Design of Intelligent Cloud Teaching Resource Sharing Platform for Chinese and Korean Modern Ceramic Art

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Abstract. With the rapid development of information technology, ceramic art education information process continues to accelerate the development of the resulting problem is the explosive growth of data. At present, in the teaching process of Chinese and Korean modern ceramic art, the teaching resources are constantly developed, and the sharing platform of teaching resources is needed to complete the data transmission and sharing process. Therefore, it is necessary to design a new type of Chinese and Korean modern ceramic teaching resources sharing platform. Through designing the framework of Intelligent Cloud Teaching Resource Sharing Platform, setting the transmission method of Cloud Teaching Resource and setting the application network of Cloud Teaching Platform, etc. Through the comparison, it can be seen that the platform can effectively improve the insufficiency of the original platform and provide guarantee for the education process of Chinese and Korean modern ceramics.

Keywords: Resource sharing · Teaching platform · Network architecture · Data transmission

1 Introduction

As one of the most innovative, universal and penetrating hi-tech in the world, information technology is not only changing people's way of living, but also changing our way of learning. In order to speed up the construction of education informationization and cultivate innovative talents, schools have begun to vigorously carry out the construction of network resources platform, open network resources, and establish network and information resources sharing mechanism, so as to achieve the great teaching goal of education informationization driving education modernization. As a kind of marginal art form, ceramic art has its unique charm. This special art form developed from traditional art to modern art through the baptism and creation of the times, and developed from an art piece fully appreciated before to a new art language with modern flavor.

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2 Existing Problems

However, there are still some problems in the construction of educational informationization of Chinese and Korean modern ceramic art. Some websites are only used as the platform of the school government affairs information release. Therefore, some educators began to learn from foreign experience, advanced technology to try to change this situation.

In the process of accelerating the development of ceramic art education information, the primary problem is the explosive growth of educational data. A large number of educational resources are being developed, posing new challenges to key technologies such as data storage, data analysis and data retrieval [1, 2]. How to ensure the expansibility of storage capacity and the performance of resource service is of great value to the teaching platform based on Web service and management.

Through literature research, we know that the digitization of teaching resources can make a great contribution to the sharing of resources among the public, and is conducive to the sharing of better resources by modern ceramic learners between China and Korea, so as to benefit those who love ceramic creation [3, 4]. Through the platform, learners can get teaching materials, teaching experience and educational ideas from other excellent universities, and students can cooperate in learning and share their learning results and experience, thus promoting the spread of the ideas of excellent teaching and learning among users. At the same time, it is also beneficial to innovate the network teaching mode of Chinese and Korean modern ceramic art, and provide a good resource foundation for developing high quality and high level distance education. Therefore, in this study, the design of China and South Korea modern ceramic teaching resources sharing platform, in order to promote the exchange and development of modern ceramic.Therefore, in this study, a sharing platform of teaching resources of modern ceramics between China and South Korea is designed to promote the exchange and development of modern ceramics. J2EE is used as the overall framework of the modern ceramic Intelligent Cloud teaching resource sharing platform in China and South Korea. The data transmission process is controlled by using the congestion control algorithm of datacast. Web2.0 is used as the main operation network of the design platform, and the sharing of modern ceramic teaching resources between China and South Korea is realized.

3 Design of Intelligent Cloud Teaching Resource Sharing Platform for Chinese and Korean Modern Ceramic Art

In this design, the basic structure of the intelligent cloud teaching resources sharing platform is set as follows (Fig. 1):

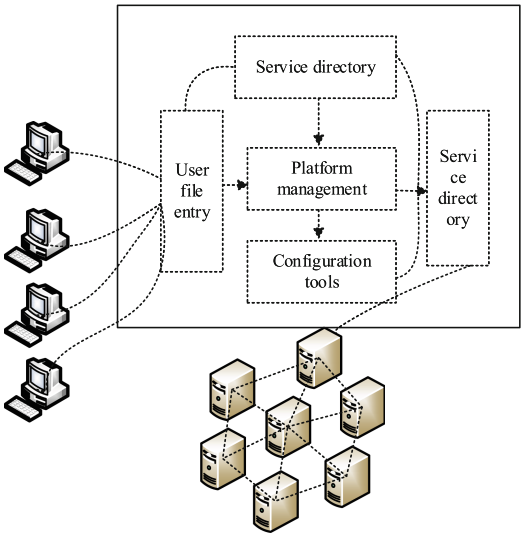


Fig. 1. Framework of intelligent cloud teaching resource sharing platform

According to the above structure, the network framework and data transmission control module of the intelligent cloud teaching resource sharing platform are designed to improve the use effect of the platform.

