Reform and Innovation Mode of College Music Teaching Under the Background of Internet Plus Times

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Abstract. In view of the various problems in the teaching practice of college music education under the background of "internet plus", and the requirements of the times for the innovation and development of college music subject under the construction of "new liberal arts". This paper will focus on the reform of college music teaching as the research object, take the idea of Web application development as the guide, adopt Java language, and combine SSH framework to complete the construction of college music online teaching platform. The platform will support curriculum learning, teaching resources, ideological connotation education, communication and interaction, and online assessment, and put forward comprehensive application solutions from the daily teaching practice and subject research fields. With the help of the application advantages of network information technology, online education is innovatively introduced into music teaching in colleges and universities, and then a new teaching mode is formed through integration. It not only improves the teaching effect, but also promotes the improvement of the teaching system of music major in colleges and universities, and promotes the process of information reform of higher education, and also makes a new attempt for the construction and development of music discipline.

Keywords: Internet plus · Java · SSH · music teaching · online teaching platform

1 Introduction

Music is a common language of human beings, an indispensable and important way to express and exchange feelings and thoughts, and an organic part of human spiritual life. Compared with language, the meaning and feelings expressed by music are more abstract, relying more on different pitches and changing melodies to give people sensory experience. It is an art form that relies on creating auditory images as a means of expression [1]. The spread and development of music is essentially the transmission and transition of ideology, and in the process, it gradually shows the educational attribute of music. Under the cultural concept of "the unity of ceremony and music" advocated by the ancients, music has been incorporated into moral education and aesthetic education, and this idea has continued to this day, which has also had an impact on today's music education practice.

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The goal of music education is not only to cultivate outstanding professional artistic talents, but also to stimulate emotions, promote intelligence and expand the value of aesthetic education and moral education. In China's current education system, music education fails to run through all the time. Except for students majoring in art, music education has gradually faded out of students' training plans since middle school. However, professional music education has long-standing problems, such as the lack of curriculum structure system, lack of teaching resources, fixed teaching forms, single evaluation system and the disconnection between professional music and educational behavior. Pursuing the educational philosophy of "emphasizing skills, neglecting knowledge", "emphasizing performance, neglecting ability", "emphasizing the West, neglecting local culture" and "emphasizing specialty, neglecting culture", we spared no effort to cultivate "high-quality, refined and sharp" music talents, which directly led to the disconnection between the training system of music talents and the needs of modern and contemporary cultural construction. Such teaching ideas and concepts are quite different from the original intention of music education [2]. In addition, when the professional music education in colleges and universities is facing the cultural needs of the new era and people's increasingly diverse, multi-level and multi-value spiritual needs, the innovative development and construction of the music discipline are constantly mentioned. Music education in colleges and universities will perfectly conform to the talent cultivation concept of "cultivating people with moral integrity and all-round development" put forward by the party and the state, and make clear the discipline orientation in terms of improving cultural self-confidence, reshaping value, cultivating aesthetic accomplishment and building "Chinese music school", and become an important link in the construction of "new liberal arts" [3]. In view of this, this paper holds that, under the background of Internet + education and the construction of "new liberal arts", with the help of the application advantages of network information technology, taking Web application as the carrier, taking the actual application needs of students and teachers as the development basis, adopting Java language and SSH framework to complete the digitization and virtualization construction of daily learning process, realizing the innovative integration of high-tech and education and teaching, thus promoting the reform of music teaching mode in colleges and universities, effectively improving the teaching effect and promoting the music major in colleges and universities. At the same time, relying on the advantages of centralized processing of data and information on the network platform, it can effectively solve various problems in the current teaching practice, put forward systematic and comprehensive solutions for the development of current music education and teaching practice, and make a brand-new attempt for the construction and development of music discipline in the new era.

2 Introduction of Key Technologies

2.1 JavaWeb

Web is a global, interactive and cross-platform distributed graphic information system based on hypertext and HTTP, which runs in the Internet environment. It is a network service established on the Internet, which provides a graphical and easy-to-access intuitive interface for visitors to find and browse information on the Internet. The documents

and hyperlinks in it organize the information nodes on the Internet into an interrelated network structure [4]. The Web can support users to obtain different types of Web resources, and can also support users to access various Web applications. Web applications are deployed on the server side, and are composed of HTML, CSS, JS files, program codes, database files and other elements. The running method is different from traditional desktop applications, and it is the product of typical B/S architecture. JavaWeb refers to the web application developed by Java language, and also refers to the technology stack formed by the concentration of technologies used in the development process.

