



Improvement of Music Aided Teaching System by Web Service

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Abstract. At present, the application of Internet technology and multimedia technology in music teaching mode is increasing, which also promotes the development and design of music teaching system. Therefore, first, based on the existing teaching aid system in the school, this paper determines the goals and functions of the music service assisted teaching system based on Web Service by analyzing the needs of music-assisted teaching in this field. Then, according to the goals and functions, a three-tier architecture based on B/S is used to design and implement the system. Moreover, use the database to complete the management of music auxiliary information. Finally, some modules of the system were tested, and the results of system operation showed that the system operated well and met the original design goals. Using Web service technology and database to manage the basic information of music teaching can improve students' understanding of music, and it is of great significance to the development of the school.

Keywords: Web Service; Music; Auxiliary Teaching System

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1 INTRODUCTION

Nowadays, with improvement of living standards, computers are popularized geometrically [1-2]. At present, the theme of the more influential music education conference is how to use modern technology, computers, electronic audio, video, and other digital technologies to apply to the music teaching management process [3]. In traditional professional music teaching, most students cannot really achieve the level of professional performance through effective practice. Therefore, it is necessary to design a set of music-assisted teaching system to assist teachers to achieve the teaching effect in the curriculum to a certain extent. At present, computers have become a resource bank for global information transmission and sharing, and web services have been widely used in various system environments [4]. Li et al. [5] proposed a teaching aid system that can consider students' learning and knowledge acquisition in a very comprehensive way. Xu et al. [6] introduced the design scheme and implementation technology of music-assisted teaching system. As an extension of classroom teaching environment and means, combined with traditional classroom teaching, the system can better meet needs of teachers and students. Chen et al. [7] realized a music-assisted teaching system. This system adopts on B/S mode and uses dynamic web design technology to achieve user management, course management, teaching

communication, and online teaching forums. Bi et al. [8] proposed a Web-based music-assisted teaching system. The system is based on the typical teaching system developed in B/S mode. It is easy to use, simple to operate, and highly efficient. Pham et al. [9] first analyzed the deficiencies of the existing music-assisted teaching, and then proposed a new personalized music-assisted learning system model based on Web Services technology, which was used to solve the problems of the integration of music teaching resources and learners' individual learning. Computer have entered lives of almost every user, which has brought about great changes and impacts on many aspects of our thinking, life, learning and so on. Therefore, this article uses the web service to complete system design by B/S three-tier architecture. Since then, music-assisted teaching has bid farewell to the era of paper management, and the use of databases to complete the management of music-assisted information has improved students' awareness of music and interest in learning, effectively improving teachers' quality of music teaching the development of the curriculum is of great significance.

2 RELATED TECHNICAL NOTES

2.1 Music-assisted Teaching System

The management system of application information in colleges and universities can effectively help colleges to collect, store and manage teaching information data and students. In addition, it has a certain effect in the communication between universities. Help colleges grow, improve the overall teaching level of colleges and students' quality, and realize the true value of quality education. Web service music-assisted teaching system is usually composed according to the browser/server model. Usually it is composed of service system, network system, development and user system.

(1) Service system

For the service system, it mainly includes the service functions of files, applications, and data. Application services can be subdivided into users and Internet application services. In the service system, its main function is to provide file, print, and fax services for the system.

(2) Network system

For an information management system, the network system is a system necessary for its normal operation. Whether it is the structural design of the network system, network performance, or the choice of its device type, it will directly affect the use of the information system.

(3) Development system

Development systems can be divided into two types: professional development systems and simple development systems. Generally, professional development systems usually select some relatively large databases for operation. For example, mainstream databases SQL and SQL can build some complex and the system data of information management stability.

(4) User system

As the name implies, user systems are mainly user-oriented. The main requirement is that the interface is simple, simple, and easy to use and operate. General user systems can be designed using some visual interfaces.

2.2 B/S Architecture

With the development of Internet technology, the architecture has been improved to some extent in accordance with the original C/S model [10]. Based on the C/S pattern, you have the B/S pattern. The so-called B/S mode is short for browser/server. Its architecture is shown in Figure 1.

