Exploration on the Reform Path of College Music Teaching Mode Under the Background of Internet+Education

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Abstract. All colleges and universities in China are constantly exploring and studying the experience of Internet teaching, hoping to improve the teaching mode, enhance the teaching efficiency and teaching results by introducing Internet technology. As an art course with high professionalism, high requirements and high standards, if the university music can be reformed in combination with the concept mode of "Internet+Education", the teaching concept and mode of university music can be greatly changed and innovated. In this paper, the author will analyze and explore the reform of music teaching mode in colleges and universities under the mode of "Internet+Education", and develop an online music teaching platform by using Java technology J2EE standard and SSH framework, so as to provide innovative methods and ways for college music education, and to promote the reform and optimization of music teaching mode and solve the problems existing in traditional music teaching.

Keywords: college music · reform · Internet+education · Java · SSH

1 Introduction

With the progress of global information technology and the requirements of national development, the "internet plus" model has penetrated into all walks of life. Under this background, the educational reform in colleges and universities has a brand-new opportunity and direction. Only by reforming and optimizing the existing teaching model in line with the development trend of science and technology, can it be better in line with the development of the times [8]. As a teaching platform for cultivating professional talents, colleges and universities undertake the important task of delivering high-quality young people to the society. The reform of teaching mode under the background of "internet plus" era can better enrich teaching resources, improve teaching quality and promote talent cultivation. On-line education in colleges and universities will evolve into a more optimized teaching mode based on the Internet. There are some limitations in traditional classroom, such as blocking teaching resources, unchangeable teaching forms, and lack of flexibility in classroom interaction between teachers and students. The advantages of Internet, such as high transmission efficiency, interconnection, openness, and removal of time and space boundaries, are just complementary to traditional teaching.

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Taking college music major as an example, this paper studies how to reform and optimize the teaching mode of college music under the background of "internet plus" era [5]. In recent years, the number of music art students in China has increased greatly. In this case, the music teaching in colleges and universities needs to adapt to the changes of the times and consider the new development trend for teaching innovation and diversified improvement of music teaching, so as to lay a foundation for promoting the future development of music education and teaching mode and perfecting the mechanism of aesthetic education and talent cultivation in colleges and universities [6]. Music major, as the highest professional course in colleges and universities, is divided into many different departments, and there are many branches in the departments. Its training direction is performers, singers, performers, etc., which not only requires high standards of professional level, but also requires more advanced professional knowledge. In the traditional college music teaching mode, each teacher's faction has different teaching methods, and most of the teachers teach knowledge and professional skills within the scope of traditional music, which is not combined with modern music elements, so it is difficult for students to achieve balanced development. The music major is under great competition and pressure of grading examination. Most art students only practice in class, but neglect the communication with their classmates and teachers. When students encounter problems, it is difficult to ask the teacher at the first time. The school pays too much attention to the professionalism of students' music level, ignoring the teaching and edification of students' spiritual level. Because of the high cost of purchasing musical instruments, the school can't meet the students' practice needs. In the era of "internet plus", college music education uses the Internet thinking that students like to see and hear, and teaches with a more open and rich teaching mode. Students can learn more professional knowledge, so that students can cultivate their sentiments and noble musical literacy while learning music knowledge. Moreover, online communication, questions and answers can greatly narrow the distance between students and teachers and students [7]. The author thinks that the online music teaching platform based on J2EE design standard combined with Java language and SSH framework is designed and developed, and its main purpose is to solve the problems existing in the music teaching mode and meet the needs of students to expand the range of music professional knowledge. It can not only realize the interaction between teachers, students and classmates, but also use Java language to design simulated instruments, so that students can consolidate their learned music theory knowledge and practice skills in playing simulated instruments, and practice makes perfect when combined with offline practice. The development of this platform helps teachers to establish a clear music teaching plan, thus improving music teaching methods, enabling teachers to develop good teaching habits and students to cultivate correct learning habits, thus providing a new direction and method for the teaching reform of college music and further optimizing the teaching mode of college music.

