Research on the Construction of Resource Sharing Platform of Digital Media Technology Major

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Abstract: In order to solve the construction problem of digital media technology professional resource sharing platform, improve the current difficulties of lagging resource update and unclear classification, and ensure the smooth sharing of digital media technology professional resources. The article briefly describes the situation of digital media technology professional resource sharing and points out that the application of cloud platforms at home and abroad has brought about resource redundancy and professional support while expanding the amount of resource sharing. Based on the introduction of vSphere technology, a digital media technology professional resource sharing platform with various functions and better targeting is designed.

1   INTRODUCTION

1.1   Research Background

In recent years, with the development of the Internet and computer technology, digital media technology capabilities have grown and the communication environment and media forms have undergone significant changes, which have had a profound impact on the media industry. In the new media environment, various high-tech applications have subverted traditional media, changed the entire business environment, and further enhanced user experience.

As modern distance education becomes more and more deeply embedded in the life of human society, the construction of resource sharing platforms that accompany information technology has gained richer and more diverse development opportunities. Educational resources on online learning platforms also occupy a more central and important position. However, in this era of rapid information interaction, resource sharing still faces a number of traditional obstacles and resistance. These include hardware lags where the development of Internet infrastructure cannot meet the growing demand for online learning, and software shackles where

intellectual property rights and credit systems still need further improvement. The emergence of digital media technology techniques has broken these traditional barriers to the development and utilization of digital education resources, providing a resource construction and sharing platform with distinct technical rationality for learners' lifelong learning.

1.2   Purpose of the Study

The resource sharing platform is an important support for digital media technology students to search for materials and find information, and can provide powerful support for the teaching activities of teachers and students. At this stage, resource sharing technology is developing rapidly at home and abroad. Cloud storage and cloud sharing products, represented by Ali cloud and Google Drive, are powerful and convenient in storage and transmission operations, which have solved the difficulties of digital media resource transmission to a certain extent. However, the resource redundancy problem of these platforms also affects the usage experience, so it is necessary to design more targeted and dedicated platforms from a practical point of view.

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2 THE CURRENT STATUS OF RESOURCE SHARING IN DIGITAL MEDIA TECHNOLOGY

Since entering the new normal development stage, the global market pattern has seen a clear trend of structural adjustment and optimization. Factors such as technology and information have replaced traditional production factors in the market and have been given more intangible asset value. The new businesses that depend on them have also received more nourishment and support, and are growing and developing rapidly. The theory of "resource sharing" has emerged in this context.

Foreign iCloud and DropBox are outstanding representatives of sharing technology and have made important contributions to cost savings and efficiency improvement of information transmission (BCAS, 2003). Domestic technology companies and scholars have also joined the research ranks and launched cloud storage technologies with Baidu Cloud and 360 NetDisk as benchmarks, solving the problem of sharing professional resources in digital media technology and providing more efficient and high-quality resource sharing channels. However, as most of these products are profitable and need to face global users to meet the diverse needs of users, there are many platform resources, high redundancy, useless resources and easy line congestion, which makes it difficult to provide long-term reliable teaching support for digital media technology majors. Based on this, many universities have designed and launched special educational resource sharing platforms from the perspective of innovation. Although the relevance of platform services has been improved to a certain extent, limitations still exist due to technical and conceptual factors:

▪ The problem of unclear classification of disciplines, many university resource sharing platforms adopt open source management mode, and different majors share the same platform for uploading and downloading resources, and invalid and redundant resources are very much, which reduces the usability and operation efficiency of the platform (Niu, Zhao, 2020).

▪ The problem of backward platform technology. The current resource sharing platform is relatively single in function and adopts the traditional network organization structure and operation mode. Once the number of resources proliferates and the scale expands, the platform directly goes down and dies, which affects the usage experience and increases the maintenance cost and risk of loss.

▪ The quality of resources varies, and the material resources required by the digital media technology profession are diverse. Due to the lack of necessary evaluation and interactive boards, all materials can only be mixed up, which is time-consuming for students and extremely low utilization of resources, and there is an urgent need to build a more stable and reliable platform system.

3 NEW TECHNOLOGIES FOR BUILDING A PROFESSIONAL RESOURCE SHARING PLATFORM FOR DIGITAL MEDIA TECHNOLOGY

Cloud storage technology is the main technical direction for the construction and development of a professional resource sharing platform for digital media technology. It can be divided into four different levels. The data storage layer assumes the function of information writing and recording; the data management control logic algorithm, which assists the realization of various functions with the support of mapping; the data service layer and the access layer are open to users and support the independent deletion of resources and download applications. Compared with traditional storage methods, cloud storage technology absorbs more advantages of distributed computing, can meet the needs of automation and intelligent operation, and can save resource expenses under the premise of ensuring data security. Foreign research on cloud storage technology started earlier.