Because the B/S mode centralizes the core parts of many system functions on its servers, it is possible to unify the client side. It is precisely because of this structure that the system is easier to maintain and upgrade in use, and its operation is more concise. The first layer of structure in the B/S pattern is the browser on the client side. Users can access system information on each server

through a browser. The main reason for this is that the interface for the exchange of user and system information is the browser. As long as we open any computer connected to the computer network, then log in to the relevant page, and send the request information in the page, then the web server will request star information, after processing the corresponding request information, will return to the user has HTML format to process the results. The second layer of architecture in B/S mode is the web server. After the process starts, it responds to the user's request, and at the end of the response, returns the result of the processing to the user in HTML format. When it comes to user requests to store data, the web server simultaneously processes the request in response. The third tier structure in the B/S pattern is the database server. The main function of the database server is to store the data sent from the web server, and feedback the processing results of the response and some related storage response operations.

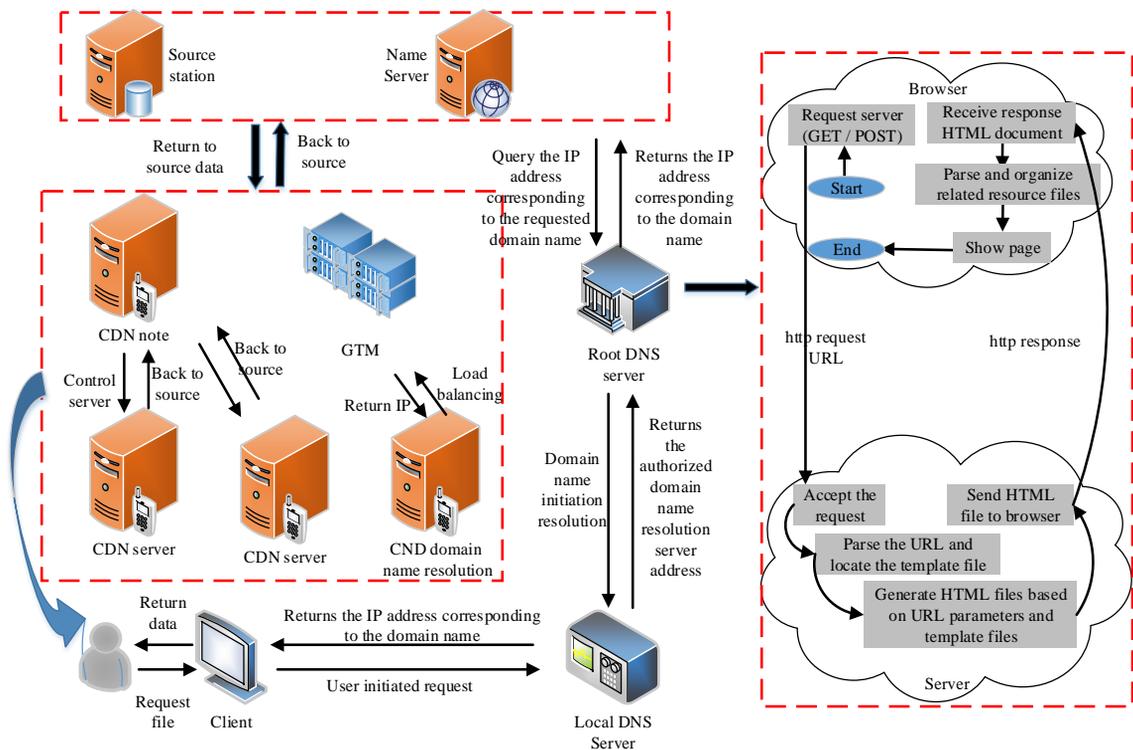


Figure 1: B/S architecture diagram.

The browser is a tool for reading and browsing the Web. It interacts with the Web server through B/S. Under normal circumstances, the browser is the client, which requires the server to transfer the specified information, and then display the information on the screen through the browser. The browser is actually a software that allows users to browse Web information, but the Web server sends the information.