2 Technical Overview

2.1 Java

Java is an Internet-oriented high-level programming language. According to different versions, Java languages are divided into three types: Javase, javaee and javame. Java is based on the evolution of C language and C+ language. Therefore, the grammars of the three languages are very close, and its ease of learning and use has won the praise of many program developers. Java abandons many uncommon features of C++, such as operator overloading, multi-inheritance, and automatic forced type conversion. It is worth mentioning that Java language does not use pointers in C language, but refers to it, and can automatically deal with abandoned code space, so that programmers don't have to worry about code occupying too much memory. Java's unique security check mechanism makes the development of Java language more robust. The classes needed by Java programs can not only be dynamically loaded into the running environment, but also rely on the network as a carrier to load the required classes, which is very beneficial to the software upgrade. In addition, the class in Java has a runtime representation, which can check the type of runtime.

2.2 J2EE

The full name of J2EE is Java 2 P1atform Enterprise Edition, which is used as a specification and guide of Java technology. The obvious advantage of J2EE is that it adopts the B/S architecture mode. The difference from the traditional C/S architecture mode is that the requirements of the client are obviously reduced by using the B/S architecture, and the client can access the back-end application only by installing a browser. J2EE provides developers with an enterprise-level application development standard with high stability, multi-user access support and high portability. Using J2EE can make the process of installing and deploying software simple, thus greatly improving the efficiency of developing applications [9]. Different software developers can all follow the J2EE specification to develop various J2EE application servers. J2EE not only contains all kinds of groups and service architectures, but also includes technical standards, which provide multi-layer functional support for developing Web-based applications. The distributed feature of J2EE adopts a four-tier architecture, including the customer layer, the web layer, the business layer and the EIS information system layer as shown in Fig. 1. Among them, the client uses HTML pages to run the client layer through the browser. The main technologies of web layer include JSP and Java Servlet. This paper chooses Tomcat container which supports JSP and Java Servlet to run. The main technology of business layer is EJB. EIS is a database used to store all kinds of persistent data. J2EE is mainly used to develop server-side web applications. Compared with other technologies, J2EE technology has the advantages of cross-platform and JDBC API.

