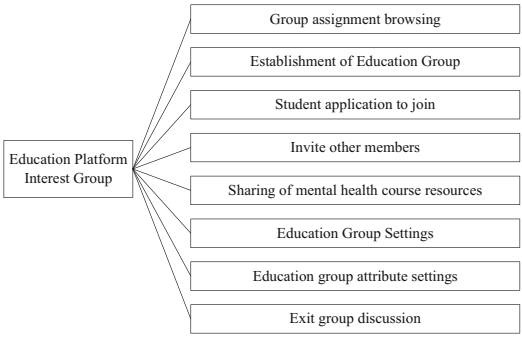

Fig. 3. Function module of interest group

of the same group can be up to 100, and this data can be adjusted by the administrator. The main functions are shown in Fig. 3.

Students can browse all groups under interest groups after logging in. On the interest group list page, students can view the name, founder account, founder name, creation time, theme, number of visits and other information of all interest groups, and can filter and query the interest group list by conditions. The filtering results are still returned in the same form of list. Students can browse the group or apply to join the group according to their personal interests and become members of the group only after being approved by the group leader.

Students can create their own group, view my group and related group information, and delete the group they created. Resource sharing within the same group. Group members can upload resources for use by group members, and can leave messages in the group to communicate with others [7]. Everyone can also delete their own uploaded files, and the team leader can delete all files in the group. Students can invite others to join or leave the group. The teacher's operation of interest groups is consistent with that of students. The administrator has the management function for the group, mainly including group resources, adding, deleting, modifying and checking messages, deleting groups, etc.

3 Platform Technology Implementation

According to the actual connection of the remote education platform architecture, build a cloud computing service model, and configure the data center with the help of OpenStack cloud environment system, so as to realize the smooth application of the remote education platform for secondary vocational mental health courses based on cloud computing.

3.1 Cloud Computing Service Model

Cloud computing is divided into three different service modes from the perspective of user experience, namely software services, platform services and infrastructure services.Infrastructure is provided to users as a service. Here, infrastructure refers to all available hardware resources including memory, storage devices, network devices, CPUs

and other basic hardware devices. IaaS uses virtualization technology to form a unified resource pool for all available hardware devices for efficient automatic management. Ordinary users can rent equipment on the cloud platform. For educational users, "cloud" refers to unlimited equipment resources in the network, which can be rented to obtain infrastructure services and deploy their own applications on it. Although users cannot control or manage the underlying physical devices in cloud computing, they can decide which operating system to install and which applications to deploy on the leased devices, and can also gain control over some network components, such as routers and firewalls. As shown in Fig. 4.

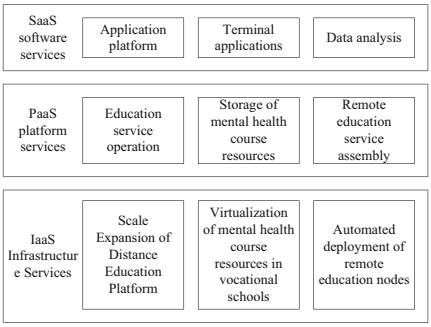

Fig. 4. Cloud computing service model architecture

The platform includes application development platform, deployment platform, etc.It is an abstract service based on infrastructure resources. Users do not need to care about how the underlying cloud infrastructure operates, and it effectively avoids the complexity of hardware facilities, such as the configuration and management of operating systems, servers, networks, etc. [8]. Users only need to deploy their own developed or purchased applications on the leased platform, control the hosting environment of applications, etc., and do not need to care about the underlying infrastructure and development platform. It has the advantages of convenient development, simplified deployment and maintenance.

Software services enable users to access applications through a browser on a client such as a personal PC, without installing applications on their own computers or servers. It is a new form for users to obtain software services. Users can subscribe to the software services they need according to their actual needs. There is no need for complex hardware equipment, professional developers and maintenance personnel, and software services can be rented in the form of services only through the Internet, which greatly reduces the cost of using software for users. In the software as a service layer model, it mainly provides software services for customers, and these software are running in the cloud.