The development of Java depends on Java language and Java platform. Java, as a typical example of successful application of object-oriented technology, has obvious application advantages such as simplicity, robustness, security, cross-platform, portability and multi-threading, which provides great help to developers. As for Java platform, its essence is the running environment of all kinds of software or applications written by Java language, and it is also the integrated development platform of Java language. According to the actual application direction, Java platform is divided into three different systems: Java SE, Java EE and Java ME. All kinds of technologies and frameworks adopted in the process of JavaWeb development are subordinate to Java EE system, such as Servlet technology, JSP technology, MVC framework, Struts framework, Spring framework, Hibernate and MyBatis framework.

Among them, Servlet technology is a technology for developing dynamic Web resources, which is mostly used in small Java programs, and can receive and respond to requests from Web clients through HTTP protocol. Compared with the previous CGI technology, servlet technology has been greatly improved, with higher efficiency, more powerful functions and easier transplantation. JSP technology is an upgrade of Servlet technology, which allows Java code to be nested in pages, and provides users with dynamic data, thus forming dynamic pages. JSP technology and Servlet technology can be used together to realize the classic three-tier framework of JavaWeb, as shown in Fig. 1. In this framework, Servlet technology is very suitable for logical processing, while JSP is very suitable for page display. The combination of the two brings out the most important and commonly used architecture design pattern in JavaWeb development.

2.2 MVC Mode

MVC is the abbreviation of Model View Controller, which stands for model, view and controller respectively, and combines them to form a software development framework model. The emergence of MVC pattern aims at realizing the design of Web dynamic programs, simplifying the modification and expansion of programs, making the overall structure more intuitive, and increasing the reusability of some programs [5].

The working principle of MVC mode is shown in Fig. 2. After the user initiates the request in the interactive interface, the controller will send it to the corresponding model according to the type of request and the requested instruction. The model will interact with the database according to the instruction, perform data operation, and then select the corresponding view to display the result according to the business logic to realize the feedback of the user's request. In different language development environments, there are many types of MVC patterns, such as Spring MVC and ASP.NET MVC. Different MVC