Amazon, Microsoft and other international giants began to explore as early as 2006 and launched cloud storage products with different performance and advantages. vSphere technology is one of the representative categories, which adopts virtualization platform design ideas, relying on vCenter Server, VMware ESXi host to provide cloud storage and computing services, to achieve a multi-core virtual machine and physical server It is more comprehensive and convenient to use. Therefore, this technology is used to build a professional resource sharing platform for digital media technology.

vSphere virtualized infrastructure includes the entire data center infrastructure, including storage, servers, and networks. It enables these different

types of resources to be shared, transforming the datacenter infrastructure into a unified, simple, easy-to-manage collection of network elements located in a virtualized environment. vSphere allows network resources to be managed like a shared tool and deployed quickly without worrying about hardware differences and limitations. The VMware vSphere cloud operating system is comprised of the following component layers shown in the figure 1.
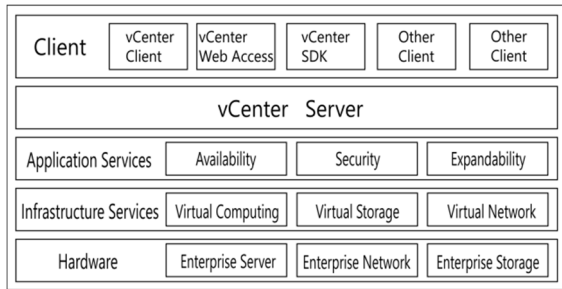

Figure 1: vSphere Cloud Operating System Architecture

4 IDEAS AND POINTS FOR THE CONSTRUCTION OF A PROFESSIONAL RESOURCE SHARING PLATFORM FOR DIGITAL MEDIA TECHNOLOGY

4.1 Demand Analysis

The introduction of vSphere technology and the construction of the resource sharing platform both serve the teaching and application process of digital media technology majors in colleges and universities. Therefore, the professional use requirements of universities are the starting point of the whole architecture and platform design. From the viewpoint of the actual operation link, its demands are mainly reflected in availability, security and scalability (see Table 1).

Table 1: Construction requirements and implementation methods of professional resource sharing platform for digital media technology

Construction demand	Implementation method	Specific advantages
Availability requirements	VMware vSphere vMotion	Implement virtual machine transfer between ESXi hosts
	VMware vSphere Storage vMotion	Implement virtual machine transfer between storage devices
	Data Recovery	Data recovery
Security requirements	VMware vShield Zones	Operating System security support
	VMware vMsafe	Protection against the virtual software
Scalability requirements	DRS	Distributed resource management
	Heat to add	Complete the resource addition without shutdown
Computational requirements	VMware ESXi DRS	ESXi Distributed Resource Management
	Excess memory allocation	More memory sharing than the physical machine
Storage requirements	VMFS	The Private Virtual Machine File System
	Thinn Provisioning	Streamline configuration
Network demand	Distributed switch	Efficient communication

The platform system must run stably and be able to provide guarantee for the transmission and download of large volume and heterogeneous digital media resources, and there should not be frequent downtime and lagging, and even if there are unexpected problems, it should have data recovery and system repair capability to ensure the security of digital media resources.

Considering that there are many users of digital media technology in universities, professional enrollment expansion and inter-campus cooperation, physical machines need to be expanded to supplement resources, so the system platform should also have certain scalability and can reduce the burden of the physical layer with the distributed resource management scheme. The introduction of vSphere can solve exactly such a problem, where vMotion and torage vMotion technologies can balance computing power and can migrate resources to idle ESXi virtual hosts and virtual memory without interrupting system operation, thus balancing the resources and performance of the two virtual devices. The distributed power manager can

also run automatically when the server itself is lightly loaded, shifting virtual machines to a few hosts and issuing commands to put the remaining ESXi virtual hosts into standby mode, saving energy in the data center and ensuring system operational efficiency.

The platform also features technologies such as VMware vShield Zones for security support and protection, which can dynamically monitor the virtualized environment and initiate seamless failover in the event of a failure, reducing the risk of data failure loss. In addition, computing requirements, storage requirements, and network requirements are also key issues in the construction of the platform. vSphere technology relies primarily on hot-add technology, DRS technology, and VFMS technology for distributed management, which allows for flexible configuration and efficient scaling to meet the needs of students and faculty in digital media technology (MARVIN 2005, Wang 2020).

4.2 Structural Design

After determining the design requirements and implementation of the platform, the architecture of the platform needs to be established according to the actual situation.

The actual situation is set up. Earlier architectures mostly used single server technology, while digital media technology majors use a large amount of resources with high heterogeneity, which can easily cause problems such as server overload and lag. Therefore, this design relies on the vSphere virtualization platform to integrate server resources, realize distributed storage allocation and management, reduce platform workload, and improve resource allocation efficiency. The operation logic can be seen in Table 2.