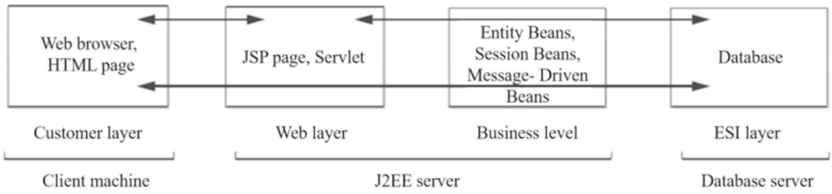

Fig. 1. The J2EE architecture

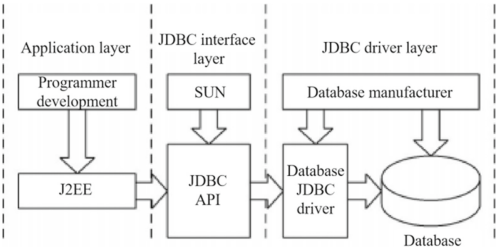

Fig. 2. The JDBC workflow

2.3 SSH Framework

Spring + Struts + Hibernate (SSH) is an open-source and lightweight architecture developed based on J2EE standard, and its appearance has been widely used by developers. To some extent, the lightness and heaviness of the architecture are determined by the resources needed to start the program. For example, when EJB starts, it consumes a lot of memory and CPU, so it is classified as heavyweight. SSH framework consumes less memory, CPU and other resources when it is started, so it is divided into lightweight framework [1]. It can be concluded that the lightweight architecture can be regarded as the degree of the architecture's dependence on containers, and the smaller the dependence on containers, the lighter it is. Spring in SSH framework is published according to Apache standard, which is an open source J2EE framework designed to solve the complex application development of enterprises. In order to facilitate the design of applications using JavaBeans as a substitute for EJB, Spring configures and manages JavaBeans through IoC (Control Inversion) function. Struts is an open source project under the name of Apache. Struts is a framework developed on the basis of object-oriented design idea and MVC design pattern. Struts' work is mainly to manage users' requests and accept responses. Hibernate can be regarded as an open source relational mapping framework, which contains five core interfaces, through which persistent access to objects and related transaction control operations can be realized. Session interface in Hibernate is the most important interface, which is mainly responsible for adding, deleting and checking the persistence of objects. Hibernate encapsulates JDBC with a very lightweight object, which is the workflow of JDBC as shown in Fig. 2. Using Hibernate framework allows programs to manipulate data tables like objects.

2.4 Development Environment

The development software used in the music online teaching system designed in this paper is installed and run under the Windows 10 operating system. The CPU used in the hardware is Inter Core i7 4600U, 8 GB of ARM memory and 256 GB of HHD. Next, coordinate the software development environment of this design. First, download and install jdk, download and install JDK version jdk1.7.0_45, configure system environment variables for it, and install Java development tool Eclipse and its plug-ins. As JDK is configured in advance, Eclipse can be directly started after installation. Then download and install Tomcat-9.0 Tomcat server, close the firewall for configuration and testing; Install MySQL database and add port, account password and other data. Download the JDBC driver and add the jar package in the decompressed folder to the dependency. Load the driver and import the jar package of MySQL. Finally, we integrate SSH framework, Struts2 + Spring4 + Hibernate5, and create and deploy its environment. These are all the development environments of the system designed in this paper. The installation and deployment of these development environments provide a guarantee for the feasibility of the development of the online music system.

3 Requirements Analysis

3.1 System Requirements Analysis

According to the research on the present situation of college music teaching, this paper designs a college music teaching platform, which borrows the idea of "Internet+education" to develop the platform, so as to promote the reform of college music teaching mode. The users of the platform are teachers and students respectively, which provide corresponding functions and permissions according to different needs. Students can learn the theoretical knowledge and practical skills of music through the platform, and they can also choose interest groups according to their own hobbies, and join discussion groups of their major for exchange and discussion. Students can discuss music professional knowledge with classmates online, ask questions to teachers, and consolidate what they have learned by completing the music class assignments issued by teachers. Students can also play simulated musical instruments that exercise their sense of sound and rhythm on the platform to increase their musical practice. The design of these functions can expand students' professional knowledge and skills in music and achieve the effect of cultivating musical sentiment [10]. Teachers can upload their own video recordings of classes to the platform for students to review and consolidate, and they can also quote some good music teaching materials or make materials combining traditional music teaching with new elements in music for students to view and learn. This system gives teachers the right to check the discussion groups that students join, so that they can keep abreast of the students' trends on the platform, and can also talk and answer questions with students online. According to the classroom teaching content and the information released by the platform, teachers assign homework. These modules provide a platform for teachers to communicate and share information with students on an equal footing, thus promoting the optimization of college music teaching mode.