2.3 Web Service

Web Service is mainly used to develop and build application programs, which can be applied in all operating systems that support network communication technology. Web Service can independently design components and modules. It can adopt a distributed component structure based on the network. The application complies with the specific requirements of open technical specifications, including HTTP, XML, WSDL, SOAP, UDDI, etc. In terms of application integration,

Web Service still belongs to a new technology and new platform, capable of establishing independent operation and distributed applications. Figure 2 shows the overall architecture of Web Service.

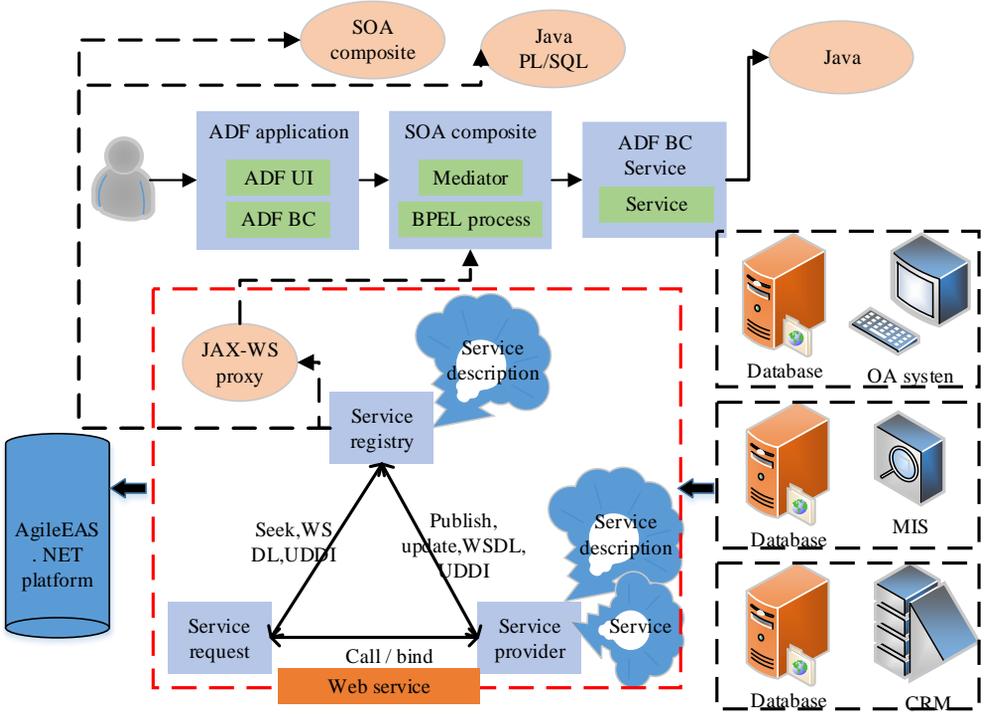


Figure 2: Web Service overall architecture diagram.

3 DESIGN OF MUSIC-ASSISTED TEACHING SYSTEM

3.1 System Overall Architecture Design

The different objects of students, teachers, and administrators in the music-assisted teaching system realized by the Web Service framework divide the system into three main systems. Then on the basis of the main system, add corresponding system functions according to different system requirements to complete user management, music knowledge learning, music appreciation, online homework management, online exams and music resource sharing, so that the entire network of teaching resources sharing and management in an efficient state. Based on the overall functional requirements of the system and possible new requirements, this project adopts the Web Service structure, including the following parts: user management, music knowledge learning, music appreciation, homework management, and resource sharing online exams and online answering questions. The architecture of the music assisted teaching system is mainly divided into three levels, as shown in Figure 3.

3.2 System Database Design

The database entities mainly include teachers, students, homework, teaching materials, test questions, and test papers, etc., where "n" in the figure indicates multiple relationships, for example, and teachers can add multiple test questions, and students can take multiple tests. Figure 4 shows the E-R relationship of the system.