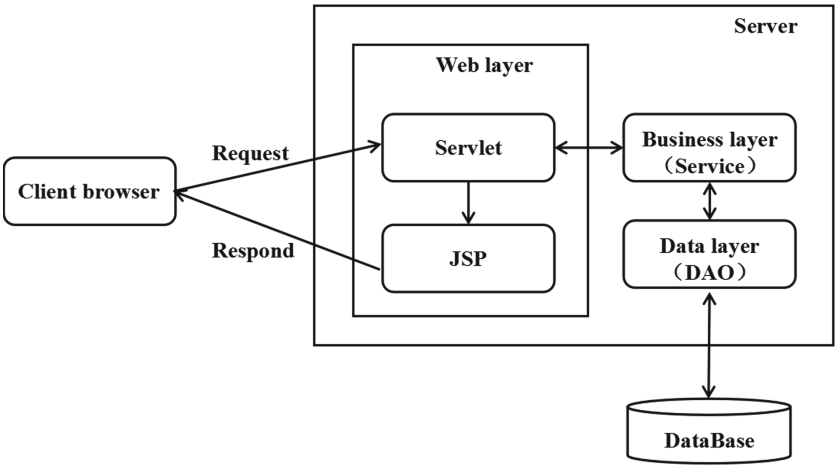

Fig. 1. JavaWeb classic three-layer framework

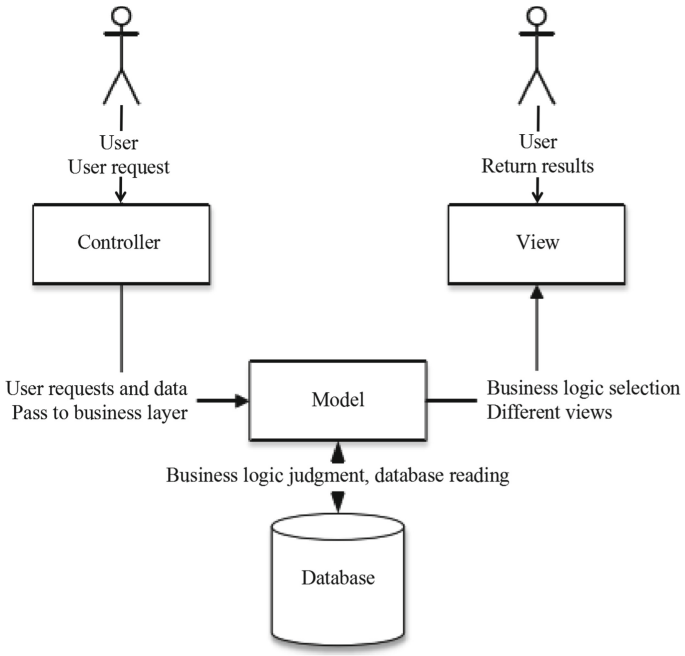

Fig. 2. The working principle of MVC pattern

frameworks have different development efficiency, running performance and application scope, which increase the flexibility and adaptability for the design and development of Web applications [6].

2.3 SSH Framework

SSH framework is the integration of Spring, Struts and Hibernate. SSH framework is developed based on the classic MVC pattern, and inherits the layered design idea of MVC pattern. SSH architecture obeys J2EE development specification, and the whole system is divided into four layers: presentation layer, business logic layer, data persistence layer and domain module layer.

1) **Spring**
   Spring is an open source container framework. In SSH framework, Spring solves the problem of loose coupling between business logic layer and other layers. The two core functions of Spring framework are control inversion (Ioc) and aspect-oriented programming (Aop). Among them, Ioc, as a design pattern, realizes the centralized management of resources by means of dependency injection, which reduces the dependency between the users of resources, that is, objects, reduces the coupling degree, and makes the system code easy to maintain. Aop is a technology to realize the unified maintenance of program functions by precompilation and runtime dynamic agent, which can weaken the functional coupling of code, so as to simplify code development and improve development efficiency, and can expand new functional realization without changing the original code [7].
2) **Struts**
   Struts is an open source framework based on MVC pattern, and its main functions are realized by JavaServlet and JSP technology. Struts Servlet, JSP, custom tags and information resources are integrated into a unified framework to form a complete MVC product [8]. The biggest advantage of Struts is that developers can use it directly without writing and developing separately, which greatly reduces the time of developing Web applications under MVC mode.
3) **Hibernate**
   Hibernate is a Java-based persistence framework, which is responsible for the interaction with the database. Its essence is an open source object-relational mapping framework, that is, by persisting data objects, object-relational mapping is carried out, and JDBC is lightly encapsulated, so that developers can use object-oriented ideas to operate relational databases, thus avoiding a large number of code writing operations.

2.4 Development Environment

According to the system development requirements and the use requirements of the above key technologies, complete the configuration and deployment of the development environment. The overall development of online music teaching platform in colleges and universities is based on Windows10.0 operating system, with Java as the basic development environment, JDK version 1.8.0_251 and Eclipse Neon 4.6.2 as the integrated development tool. The Web server is Apache Tomcat 9.0, and the database is MySQL 5.7.

The overall design of the platform will be divided into two parts. The front-end development takes JSP technology as the core, and combines HTML code, XHTML code,