3.1 Design of Intelligent Cloud Teaching Resources Sharing Platform

In this design, J2EE [5] will be used as the sharing platform design framework. J2EE is a set of relatively new technical framework, including a lot of system development and deployment that can simplify and standardize the application, and further improve the security and portability of teaching resources sharing platform. At its core are a set of service architectures, various components, and technology-level specifications and guidelines for technologies that typically have common rules for good communication. At the same time, the resource sharing platform has good compatibility after using this technology, it is difficult to avoid the communication inside or outside the user network, and the performance of the back-end information is poor.

Through the literature research, we know that the current intelligent cloud teaching resources sharing platform needs to adapt to various new teaching business needs, and the information system of modern ceramic teaching resources in China and Korea has been built and put into use. Thus, the platform on the server side needs to be built incrementally. By using the J2EE architecture, the user's original teaching resources can be fully utilized, so IBM CICS, BEA TUXEDO Inprise VisiBroker and Netscape Application Server are added to the design platform. Because J2EE can get a wide range of technical support in the field of computing, and thus access to a large number of important teaching resources. On the premise that each user does not give up the existing resources, the user can fully own the portable J2EE, allowing it to enter the domain while the upgrade path. At the same time, the platform has good expansibility,

adapts to all operating systems and hardware environment, and can fully meet the user's requirements.

3.2 Cloud Teaching Resources Transmission Method Setting

In the process of building the platform, choose Datacast congestion control algorithm [6, 7] to control the data transmission process. In order to use Datacast congestion control algorithm to mathematically model the data of the platform, assume that the switches in the platform are "shared" by some other receiving nodes, and under what circumstances the data source will receive a duplicate request packet. Through research, we know that the slowest switch holds the updated data, while the slowest switch holds the old data. If the cache of the last "shared" switch does not hold the requested data for the requested packet, it is not possible for other switches to hold the data. Therefore, the last "shared" network caching device is critical to cache loss. Define it as a critical cache point. When the last "shared" network cache device cannot answer the corresponding packet directly, the request packet is sent to the data source. A critical cache node is usually fixed in a given Steiner tree [8] because it is determined by the structure of the Steinex tree itself and the rate of receivers. Critical cache nodes do not change over time when the receiver rate is constant. From the above analysis results, the transmission process of ceramic teaching resources is embodied by mathematical model, as follows.

$$a_i^{ll}(t) = (1 - r(t))\frac{\alpha}{T} - r(t)\frac{a_i^l(t)}{2}\frac{a_j^l(t - d_1 - d_4)}{MTU} \tag{1}$$

$$a_j^l = \begin{cases} Q \\ \max\{Q, a_i^l(t - d_2 - d_3)\} \end{cases} \tag{2}$$

$$r(t) = \circ\{a_i(t - d_1 - d_2) - a_j(t - d_1 + d_3) > E + \alpha * MTU - (d_3 + d_4)Q\} \tag{3}$$

In the above formula, t represents the current time, a_i represents the current data location of the resource data source, $a_i^l(t)$ represents the derivative of the current data location of the resource data source, namely, the sending rate of the resource data source, $a_i^{ll}(t)$ represents the second derivative of the current data location of the resource data source, namely, the rate of change of the sending rate of the resource data source, $a_j(t)$ represents the current data location of the slowest recipient, Q represents the ideal rate of the slowest recipient, E represents the size of the cached data in the network device, MTU represents the size of a teaching resource packet, d_1 represents the delay from the critical cache node to the resource data source, d_2 represents the delay from the resource data source to the critical cache node, d_3 represents the delay from the critical cache node to the slowest recipient, and d_4 represents the delay from the slowest recipient to the critical cache node. According to this formula, the transmission time of ceramic art teaching resources can be obtained and controlled.