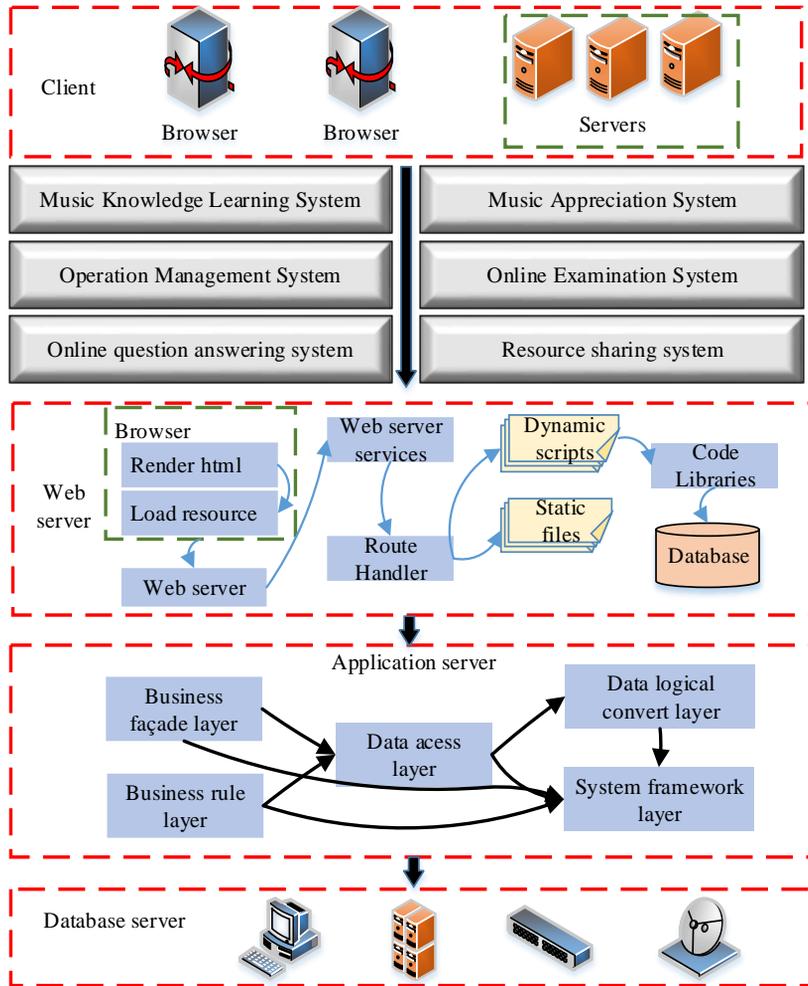


Figure 3: Architecture of music-assisted teaching system.

The data design takes user data as the core, and the data tables of system functions are directly or indirectly related to the user tables. The common functions of system classes such as attachments, system settings and other independent tables are not directly related to the business function tables.

3.3 System Security Design

The network topology of the music-assisted teaching system is shown in Figure 5. The music-assisted teaching system is developed in ASP language and runs on WINDOWS series platforms. The B/S three-tier architecture supports remote office and remote operations, and centralized data storage management. Based on the object-oriented dynamic modeling technology, users can perform customized operations such as processes, functions, interfaces, permissions, and approvals. For the music teaching system, many data and files are stored on the application server and the data server. If the security cannot be guaranteed, serious losses may result. The system must authorize access to different data and files, and strictly control these data and files.