3.2 OpenStack Cloud Environment Construction

In order to solve the problem of high concurrency existing in traditional platforms, this study builds a cloud platform for the following reasons: Through elastic resource allocation and horizontal expansion, the cloud platform can flexibly deploy computing, storage

and network resources according to actual needs to cope with high concurrency pressure. During high load periods, the system dynamically increases the number of servers and allocates requests through load balancing technology to improve the throughput and concurrent processing capability. Secondly, the cloud platform also has a certain automatic scaling function, which can automatically expand and reduce resources according to preset trigger conditions, which enables the cloud platform to independently adjust the scale of resources according to the load situation, so as to achieve the purpose of efficient use of resources. Finally, cloud platforms offer a variety of flexible storage options, such as object storage, file storage, and databases, to meet the high-throughput read/write and storage needs for large-scale data. In summary, building a cloud platform provides a resilient and scalable solution for highly concurrent scenarios, ensuring that the system can maintain stability, high availability and high performance levels in response to high load stress. To build a cloud platform, you can simply install the required OpenStack components on the infrastructure, and the running ability of OpenStack components fully meets the requirements of cloud computing. Cloud computing is a computing method that provides users with dynamic, scalable, and virtualized resources in the form of services through the Internet. Users do not need to understand the infrastructure supporting cloud computing. Cloud computing can also meet the needs of different fields, such as scientific research and commercial fields. Cloud computing is not a new technology. Long before the emergence of cloud computing, various related technologies were developing and maturing, such as distributed processing technology, parallel processing technology, grid computing technology, public computing technology and software as a service technology.

The operation capability of OpenStack components is defined as:

$$w = \left(\frac{\lambda E}{q_{\max} - q_{\min}} \right)^2 + 1 \tag{5}$$

In the formula, λ represents the access parameters of the OpenStack component, $q_{\max}$ represents the maximum value of the cloud platform response parameters, and $q_{\min}$ represents the minimum value of the cloud platform response parameters.

The OpenStack cloud environment mainly includes a control node and a computing node, which are used for testing the cloud platform. There can be multiple calculation nodes in practical application. The steps for installing a control node and a computing node are basically the same, but the main installed components are different. Before installing OpenStack components, it is necessary to analyze the existing hardware environment, select the appropriate operating system and determine the OpenStack version; Then the installation and configuration of authentication server, computing service and image service; Finally, the installation of storage service and Web control end [9]. For cloud computing tasks, choose Ubuntu Server 14.04 as the operating system, and use the Kilo version of OpenStack.

The statistics of OpenStack component computing power conform to the following expression.

$$Q = \left(\eta \cdot \vec{A} \right) \times \sqrt{s_1^2 + s_2^2 + \cdots + s_n^2} \tag{6}$$

In the formula, $\vec{A}$ represents the Kilo version running vector of the OpenStack component, η represents the transmission efficiency of secondary vocational mental health course resources in the OpenStack cloud environment, and $s_1, s_2, \cdots, s_n$ represents n randomly selected remote education service mirror response parameters.

Install the operating system, configure the network, database and other information according to the process, and install the control node and computing node. The construction of an IaaS platform has been basically successful. In the cloud platform, each user only needs to register an account, and then can configure different instances from the image to operate resources independently, reducing the management work for the platform administrator. Users can freely use resources, deploy applications, install software, etc. in the cloud in a customized way.

Simultaneous Formula (5) and Formula (6) can define the OpenStack cloud environment building expression as:

$$D = \left| \frac{\hat{d}}{w} \right|^2 \cdot Q \cdot \sum_{-\infty}^{+\infty} f \cdot \frac{1}{\dot{g}} \tag{7}$$

In the formula, $\hat{d}$ represents the educational account registration features on the IaaS platform, f represents the deployment parameters of remote education resources for mental health courses in secondary vocational schools, and $\dot{g}$ represents the cloud computing response vector in the OpenStack environment.

The OpenStack cloud environment consists of three roles: client, controller, and computing node. The client has no special requirements for the machine and can be built using any physical host within the same LAN segment; The controller is composed of components such as Nova provided by OpenStack, which can be deployed on one machine or different physical hosts depending on the deployment mode. The remote education platform for secondary vocational mental health courses based on cloud computing adopts the method of deploying the controller on a single physical machine. The computing section consists of separate physical machines, which must support virtualization technology. The main function of a computing node is to run a virtualized instance and provide computing services.

3.3 Data Center Configuration of Education Platform

The data center has an embedded vCenter Server to deploy the vCenter Server, vCenter Server components and Platform Services Controller on one server. On the contrary, the centralized architecture separates the vCenter Server and Platform Services Controller and deploys them on different servers. The specific configuration process is as follows.

Step 1: Use VMware vSphere Client to access the vCenter Server in the browser, enter the vCenter user name and password, and log in to the vCenter Server.

Step 2: Create a data center in vCenter Server, and enter the name of the data center "Distance Education Platform Data Center".

The response capability of the distance education platform data center is defined as:

$$G = |\Delta H| \cdot \sqrt{\left(\frac{\tilde{h}}{\tilde{\dot{j}}} \right)^2 - \lambda D} \tag{8}$$

In the formula, ΔH represents the accumulated distance education resource courses in the secondary vocational open stack cloud environment, $\tilde{h}$ represents the response characteristics of the education resource vCenter server component, $\tilde{j}$ represents the response characteristics of the education resource of the platform service controller project, and λ represents the discrimination vector of the education resource.

