Construction of Network Resource Sharing Platform for Pre-school Fine Arts Education under Internet Background

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Abstract: With the development of information technology, the informationization degree of preschool education has been significantly improved, and a large number of digital education resource platforms have been built to provide support for school education and teaching activities. This paper mainly studies the construction of pre-school art education network resource sharing platform under the Internet background. The system developed in this paper adopts MVC design pattern in technology. Considering the cross-platform and easily portable characteristics of Java, it adopts Java language development, applies SSH framework, and uses jQuery to optimize the interactivity of system interface. The database management software of the system adopts SQL Server. By establishing a relatively complete set of digital education resource integration and convergence engineering methodology, it provides the best solution for teachers in the process of applying resources, maximizes the support for teachers' work efficiency, and promotes the improvement of curriculum teaching level.

1. Introduction

Today, with the rapid development of science and technology, information technology has penetrated into all aspects of economic development and social life, and has also brought unprecedented opportunities and challenges to education [1]. Information technology injects new vitality and vitality into education, not only provides innovative technical means and solutions, expands the coverage of high-quality resources, but also injects new ideas and impetus into the sustainable development of education, promotes the reform of teaching and learning methods, and promotes the improvement of both the quality and efficiency of education [2]. It should be said that education informatization is the inevitable choice to realize leap-forward development for education, do a good job in education should pay more attention to teachers' and students' actual, meet the students' real needs, respect and service to the healthy growth of the students, information technology application in the field of education, more cross time significance, explore the method of supply strategy of digital education resource, to maximize the teachers and students, parents to provide quality education services. The sharing of teaching resources is an important link in the teaching process, which is directly related to the level of teaching quality. With the advent of the Internet era, online education has developed rapidly, enabling people to learn knowledge in the "classroom" on the Internet without leaving home, share teaching resources, ask questions in real time, actively interact with teachers and classmates, and improve the fun of learning [3-4]. The traditional teaching resource sharing method is limited by the region and time, which leads to a small scope and a low degree of resource sharing. If this goes on in the long run, it will inevitably make the situation of unequal educational resources even more serious and fail to promote the continuous improvement of the level of teachers. Therefore, teaching needs to change from the traditional teaching resource sharing mode to the Internet teaching resource sharing service. Now it is necessary to develop a new set of teaching resource sharing service system to promote the sharing and development of teaching resources, change the traditional sharing mode, and alleviate the uneven distribution of resources [5-6].

Foreign researches on teaching resource sharing service system have summarized the

characteristics of current similar systems as follows: developed countries in Europe and the United States have gradually shifted from focusing only on resource construction to not studying the integration and systematization of resource construction, practice and sharing [7]; Eu countries for the application of the open sharing of teaching resources in the university teaching has gradually improve, and the normalized application system, the business functions on the discussion of concrete cover high quality teaching resources and open sharing of teaching resources sharing service provided by application technique, effect and method, evaluation methods such as policy support, different operation [8]; teaching resource sharing service in the United States mainly constructs the use of teaching resources from the perspective of students, covering the reorganization and redesign of resources [9].

The research of this paper is always guided by the analysis, design and practice of how teachers use digital resources suitable for activities in an efficient and convenient way.

2. Pre-school Art Education Network Resource Sharing Platform

2.1 Practical Strategies of Network Art Resources in Preschool Art Teaching

(1) Change the concept of education

If preschool children want to continue to develop and progress in the art teaching, it is necessary to change the traditional educational concept, pay attention to the application of network art resources. Network art resources have the characteristics of more resources, rich content and diverse forms, which are more "fresh", more diverse and more in line with the development and trend of the Times than the teaching resources used in traditional preschool art teaching. Today, such a huge amount of art resources on the network has been enough to meet the needs of preschool art teaching, but how to use these resources, how to use these resources is the need for every educator to think about. However, no matter how to use it or how to use it, we should first keep an open and positive attitude to accept such a trend -- the application of network art resources in teaching is becoming more and more extensive and necessary. Therefore, to understand the trend, step up, and constantly attach importance to the application of network art resources in preschool art teaching is the new basis for the faster development of preschool art teaching.