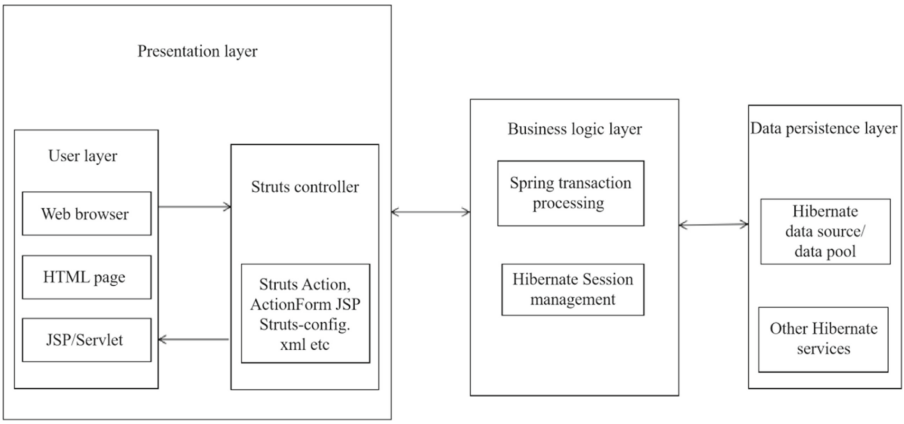

Fig. 3. Overall architecture

3.2 Global Design

The online music teaching platform based on Java language mainly adopts B/S network structure, which not only unifies the client, but also simplifies the process of system development, maintenance and use, and concentrates the core functions of the system on the server. Because the logic of the system application is concentrated in the central server, users can use it through different databases and operating systems. The advantage of B/S network structure lies in the fact that only a browser needs to be installed on the client to access it, and the system is easy to expand [2]. Figure 3 shows the overall structure of this system design: the browser interacts with the database through Tomcat web server. In the presentation layer, the interactive interface is realized through JSP pages, and JSP is responsible for receiving Request and sending Response. Among them, the small program of simulated musical instruments written in java is completed by setting buttons in HTML, and then the system will submit a request when the user clicks the buttons. The form of the request points to JSP or Servlet, and the Java program is called in JSP or Servlet.

Then Struts acts as a controller to send the request class received in Action Servlet to the corresponding Action for processing according to struts-config.xml file. In the business layer, spring, as the medium of management interaction, completes business logic through the Spring IoC container, which is responsible for providing business model components and the collaborative processing component dao of this component to Action, and includes container components such as transaction processing and buffer pool to improve system performance and ensure data integrity. In the persistence layer, the object mapping of Hibernate replaces JDBC interface to interact with MySQL database, extracts the data requested by data processing components, and returns the processing results.

4 Function Implementation

According to the needs of different roles, this paper divides the online music teaching platform into two modules, namely the student end and the teacher end.

Student end is divided into four sub-modules: learning resources, discussion and communication, simulation practice: and homework.

Learning resources: In this module, students can not only watch the recorded and broadcast videos of various classes of music majors released by teachers for review and consolidation, but also learn music resource information from different directions by sharing videos of concerts, musicales and music programs by teachers. Learn traditional theories and practice methods while receiving and understanding new musical elements, so as to expand musical knowledge, cultivate one's musical literacy and improve the skill level of practice [4].

Discussion and communication: The main forms of discussion and communication are group, message board and private letter. The group is subdivided into interest groups and discussion groups, and students can choose their own interested groups to join. For example, students who are interested in the piano can join the corresponding group. The role of discussion groups is to discuss professional knowledge with students of the same major or department. For example, students can upload their own music works for students to make suggestions and discuss, so as to increase their knowledge of their own works. The message board is open to all music majors and teachers in the school, and everyone can discuss problems. In the private function, students can ask their teachers about their problems in music class and platform learning, and they can communicate with teachers in real time at the first time. This module not only exchanges learning and practicing skills, but also enhances the communication and interaction between students and teachers, and draws the relationship closer.

Simulation practice: Students can choose the instruments they are interested in and use the mouse and keyboard for simulation practice when entering this module. Although the effect of playing real instruments is different, students can review their performances and practice new course content, which can be combined with offline practice to improve students' professionalism. As shown in Fig. 4, it is a small piano simulation program designed with Java code.

Homework: Students enter the after-school homework module to complete the music homework assigned by the teacher, such as video recording or voice recording to show their recent learning. After the recording is completed, they submit it to the platform, wait for the teacher to review and then feedback the results, and discuss and summarize the teachers' opinions with the students in the discussion group.

Teacher side is divided into three sub-modules: teaching materials, discussion and communication, and homework assignment.