Table 2: The operation logic of the professional resource sharing platform of digital media technology

step	concrete operations
1	Teachers and student users enter the account and password login management interface
2	Resource sharing platform and Web Access authentication information, resolve the virtual machine physical address
3	The vCenter Server server receives requests, contacts the virtual machine console and configure resources
4	VMware ESXi host distributed run
5	The operation record is synchronized to the database log section

After teachers and student users log in to the management interface with their accounts and passwords, Web Access is enabled and verifies the information, resolves the physical address of the virtual machine and blocks illegal abnormal access, while the vCenter Server server receives requests to deploy allocated virtual machines and compute servers, and VMware ESXi hosts run computation in a distributed manner to resolve terminal Various resource upload and download requests are submitted, and all operation behaviors are synchronized to the log disk of the database for easy query and recovery at a later stage. It is important to note that the use of Web Access relies on the client program, so all accessed virtual machines have to install either the windows version or the Linux version of the server to achieve automatic allocation of virtual resources. The resource allocation logic can be simplified to the following formula:

$$W = \lambda_1 F + \lambda_2 M + \lambda_3 C + \lambda_4 V + \lambda_5 N \quad (1)$$

W represents the resource weight value, the virtual machine with large weight value can get the priority allocation right; $\lambda_1 \quad \lambda_5 \sim$ are the weight coefficients, five coefficients are 1, F, M, C, V, N, representing the remaining memory, the remaining capacity of hard disk, CPU, disk read/write speed and network status, which together decide the weight of virtual machine resources and ensure the storage security and sharing efficiency of digital media technology professional resources.

4.3 Function Implementation

VMware vSphere virtualization technology is widely used for its high degree of virtualization, cross-platform and compatibility, and flexible storage services. vSphere provides a complete virtualization solution for the unified provisioning and centralized management of server resources, consisting primarily of VMware Esxi, VMware vCenter, vSphere Client, and other components. VMware Esxi is a linux version of the network operating system installed on the server and is the resource host of the entire virtualization platform, mainly used to support virtual networking, storage management, memory and CPU resource scheduling and other related functions; VMware vCenter is a powerful centralized management component for hosts and virtual machines, and is the control and management center of the entire virtualization platform. Management Center vSphere Client is a remote login and management client component that

provides a user-friendly visual view for users to log in to the vCenter control and management center or directly to the host server.

The Digital Media Technology Professional Resource Sharing Platform, powered by vSphere, has very diverse functions (see Table 3), which are described in detail below according to board categories.

Table 3: Functional classification of professional resource sharing platform for digital media technology

System front ground plate function	Shared plate function	Management plate function
Account login management	Resource classification	User management
	Resource retrieval	Image management
	Resource download	Resource management
Interactive interface management	Resource upload	Security administration
	Resource deletion and reform	/
	Resource appraisal	/

4.3.1 System's Front Panel Function

In the teaching process of digital media technology, the variety and quantity of resources required are very large, both for animation, games, and film and television production. The corresponding audio, video and virtual model materials are even more encompassing. Therefore, the three interface parts are determined according to the actual usage. The foreground part of the system is a key part. After a user submits an access request, the system identifies user roles based on the account format and origin, and opens different login screens to teachers and students. The two databases are interrelated, but the operational details are different.

4.3.2 Shared Functions

The sharing function section is the main place for teachers and students to perform sharing operations. The modules of resource search, upload, download, evaluation and deletion are open to students.

Students can search for resources under the premise of classification and find the type of resources they need step by step. Take 3D character model search as an example, the search logic is a subset of 3D animation design model characters (Cai 2019) to reduce the time of blind selection. When students have specific design requirements, they can also search directly by keywords and titles. The evaluation section is open under all resources. Students can share materials and their feelings about using them, and remove dynamics at any time according to their needs to provide reference for other students. Additional resource categories section can be opened to teachers. Teachers can classify the section into non-linear editing, graphics and other first level subjects according to the school's curriculum structure and system. Also, they can regularly upload and update relevant resources and remove invalid and outdated ones to ensure efficient retrieval and usage and reduce server overhead.

4.3.3 Management Board

Due to the openness and sharing of information resource platform, computers are inevitably attacked by viruses or hackers, so we must pay great attention and be vigilant to information security. Therefore, security mechanisms, such as encryption technology, firewall technology, anti-virus technology and tracking and monitoring technology, must be constructed to realize the safe operation of the information resource sharing platform.

The management board is located at the back end of the sharing platform, including user management, security management, image management, etc. The management authority is controlled by the administrator, who can add a blacklist for high-risk users, update the design of database resources and algorithm resources, and upgrade and optimize the firewall security algorithm, thus facilitating the maintenance and operation of the platform.

5 CONCLUSIONS

Information technology has a revolutionary impact on the development of education. Adhering to the deep integration of information technology and education teaching and realizing the centralized deployment of education resources can promote the balanced development of education resources, improve the overall teaching quality and the information level of teachers and students, and

maximize the allocation, scheduling, monitoring and updating of teaching resources.

To sum up, the digital media technology major was created against the background of highly developed information technology, aiming to cultivate emerging composite talents who can adapt to the development trend of the times. As an important supplementary teaching platform, the resource sharing platform is of great significance. In practice, we must face up to its significance and value, introduce vSphere and other technologies, optimize the design of the foreground login module, resource sharing module and background management module, and optimize the platform's operation logic by combining the needs of teaching and instruction, so as to lay a solid foundation for improving the usability and security of the platform.

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