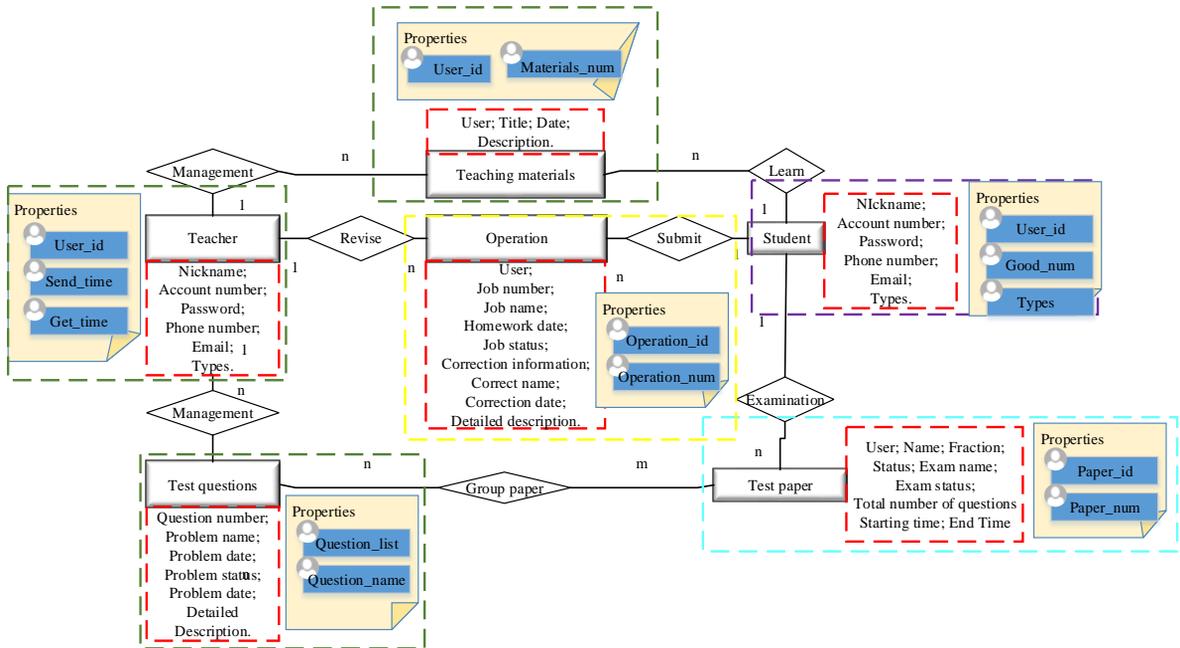


Figure 4: E-R relationship of the system.

4 REALIZATION AND TESTING OF MUSIC-ASSISTED TEACHING SYSTEM

4.1 Main Modules Implementation

(1) Implementation of login module

This system uses a campus card account as the system account, which avoids user registration, avoids the irregularity of account format, length, content, etc., and can also guarantee the authenticity of users and facilitate the unified management of user information. Figure 6 shows the user login module of the entire system.

(2) Realization of knowledge learning module

The course module system includes many course-related functions. For students and teachers, you can view course introduction, course experiment, course notice, course plan, course related resources, etc. At the same time, teachers also have the functions of course experiment, course notice, and lesson plan editing, and upload course resources to the course system module for the students' reference and use. The administrator is responsible for the management operations of all sub-functions of the course module, including the course resources uploaded by the teacher, and the resources edited by other teachers should be properly reviewed.

After passing the authentication of the user's identity in the system login interface, you can enter the music-assisted teaching system to use related functions. After successful login, you will enter the system and display the system's sub-functions in the system: music knowledge learning, music appreciation, homework management, online examination, online question answering, and resource sharing, as shown in Figure 5. As shown in Figure 6, after successfully entering the system, I entered the music knowledge learning system to learn music knowledge. After entering the music knowledge learning subsystem, fill in the keywords of the music knowledge you want to learn, and click the "Search" button to display the first learning content.