3.3 Platform Application Network Configuration

According to the above design results, WEB2.0 [9, 10] is used as the main running network of the design platform. WEB 2.0 is a new category of Internet applications

relative to WEB 1.0. The main feature of WEB 1.0 is that users get information through browsers. WEB2.0 pays more attention to the interaction of users, users are not only the browsers of teaching resources sharing platform, but also the makers of teaching resources. [11–13] The fundamental difference between the network architecture of the design platform and the original one is that from the user's point of view, the experience brought to users is different. The following is a comparison of the two in terms of modes, basic components, tools, operating mechanisms, creators, applications, and forms. The main differences are shown in the following table (Table 1):

Table 1. Selection of network architecture and use of original platform network architecture

Type	Selection of network architecture	Original Platform Network
Mode	Simple spelling	Read and write
Components	Website	Publication of records information
Tools	Internet browser	Browsers, RSS readers
User population	Relevant Professionals	Ordinary users
Applications	Primary software applications	Full application
Morphology	Static	Dynamic
Operational mechanisms	Client server	Web server

In short, the transition from portal to personal, from content to application, from network information to personal, and from one-to-one to socialization is the transition of the original network architecture. In short, the original platform network architecture is no longer one by one hyperlinks, but the interaction between users platform.

Using the network architecture selected in this paper, the original platform network architecture can be expanded, from the point of view of information source, the information source of this design platform is more personalized and diversified. The information source of the original platform is mainly from the website builder, and the design platform of the text is not only from the content created by the user, but also from the sharing or grading of the content by the user to build a more perfect sharing system of teaching resources. The above network construction and design part of the effective combination, so far, China and South Korea modern ceramic teaching resources to share the intelligent cloud design platform.

4 Experimental Demonstration and Analysis

4.1 Experiment Setup

On this basis, the design process of the intelligent cloud of China and South Korea modern ceramic teaching resource sharing platform is completed. In order to verify the

feasibility of Chinese and Korean modern ceramic teaching resource sharing platform in practical application, the test link of Chinese and Korean modern ceramic teaching resource sharing platform was established, and the effect of the platform was analyzed. In this experiment, we use the traditional teaching resource sharing platform to compare the functions of the platform. In order to ensure the consistency of the experimental process, the experimental environment is set as follows (Table 2).

Table 2. Parameters of experimental environment

Type	Category	Setting parameters	Quantity
Software	Collaborative control	ELKOE	1
Experimental Control Software	Development of experimental links	JAVA	1
	Database	MY SQL 2016	1
	Database upgrade package	SQL 2KSP4	1
	Network server	Apache-tomcat	1
Experimental environment hardware	CPU	Pentium3	1
	Hard disk	1TB above space	2
	Memory	4 GB or higher	1

In order to improve the depth of the study, the experimental environment is set to 4 G network model and 5g network model. 10 groups of experiments are carried out for each operation mode, each group repeated 10 times. In this experiment, the network structure is set as follows (Fig. 2).

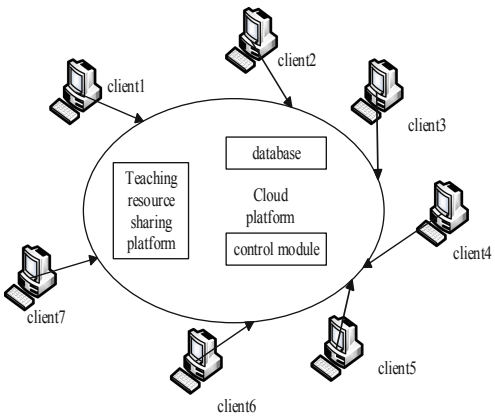


Fig. 2. Experimental network architecture.

The experimental network structure is set to the above form, and the experimental environment is combined with it. The corresponding experimental results are obtained according to the pre-set experimental comparison index.

4.2 Experimental Index Design

In the process of the experiment, the data transmission time, the accuracy and the recovery rate of Chinese and Korean modern ceramic teaching resources sharing platform are compared. Because some experimental indexes need to be obtained by calculation, the calculation process is set as follows.

Time for data transmission of teaching resources: t_1 means the processing time of the sending end, t_1 means the processing time of the sharing end, and T means the time for data transmission:

$$T = t_2 + t_1 \tag{4}$$

Using this formula, the transmission time of teaching resources can be obtained, and the data transmission ability of the designed platform and the traditional platform can be embodied.