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns="http://java.sun.com/xml/ns/javaee"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://java.sun.com/xml/ns/javaee
                    http://java.sun.com/xml/ns/javaee/web-app_3_0.xsd"
        version="3.0">
    <filter>
        <filter-name>struts2</filter-name>
<filter-class>org.apache.struts2.dispatcher.filter.StrutsPrepareAndExecuteFilter</filter-class>
    </filter>
    <filter-mapping>
        <filter-name>struts2</filter-name>
        <url-pattern>/*</url-pattern>
    </filter-mapping>
    <listener>
 <listener-class>org.springframework.web.context.ContextLoaderListener</listener-class>
    </listener>
    <context-param>
        <param-name>contextConfigLocation</param-name>
        <param-value>classpath:applicationContext.xml</param-value>
    </context-param>
</web-app>
```

Fig. 3. Key code for Spring integration of Struts 2

XML elements and JSP operation instructions to form the front-end interactive interface of the system. While server-side development relies on SSH framework to complete the design. The integration of SSH framework needs to be completed in Eclipse and with the help of Maven 3.3, a project management tool. First, create a new Maven Project, determine the type of Web application, and set various parameters to complete the creation of Maven Project. Under the pom.xml file, all kinds of Jar packages required by SSH framework are downloaded and introduced into Maven project by code, including Stuts2.5.10, Spring4.3.8, Hibernate5.1.7, MySQL dependency, etc. After the environment settings of Stuts, Spring and Hibernate are completed respectively, the integration operation between the frameworks is started. As shown in Fig. 3, the system development environment can be built by registering the filter of Struts 2, configuring the listener at the core of spring framework, and adding Hibernate configuration information in the Spring configuration file through code. Through the introduction of the above key technical theories, we have determined the overall environment of system development, the configuration of related software and tools, and the technical feasibility of the overall project of online music teaching platform in colleges and universities.

3 Requirements Analysis

3.1 System Requirements Analysis

The online music teaching platform in colleges and universities will be guided by the idea of Web application development, and complete the overall design and development under the Java language environment, combined with SSH framework. The platform will aim at the practical problems faced by current music education in colleges and

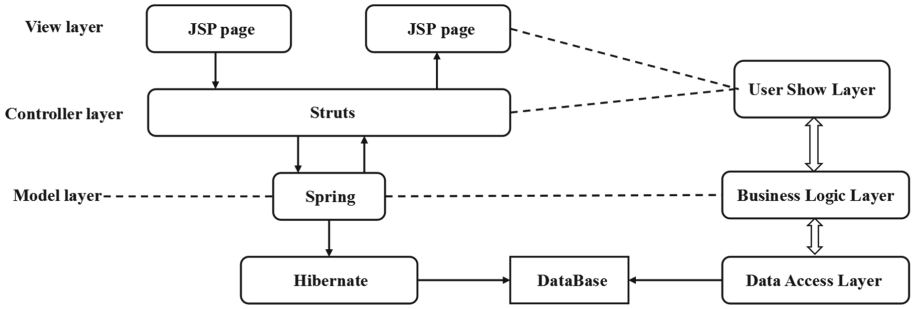

Fig. 4. SSH framework work flow chart

universities, integrate the real needs of teachers and students, and put forward comprehensive application solutions that meet the requirements of the reform of teaching mode of music education in colleges and universities and the construction and development of "new liberal arts".

The platform will support users with different roles, teachers and students, to apply for account registration by submitting materials, log in and use the system with unique identification information, and complete the corresponding permission allocation and management according to the platform application requirements of different user roles. Among them, student users have the right to use multiple functional modules, such as course learning, teaching resources, ideological connotation education, communication and interaction, and online evaluation. For teachers, the design of functional modules focuses more on the management and control of courses, and its main functions include: course publishing, resource uploading, interactive Q&A, assessment and scoring, etc.

3.2 Global Design

The online music teaching platform in colleges and universities is developed with B/S architecture and MVC design pattern. The front-end design of the platform mainly includes static page interaction effect, dynamic data information display and data interaction between front and back ends. The dependent technologies include HTML language, CSS structure, JavaScript language, JSP technology, Ajax technology, etc. [9]. The front-end design determines the overall human-computer interaction performance of the system, and also relates to the platform work efficiency and user experience. On the server side, SSH framework will be adopted to divide the functions of the server side with the design idea of layered architecture. Figure 4 shows the overall operation process of the system, with arrows pointing out the direction of control and data flow among all levels.

4 Detailed Function Implementation

4.1 Student Client

Under the course learning module, students can view the syllabus and teaching plan of relevant courses issued by teachers, as well as the courseware, knowledge point system,

materials and video micro-lessons used in daily classroom teaching. All the contents are published in advance by teachers, which is convenient for students to preview the contents before class and consolidate their knowledge after class by using the platform. Compared with the traditional classroom teaching mode, which is complicated and profound, the online learning mode of the platform can more concise the core knowledge and stimulate the initiative of students' autonomous learning. Various forms can also attract students' attention to improve students' learning effect of music theory.