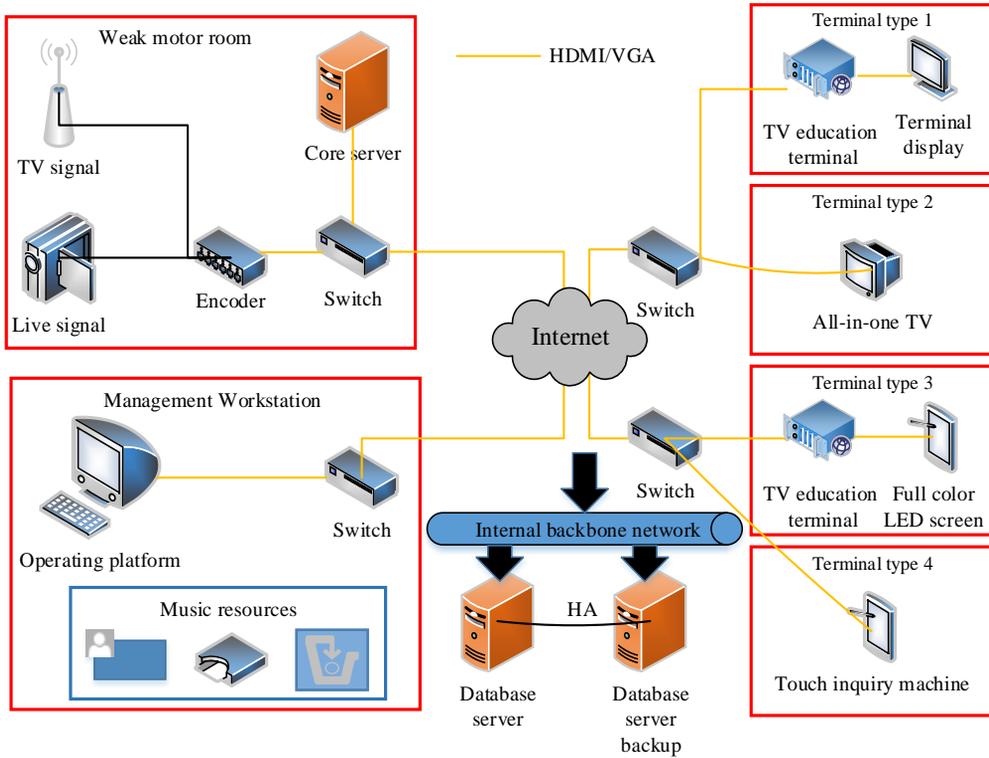


Figure 5: Network topology structure diagram of music-assisted teaching system.

(3) Realization of music appreciation module

As shown in Figure 7, enter the music appreciation subsystem to appreciate music information. After entering the music appreciation system, select the type of music appreciation, including video, audio, pictures and text.

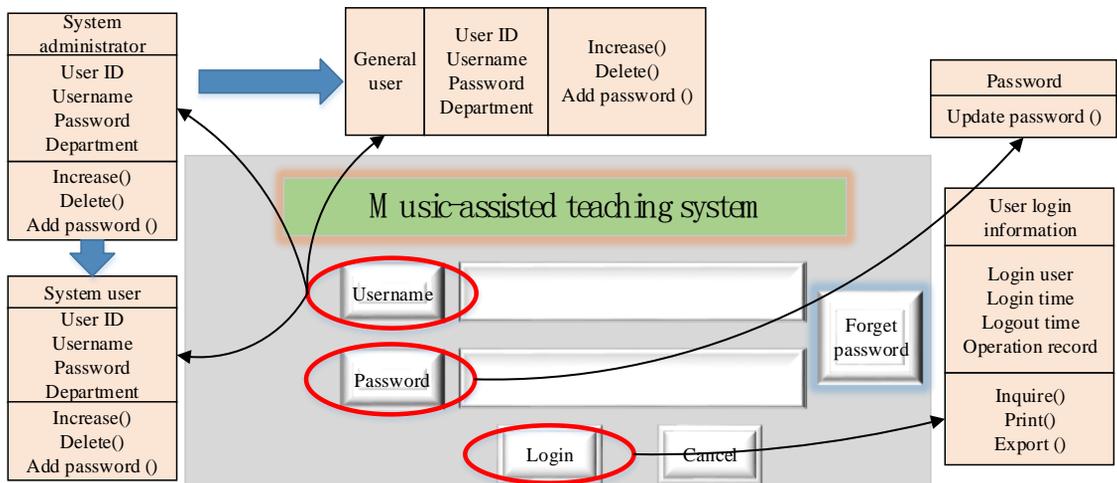


Figure 6: User login module.