Precision rate of teaching resources: J represents the precision rate during the use of the teaching resources sharing platform, G_1 represents the effective information obtained by the users after data sharing, and G_{ALL} represents the total number of teaching resources in the platform when the users use the resources sharing platform.

$$J = (G_i/G_{ALL}) * 100\% \tag{5}$$

This formula can be used to analyze the foundation effect of the platform, and the corresponding results are obtained.

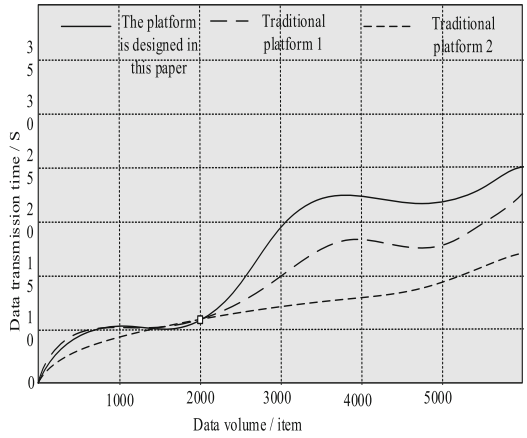
Recall: Set U to represent recall, K_i to represent the number of effective teaching resources available to users, and K_{ALL} to represent the total number of teaching resources that can be shared.

$$U = (K_i/K_{ALL}) * 100\% \tag{6}$$

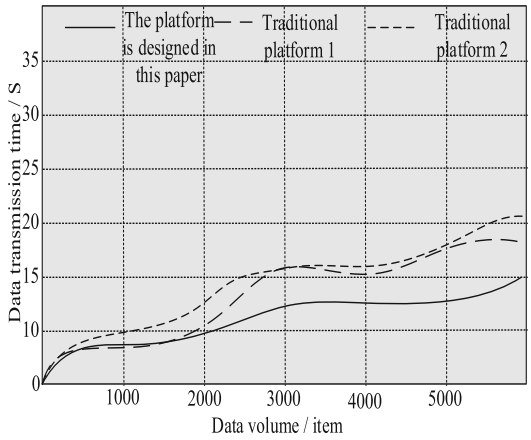
The recalling rate of the platform can be obtained by this formula, and the application effect of the designed platform and the original platform is analyzed. Using the above set of 3 sets of experimental indicators, this paper systematically analyzes the use of the design of Sino Korean modern ceramic teaching resource sharing platform, and verifies the scientificity of the design of Sino Korean modern ceramic teaching resource sharing platform.

4.3 Analysis of Experimental Results of Time-Consuming Transmission of Teaching Resources

From the above experimental results, it can be seen that the data transmission time of the designed platform is lower than that of the traditional platform in both network modes. In the process of experiment network change and data increase, the effect of the design



(a) Experimental Results of 4G Networks



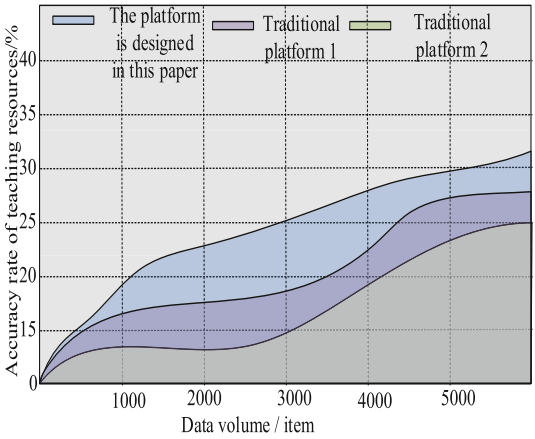
(b) Results of the 5G network experiment

Fig. 3. Experimental results of time-consuming transmission of teaching resources

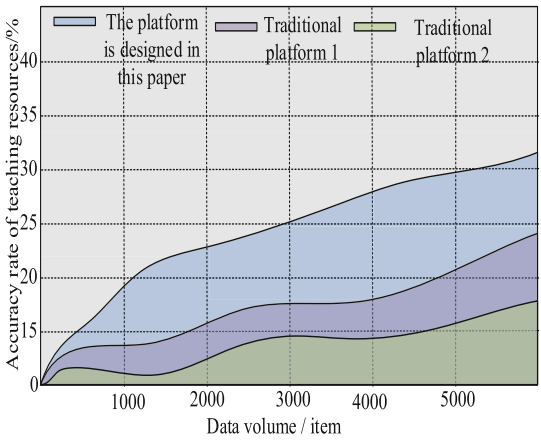
platform is more stable, and there is no fluctuation and abnormal, data transmission capacity is stable. The traditional platform has low adaptability in the transformation of network, but it appears to be stable in the process of data increase. Therefore, this platform has higher requirements for network conditions, and some abnormal problems will occur in the daily use (Figs. 3, 4).