(2) Resource sharing

It is an effective and quick way to solve the problem to establish a network art resource sharing website in the school. On the one hand, in the gardens building group, to set up the repository of fine arts, art teaching communication can collect art teaching resources, for the preschool teachers share their production, gathering network to facilitate the art resources channels, can also convenient and other teachers using resources for teaching, for preschool teachers save a lot of preparation time, improve the utilization rate of resources, It also gives a better play to the role of online art resources in teaching [10-11]. On the other hand, taking preschool as the construction unit will not cause the potential waste of large-scale platform construction, and it can be implemented quickly in a small unit, providing valuable practical experience for the further construction of online art resource website platform in a large range of provinces and cities [12].

(3) Construction of network art hardware facilities

In the aspect of teacher training for the construction of network art resources, the policy on the cultivation of information technology ability of preschool art teachers is far from enough, which greatly limits the application of network art resources in preschool art teaching. Should increase the intensity of teacher training, not only in preschool internal information related to the teaching technical ability training, using case analysis form such as specific learning, let technology to quickly master the application of network resources of fine arts preschool teachers, in addition, the government also should strengthen training, training, focus on training and so on a variety of ways through the network deeply for technical training of teachers.

(4) Formulate network resource regulation policies

Network art resources as a new form of art resources, with the help of the network to spread and popularize, the prospect is very great, can bring a new development opportunity for the new era of

preschool, primary and senior education and teaching. Network, however, it is a "double-edged sword", it bring convenient and quick for the teaching at the same time, also spread with numerous repeated mad, quality is low, vulgar, unhealthy information resources for the popularization of network art education has brought more than obstacles, so the author suggested that the government education department to develop as soon as possible to the network resource sharing, fine arts, download and other related policies, on the one hand, this can greatly improve the quality of online art resources. Currently, the quality of online art resources is uneven. Under the constraints of laws and policies, the network environment is gradually getting better and at the same time, the quality of resources will be gradually improved through selection. On the other hand, front-line teachers can also provide teaching guidelines and norms to prevent preschool teachers from popularizing superstandard or inappropriate network resource content and provide policy guarantee for the healthy development of teachers.

2.2 System Architecture Design

(1) System technical architecture

In order to complete the development and design of the system, considering the cross-platform and easily portable characteristics of Java, the system uses the Java high-level programming language, the system applies the MVC design pattern, the application of SSH framework, the use of jQuery to optimize the interaction of the system interface, and the use of JavaScript to design and implement the foreground interface. The database management software of the system adopts SQL Server.

Considering the cross-platform and easy transplantation of JAVA, the art education network resource sharing platform uses JAVA high-level programming language for system development and design, and uses JavaScript for the design and implementation of the front interface. In order to facilitate management, the art education network resource sharing platform applies the MVC design pattern and divides the program development into different levels such as data Model layer, business logic layer and foreground display layer according to the concept of Model, View and Controller, so as to conduct phased development and reduce the difficulty of project management. At the same time, the system applies SSH framework, Struts is responsible for program function scheduling, accepts user requests, and calls the corresponding business logic to complete the request, and returns the processing results. Spring is responsible for specific business processing, analyzing user requests, completing corresponding operations, and returning the results to Struts in form or other formats. Hibernate is responsible for the relevant operations of the data model, including the interaction between the system and the database, the modeling and encapsulation of the data and the persistent storage. Finally, the database management software of the system uses SQL Server.

(2) System functional architecture

The design of art education network resource sharing platform realizes eight functions: personal space management, theme teaching and research management, quality class selection management, online class management, famous teacher classroom management, micro teaching and research management, simulation teaching and research management and sunshine classroom management.

Personal space management. Personal space management function is mainly for different roles of users can be used to create a learning, communication and teaching research work space, to help users use spare time to teach and learn, improve learning and work efficiency, mainly divided into basic information management, personal resource management and discipline resource management.