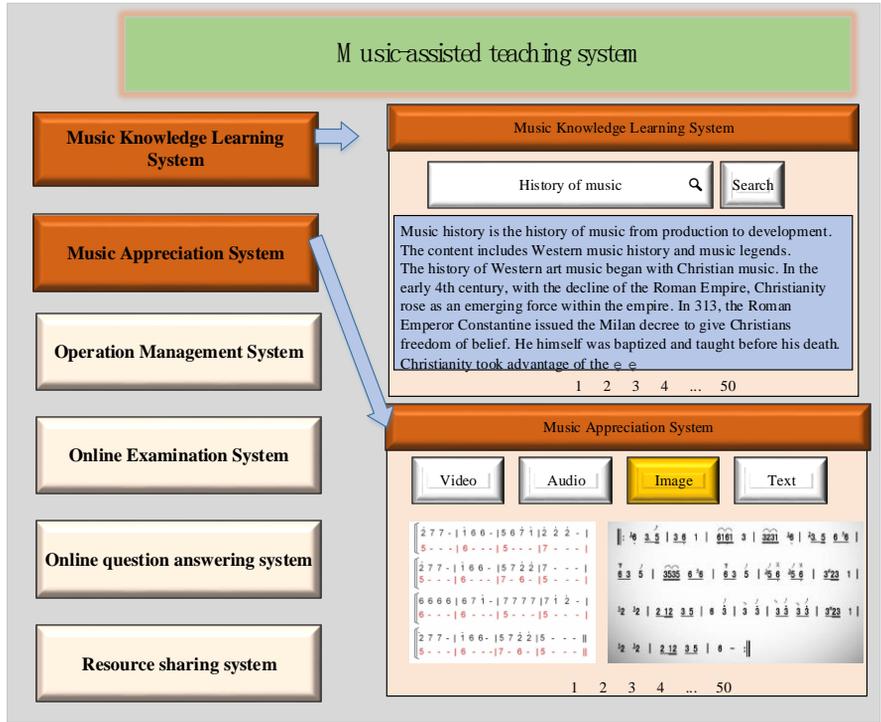


Figure 7: Knowledge management and music appreciation module.

4.2 Functional Test

This article selects 1,000 students to test success rate of login. Figure 8 shows the result of successful login. We can know that many people login, rate of success of system login also gradually decreases when in certain time. There is a positive correlation between the two. It can be seen that the function of the login module currently designed is to meet the system operation requirements from the performance.

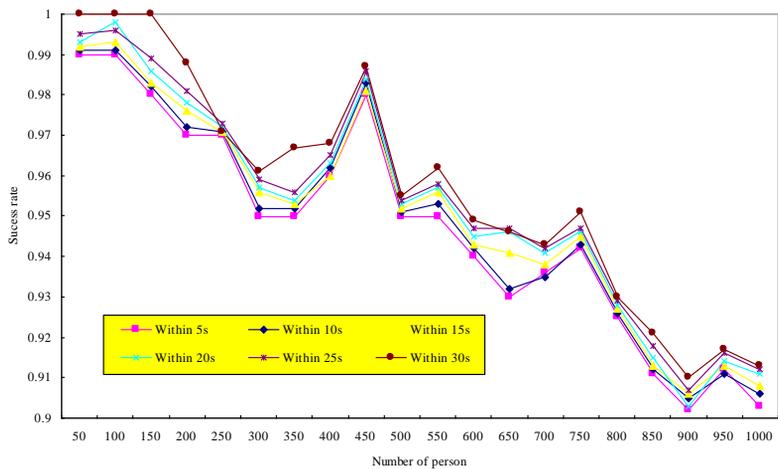


Figure 8: Multi-user login success results in different periods.

Figure 9 shows the statistics of interest results for each class and the corresponding results. As can be seen from Figure 9, the music knowledge-learning module designed in this paper can meet the requirements of students and teachers. Unlike teaching mode of traditional music, system designed in this paper can significantly improve the students' interest in learning, to achieve better academic performance and learning effect.