Step 3: Select the Add Host option in the data center, and add the ESXi host to the data center through the IP address. During the addition process, you need to configure several configuration items, such as name and location, connection settings, and license allocation, to complete the host addition.

In the vSphere virtualization environment, clusters are the basis for virtual machines to achieve HA (high performance) and FT (fault tolerance). By default, there is only one working network in the vSphere environment, a virtual switch vSwitch0, and a physical network card [10] connected to each ESXi host. To manage and use clusters, a virtualized environment requires network redundancy and at least two shared storage. To ensure network redundancy, you need to add another physical network card for each ESXi host to connect to vSwitch0. Also add network storage for ESXi hosts.

The virtualization operation expression of the distance education platform data center is:

$$K = \left(\frac{1}{\mu}\right)^2 \cdot \sqrt{G\left(\hat{l}^2 - 1\right)} \tag{9}$$

In the formula, μ represents the connection parameters of the physical network card in the data center, and $\hat{l}$ represents the virtualization fault tolerance vector of the data center.

Using formula (9), the data center configuration expression is derived as:

$$M = \vartheta \cdot \sqrt{K \times \frac{\left|\sum_{-\infty}^{+\infty} \xi \times \dot{X}\right|}{\sum_{c=1} V_c + V_0}} \tag{10}$$

In the formula, ϑ represents the real-time response permissions of the data center for vocational and mental health courses on the remote education platform, ξ represents the remote education resource exchange parameters of the data center, $\dot{X}$ represents the real-time transmission characteristics of the remote education resources in the platform system data center, c represents the calibration parameters of the education resources, V_c represents the remote education resource storage vector based on parameter c, and V_0 represents the initial value of the remote education resource storage vector.

Using formula (10), the operation expression of the distance education platform for secondary vocational mental health courses based on cloud computing is derived as follows:

$$B = \frac{\omega \cdot M}{\hat{b}} \tag{11}$$

In the formula, ω represents the service parameters of the distance education platform, $\hat{b}$ represents the real-time service characteristics of distance education resources for mental health courses in secondary vocational schools.

So far, the creation and the most basic configuration of the data center have been completed, and virtual machines can be created in the data center to provide the most basic services for the remote education platform. After the basic configuration is completed, the advanced configuration of the data center can be carried out to realize the advanced features of vMotion, DRS (Distributed Resource Scheduler), HA (High Availability) and FT (Fault Tolerance).

4 Example Analysis

In order to verify the practical value of the distance education platform for secondary vocational mental health courses based on cloud computing, the distance education platform based on virtualization, and the distance education platform based on mobile embedded terminal technology, the following comparative experiments are designed.

4.1 Principle and Steps

In order to fully verify the practicability of the proposed platform, the instantaneous response rate of the remote client terminal is selected as the platform performance index for the following reasons: First, user experience is a key consideration, especially for remote access and interaction scenarios. The instantaneous response rate of remote client terminal can accurately measure the response speed of the system, so as to evaluate the performance of the platform. Secondly, the instantaneous response rate provides a real-time indicator, which can observe the performance of the system under high concurrent load in time, help to detect potential problems early and take corresponding optimization measures. In addition, it has the accuracy to directly measure the response time of user requests after they reach the system, providing a reliable measure to evaluate the system's ability to handle them in real time under different loads. At the same time, the remote client terminal instantaneous response rate is an intuitive indicator that can be widely understood and applied to various roles such as system administrators, developers, and decision makers to evaluate the performance of the platform and provide a basis for performance optimization and improvement. To sum up, choosing remote client terminal instantaneous response rate as platform performance index can comprehensively evaluate system response speed, timely find performance problems, and provide reliable data support for decision-making and performance optimization. For the education platform system, without considering other interference conditions, the faster the instantaneous response speed of the remote client terminal, the stronger the response ability of the terminal system, which is more in line with the practical application needs of strengthening the construction of secondary vocational mental health curriculum.

The specific implementation process of this experiment is as follows.

- Use the equipment elements shown in Table 1 to build the distance education environment required for the experiment.
- Input the executive program of the remote education platform for secondary vocational mental health courses based on cloud computing into the platform host, record the numerical changes of the instantaneous response rate of remote client terminals under the effect of the system, and the results are experimental group variables.

Table 1. Distance Education Environment

Project	Experimental equipment	Instrument model
1	Distance education terminal	STM32F103VCT6
2	Cloud storage server	Stc89c52RC kit
3	Teaching resource processor	STM32F407ZGT6 Development Board
4	Data sharing chip	PYNQ Linux 7010 chip
5	Terminal server	Kintex-7 FPGA
6	Data Register	EPM240 CPLD

- Input the executive program of the virtualization based distance education platform into the platform host, record the numerical change of the instantaneous response rate of the remote client terminal under the effect of the system, and the results are the first control group variables.
- Input the remote education platform executive program based on mobile embedded terminal technology into the platform host, record the numerical changes of the instantaneous response rate of remote client terminals under the effect of the system, and the results are the second control group variables.
- According to the variable data obtained, the experimental rules are summarized.