Themed teaching and research management function for the school teachers and other users to provide a network teaching and research platform, so that they can not be limited by space and time and other conditions at any time and place to carry out teaching and research communication, forming a community of teaching and research community. Among them, the theme teaching and research management function is mainly divided into independent teaching and research management and school-based teaching and research management two parts.

The function of quality class evaluation management mainly provides quality class evaluation activities for teachers to help them improve the quality of teaching and research, which is mainly divided into three parts: activity management, registration activity management and evaluation activity management.

The online lecture management function mainly provides an online lecture platform for teachers, so that they can listen to lectures anytime and anywhere. According to their teaching tasks in this semester, they can arrange their time reasonably, so as to avoid being affected by the time and place restrictions of offline lectures.

Classroom management of famous teachers. The function of classroom management of famous teachers is mainly to provide demonstration classes for the majority of teachers and help them improve their teaching quality, which is mainly divided into two parts: teacher management and album management.

Micro teaching and research management. Micro-teaching and research management function is mainly for teaching and research staff to provide a platform to organize small teaching and research activities, can be anytime and anywhere for a topic of teaching and research discussion, improve the quality of teaching and research. Micro teaching and research management function is mainly divided into two parts: friend management and micro teaching and research management.

The function of simulation teaching and research management is mainly to solve the problems existing in the management and control of teaching and research resources of teachers in different places, so that they can participate in the teaching and research conference instantly through the network video conference or voice chat, so as to realize teachers' long-distance communication and resource sharing.

Sunshine classroom management function is mainly the course of this semester for unified management, according to the different objects of operation, can be divided into teacher management and schedule management and other two parts.

3. System Simulation Test

3.1 Testing Environment

Good test environment can imitate the real use environment, as far as possible to reduce changes in system performance caused by changes in the external environment, improve the quality of system testing. Therefore, in order to make the test process of the art education network resource sharing platform as realistic and perfect as possible, this paper uses two servers to deploy the system, and uses the campus network to test in real time on campus to simulate the real use environment of the system.

3.2 Function Testing

In the test of art education network resource sharing platform, this paper mainly adopts the method of unit test and integration test. Firstly, the specific implementation of the eight functional modules of the system was tested, and multiple test cases were designed for each functional module from multiple different angles, and the completion of each functional operation was repeatedly tested.

3.3 Mathematical Statistics

The purpose of this stress test is to examine the performance of the platform in order to verify server load. In line with the production environment as far as possible, the project team simulates the number of concurrent users, conducts performance tests on the core business of the system, collects the test results, and ultimately serves as the basis for the stable operation of the system, and provides guidance for the system tuning.

The relevant test formula is as follows:

$$F = \frac{N_{PU} \times R}{T} \tag{1}$$

$$C^{\mu} = C + 3\sqrt{C} \tag{2}$$

4. Simulation Test Results

4.1 System Function Test

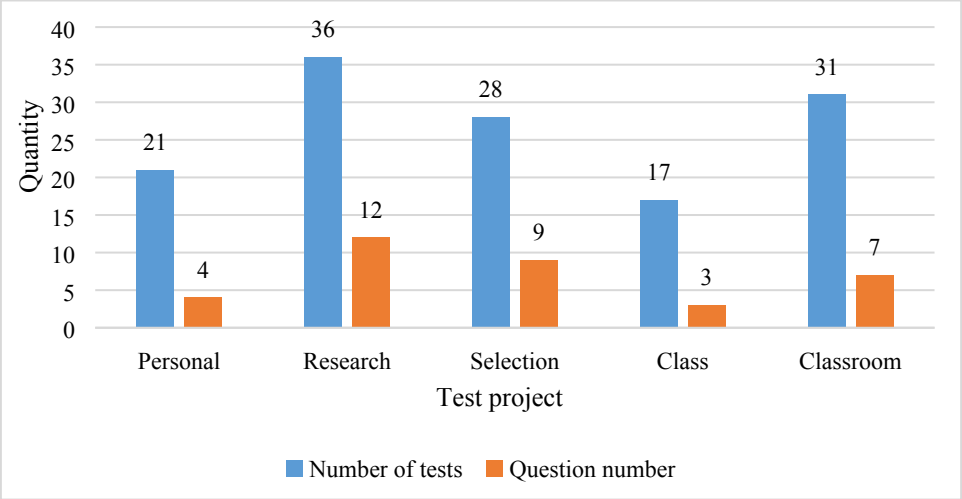

Figure 1. System function test results

As shown in Figure 1, a total of 21 functions were tested in personal space management, and 4 of them had problems. The teaching and research management tested 36 functions, 12 of which appeared problems; There are 28 functions tested in the course selection, 9 of which have problems. There are 17 functions tested in the online course, and 3 of them have problems. There are 31 functions in classroom management test, 7 of which have problems. The above problems mainly focus on the database link is not on, the information appears garbled, the length of the extended field is not reserved enough, the old and new code is not completely corresponding to the individual. In view of the above defects, according to the data standards and functional requirements, we have carried out thorough modifications one by one until the platform is stable.

4.2 System Performance Testing

Table 1. System processing quantity

	60	120	180	240
Concurrent users	20	50	100	200
Response time	21	28	43	64
System processing quantity	19	17	14	11

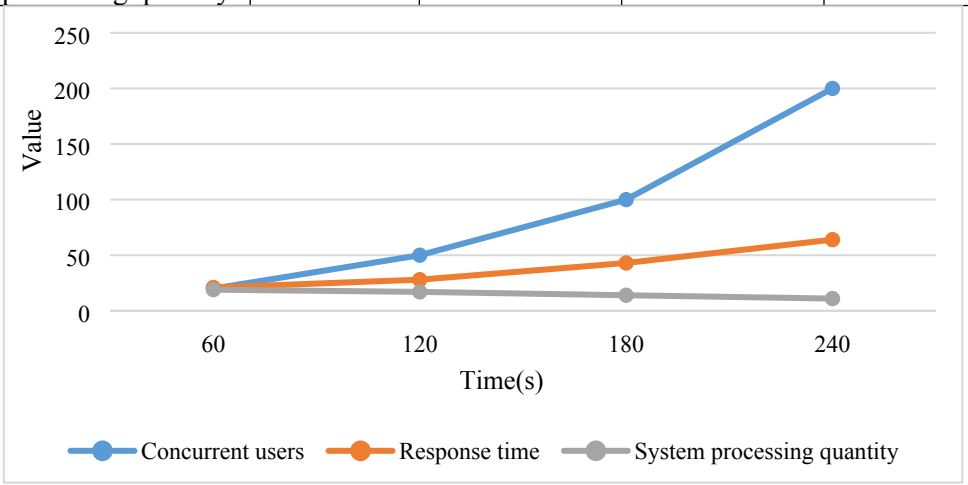

Figure 2. System processing quantity

As shown in Table 1 and Figure 2, after the LoadRunner software was used to test the responsiveness of the system, the number of concurrent users at the peak of the test could reach 200, and the time from sending operation request to receiving result feedback was less than 3 seconds.

After testing, it is found that when there are tens of thousands of users accessing the system at the same time, the running speed of the system is significantly slower, and it takes longer time to display the operating results. At this time, the temperature of the processor rises sharply, the system is prone to crash and other conditions, and the reliability needs to be enhanced.

5. Conclusions

In this paper, the development background of the system and the research status abroad are introduced, and the purpose and significance of the system development are explained. The paper focuses on the design and implementation of the art education network resource sharing platform, and introduces the background of the system development and the comparison of domestic and foreign research status, the user's demand analysis of the system, the system architecture design and detailed design, as well as the implementation and testing of the system. This paper provides a relatively complete digital education resource sharing service solution, which can further integrate high-quality resources to achieve balanced supply. It plays an important driving role in expanding the coverage of high-quality education resources in the city, promoting education equity, and improving the quality of school education and teaching, with significant social benefits. At the same time, the phenomenon of repeated purchase of resources and low level construction investment by educational units at all levels has been reduced, and the overall economic benefits have been improved.

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