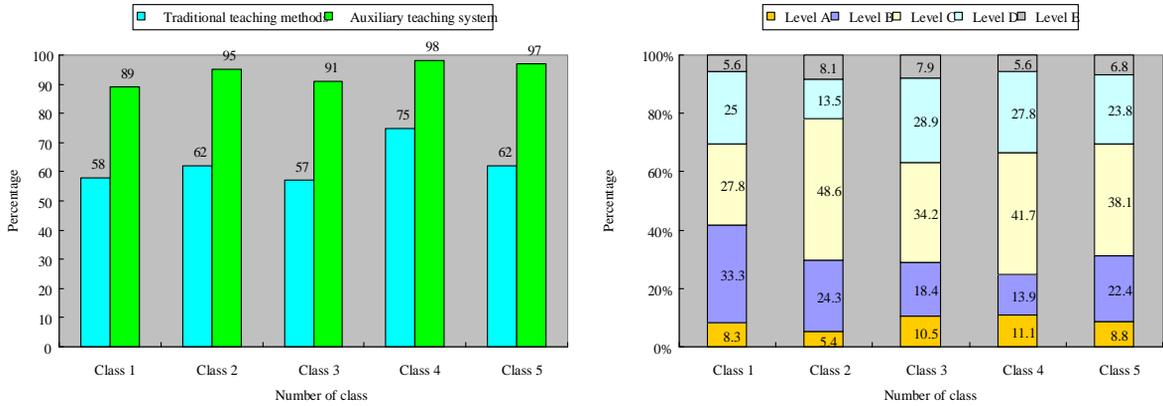


Figure 9: Student interest and results graph.

4.3 Performance Test

In the system performance test, the core link lies in the user's concurrent performance test. Simulate according to the operating characteristics of the software, according to the operating status of the system and the reflection made by the maximum number of users, in order to identify the quality of the reaction and execution of the system under various conditions. Use the method of continuously increasing the total number of users to test the load capacity of the system. The test data should be authentic and accumulated until the upper limit of the data prompted by the system. This system performs concurrent user testing on the data source registration service. The user logs in to the system, enters information, registers, tests connections, registers table information, and initializes the data source. The test results are shown in Figure 10.

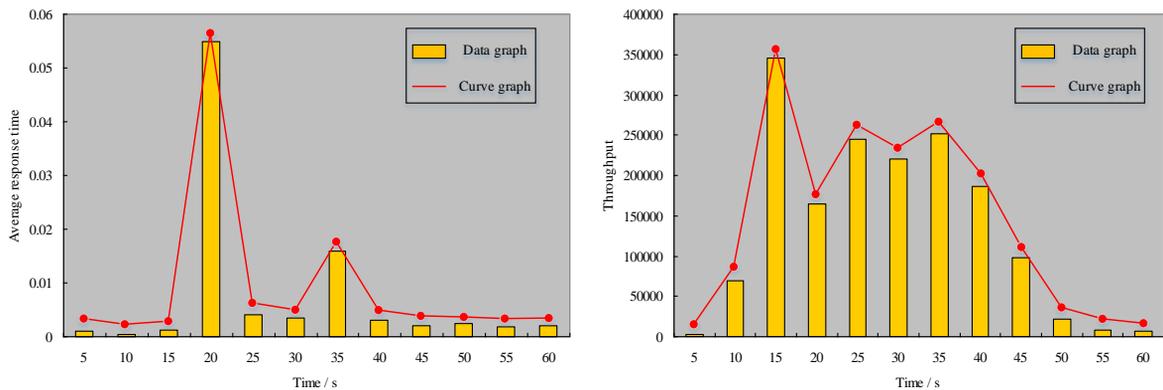


Figure 10: Performance test result graph.

During the evaluation, the actual operation path of the operator needs to be used for evaluation, that is, the system can be entered after multiple users switch. The various sections will echo each other and require guidance before they can be effectively implemented. This can make the error of module function evaluation smaller and closer to the real state. Then make an overall evaluation of the functions of these sectors. Its comprehensive testing items include key content of the database, sharing system, common operations, data information, etc. Using comprehensive coefficient research and information deployment to evaluate the system's business operation functions within the limit resources, the verification results meet the needs of the system.

5 CONCLUSIONS

Using Internet technology to assist music education and teaching has advantages that cannot be compared with traditional classroom education. Therefore, it is urgent to develop music-aided teaching system, which is in line with development of new educational technology. With existing teaching assistant system in the school, this paper determines the goals and functions of teaching system of music assistant by adopting Web Service by analyzing needs of music assistant teaching in this field, and develops and implements it. Using Web service and database to manage the basic information of music teaching can improve students' understanding of music, and it is of great significance to the development of the school.

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