4.4 Analysis of Experimental Results of Accuracy Rate of Teaching Resources

According to the above experimental results, the accuracy of teaching resources of the designed platform and the original platform can be obtained. By comparing the data, we can see that the design platform is better than the traditional platform, in different



(a) Experimental results of the 4G network



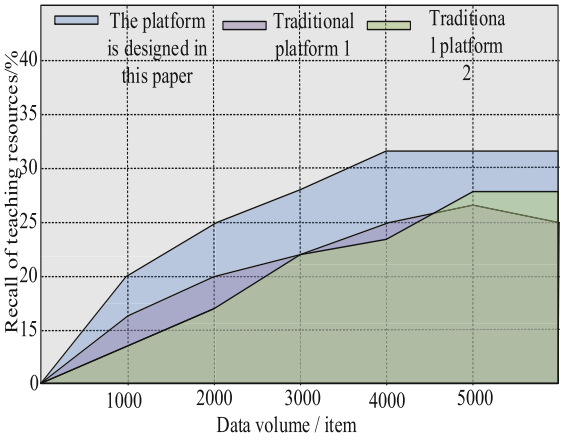
(b) Results of the 5G network experiment

Fig. 4. Experimental results of accuracy of teaching resources

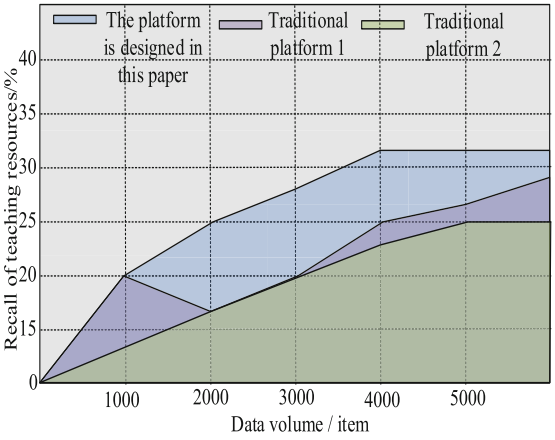
network environments, the design system of teaching resources accuracy and stability, will not affect the use of users. Compared with the design platform in this paper, the application effect of the traditional system is obviously lower, and it has a big fluctuation problem, which will affect the daily application. Therefore, the design platform in this paper has more advantages in the use process (Fig. 5).

4.5 Analysis of Experimental Results of Recall Rate of Teaching Resources

Through the literature research, we can see that the recall rate and precision rate of data are both negative growth, and can not achieve synchronous growth. Combining this principle with the experimental results of this part, we can see that the experimental



(a) Experimental results of the 4G network



(b) Results of the 5G network experiment

Fig. 5. Experimental results of recall of teaching resources

results of the Sino Korean modern ceramic teaching resource sharing platform are better, and its recall and precision rate meet the requirements of Sino Korean modern ceramic teaching resource sharing. The recall experimental results of the traditional platform are better than the accuracy experimental results, but the comprehensive experimental results are lower than the design of Sino Korean modern ceramic teaching resource sharing platform. Therefore, the Sino Korean modern ceramic teaching resource sharing platform designed in this paper is better than the traditional platform. At the same time, through the comprehensive analysis of the three groups of experimental results, we can see that the design of Sino Korean modern ceramic teaching resource sharing platform can be used as a tool for Sino Korean modern ceramic teaching.

5 Closing Remarks

This paper studies some problems of the intelligent cloud teaching resources sharing platform of Chinese and Korean modern ceramic art. Based on the construction and operation of the teaching platform at home and abroad, this paper deeply analyzes the development mode, management mode and resource sharing of the existing resources, and designs a solution to the problem of cloud teaching resource platform of pottery art.

In order to keep pace with the development of Internet technology and discuss the solution to the problem of the construction of teaching resource platform, this paper designs and realizes the Ceramic Art Intelligent Cloud Teaching Resource Platform based on cloud computing.

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