Under the teaching resource module, students can obtain different types of teaching resources to improve the oneness of teaching materials in the classroom teaching mode. First of all, it is a collection of excellent music works, which covers all kinds of excellent music works with different styles and difficulties, such as "May we all be blessed with longevity", "Never Walk Away" and "Sichuan embroidery", which are integrated with Chinese traditional culture, as well as "Sailing for a Long Sail" and "Believing that Love Will Win", as well as national instrumental works that combine tradition with modernity, such as "Ten thousand steeds gallop", "Tower shadow Cantonese rhyme" and "cloud, mountain spring scenery". Secondly, there are all kinds of special teaching video courses for famous teachers, such as "Master Vocal Music Class-Dai Yuqiang", "Master Vocal Music Class-Li Guyi" and "Master Instrumental Music Class-Chen Jun", which not only enrich the teaching resources, but also enable students to get close to masters and famous artists, and provide them with better learning opportunities. In addition, the system concentrates on classifying and storing the expanding extracurricular teaching resources, so that students can use their fragmented time to acquire music education-related knowledge. For example, the documentary "Music Education in China", the film "Spring of the Cattle-herding Class" and the book "The Extremes of Music" and so on. Online teaching platform has effectively solved the shortage of teaching content and teaching resources in the current music teaching process, and has become a necessary supplement to traditional classroom teaching, broadening students' horizons and knowledge and improving students' learning efficiency.

Under the ideological connotation education function module, students will constantly feel the significance of music education through the form of music appreciation, and can also correctly recognize the relationship between music education and ideological education. Excellent music works are not only the expression of the author's own emotions and thoughts, but also the rich cultural background and the background of the times. They can achieve a high degree of unity of emotions, attitudes and values in music teaching during the critical period of the formation of college students' outlook on life, values and world outlook, and are conducive to improving students' comprehensive qualities in patriotism, ideology and morality, self-cultivation and so on, and promoting their comprehensive, healthy and harmonious development of mind and body.

Under the interactive Q&A module, students can freely share and exchange their learning experiences, and they can also ask teachers for help on some issues. Loose communication is helpful to form a good learning atmosphere, and it is also convenient for students to get teachers' targeted guidance and help in time. In addition, for the assessment of students' professional skills or training level, the system provides support. Students can upload training or assessment content by themselves in the form of

video, and complete comprehensive assessment through the integration of students' self-evaluation, students' mutual evaluation and teachers' evaluation. While strengthening students' sense of participation in teaching practice, it is more accurate and fair than the previous evaluation methods [10].

4.2 Teacher Client

Compared with the functional design of the student client, the teacher client pays more attention to the guidance, deployment and control of music teaching activities. When teachers log in to the system, the main work lies in the release of course information, the collection, collation, production, uploading and maintenance of various teaching resources. For students' communication and questioning, they can also actively participate in it. With the application advantages of the platform, teachers can more conveniently and directly complete targeted counseling and help for students, and help improve the teaching effect. In addition, for the evaluation of students, teachers can quickly judge according to the evaluation content uploaded by students, and the evaluation results of teachers will be combined with the results of students' self-evaluation and students' mutual evaluation according to a certain weight to get the final result, which improves the one-sidedness and fairness of the traditional single evaluation system, and is conducive to the follow-up teaching work and the improvement of teaching effect.

5 Conclusion

The construction of online music education application platform in colleges and universities can aim at various problems existing in the current practice of music teaching in colleges and universities, and fully realize the reform of teaching mode with the help of the application advantages of network information technology. The platform can accurately meet the actual needs of current students and teachers, form a joint force with classroom teaching, effectively improve the teaching effect, and at the same time pay more attention to the individualized and differentiated cultivation of talents, and improve the music education system in colleges and universities. It is not only suitable for professional music education institutions, but also conducive to the opening and promotion of music education in ordinary colleges and universities. The construction of the platform not only provides the necessary technical conditions for the construction and development of music discipline in the new era, but also makes a beneficial attempt to promote the informatization construction of higher education.

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