4.2 Data Processing

The following figure reflects the specific numerical changes of the instantaneous response rate of remote client terminals in the experimental group, the first control group and the second control group.

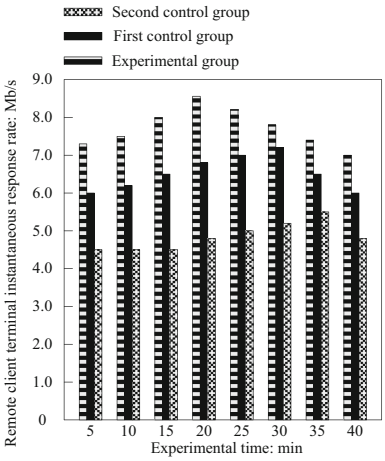

Fig. 5. Instantaneous Response Rate of Remote Client Terminal

Further analysis of the experimental data in Fig. 5 shows that, with the passage of time, the instantaneous response rate of the remote client in the experimental group shows a trend of first increasing and then decreasing. In the previous experimental stage, with the increase of the number of concurrent requests, the instantaneous response rate of the experimental group increased rapidly, reaching the highest value of 8.6 Mb/s. However, the instantaneous response rate of the experimental group began to gradually decline, indicating that the processing capacity of the system under high load conditions is still limited.

Compared with the experimental group, the change trend of instantaneous response rate of remote client terminal in the first control group was basically the same. At 30 min into the experiment, the instantaneous response rate of the first control group reached a peak of 7.2 Mb/s, which was slightly lower than the highest value of the experimental group. This may be because the first control group used a similar architecture and resource allocation, but the experimental group was better able to cope with high concurrency due to the elastic and scalable nature of the cloud platform.

The instantaneous response rate of the remote client in the second control group increased gradually after stabilizing in the early stage, and tended to decrease in the late stage. Compared with the experimental group and the first control group, the instantaneous response rate of the second control group was significantly lower, and only reached the highest value of 5.5 Mb/s at 35 min of the experiment. This may be because the second control group did not adopt the elastic and scalable characteristics of the cloud platform to effectively cope with high concurrent stress.

In summary, through further analysis of Fig. 5, it can be concluded that the experimental group showed better response ability and the highest instantaneous response rate in the high-concurrency scenario. The first control group, as the baseline group, performed relatively well and was close to the experimental group. The instantaneous response rate of the second control group was significantly lower because the elastic and scalable characteristics of the cloud platform were not adopted. This further validates the advantages and effectiveness of using the proposed platform to solve high concurrency problems.

4.3 Experimental Conclusion

To sum up, the conclusion of this experiment is:

(1) The application ability of the virtualization based distance education platform and the mobile embedded terminal technology based distance education platform in improving the instantaneous response rate of remote customer terminals is relatively weak, which is not enough to solve the problem of limited response ability of remote customer terminals, nor to achieve the practical application needs of strengthening the secondary vocational mental health courses in the construction of the education platform system.
(2) The application of remote education platform for secondary vocational mental health courses based on cloud computing has significantly improved the instantaneous response rate of remote customer terminals. Compared with the virtualization based remote education platform and the mobile embedded terminal technology based

remote education platform, it can better solve the problem of limited response capacity of remote customer terminals, so as to realize the construction of the secondary vocational mental health curriculum in the education platform system.

5 Conclusion

Aiming at the problem of poor response ability of the distance education platform of mental health course in secondary vocational schools, a cloud-based distance education platform of mental health course in secondary vocational schools is proposed and designed. This paper establishes the hierarchical structure system of the education platform by analyzing the platform requirements, optimizes the docking mode of typical functional modules, then completes the construction of OpenStack cloud environment based on the cloud computing service model, and finally completes the design of the distance education platform by configuring the data center system based on relevant course information. The experimental results show that the client instantaneous response rate of the proposed platform reaches 8.6 Mb/s at the 20th min, which is better than the comparison method. Thus, it can be shown that the distance education platform of the secondary vocational mental health course can give full play to the characteristics of cloud computing technology, provide distance learning services and resource storage services by using the powerful computing power of cloud computing technology, organize distributed infrastructure resources in the network by using virtualization technology, form a unified resource pool, and automatically manage these resources by software. Providing IaaS services externally can effectively solve the problem of high concurrency on traditional platforms, improve the instantaneous response ability of clients, and achieve better application results.

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