Teaching materials: The videos of music classes are released by the corresponding teachers, and the addition, uploading and modification of related teaching materials are all done by teachers. Teachers can not only upload their own courseware, but also upload the highlights of videos such as concerts and music programs that they think are good to the platform for students to learn. The materials related to music teaching are all the results of music teachers' screening, collection and integration through various aspects, so that students can learn about the development of modern music while learning

```
public class MyJavaPiano extends JFrame{
private static final long serialVersionUID = 1L;
public static final float version=3.0f;
public static final int w = 850;
public static final int h = 486;
public static Win_KeySetting win_KeySet;
public static Panel_Controls controls;
public Menu menuBar;
public RecordFrame recordFrame;
public Panel_Keyboard keyboard;
public Panel_Piano piano;
public GUIProperties guiProps;
static{
try {
Properties props = new Properties();
props.put("logoString", "MyJavaPiano");
com.jtattoo.plaf.mcwin.McWinLookAndFeel.setCurrentThe
me(props);
UIManager.setLookAndFeel("com.jtattoo.plaf.mcwin.McWi
nLookAndFeel");
} catch (Exception e1) {
e1.printStackTrace(); } }
public static void main(String[] args) {
MyJavaPiano jPiano = new MyJavaPiano();
jPiano.setInitial_props();
DeviceManage.initial();
jPiano.showView();}
private void setInitial_props(){
ConfigManage.setInitial_props();
guiProps = new GUIProperties(this);
String theme = ConfigManage.initial_props.get("theme");
String lookAndFeel = ConfigManage.initial_props.get("loo
kAndFeel");
if(!lookAndFeel.equals("")){
guiProps.updateLookAndFeel(lookAndFeel);}
if(!theme.equals("")){
guiProps.updateTheme(theme);} }
private void showView(){
this.setTitle("MyJavaPiano_" version);
Dimension screenSize = Toolkit.getDefaultToolkit().getScr
eenSize();
this.setLocation(screenSize.width/2 - w/2, screenSize.heigh
t/2 - h/2 50);
this.setSize(w, h);
this.setIconImage(ImgUtil.getImage("icons/music.png"));
this.setVisible(true);
this.setResizable(false);
setLayout(new FlowLayout());
keyboard = new Panel_Keyboard(this);
piano = new Panel_Piano();
controls = new Panel_Controls(this);
menuBar = new Menu(this);
recordFrame = new RecordFrame(this);
win_KeySet = new Win_KeySetting();
this.add(controls);
this.add(keyboard);
this.add(piano);
this.setJMenuBar(menuBar);
this.validate();
this.addKeyListener(new PianoKeyListener());
this.addKeyListener(new SpecialKeyListener());
this.addWindowListener(new WindowAdapter() {public vo
id windowClosing(WindowEvent e) {DeviceManage.close
();
ConfigManage.saveInitial_props();
if(!Toolkit.getDefaultToolkit().getLockingKeyState(KeyEve
nt.VK_NUM_LOCK)){
Toolkit.getDefaultToolkit().setLockingKeyState(KeyEvent.V
K_NUM_LOCK,true);
}
System.exit(0); } }); } }
```

Fig. 4. Simulation piano code

traditional music, and make them learn how to combine the two and keep pace with the times [3].

Discussion and communication: Teachers can check students' discussion on different types and factions of music through the message board of this module, so as to deepen their understanding of students. Teachers can not only see and comment on the works published by students in the group, but also airborne each discussion group to discuss activities and homework with students. Teachers can also reply to students' questions through private messages, answer questions in real time, and enhance the distance and relationship between teachers and students.

Homework: Teachers can edit and publish some homework for students to complete independently according to the content taught in class and the music materials uploaded on the platform, such as making students summarize their recent knowledge of music theory and analyzing the musical elements contained in G.E.M.'s "Loneliness". After the students finish, consult and give comments and opinions, and upload them to the student side.

5 Conclusions

The online learning platform of college music designed in this paper combines the thinking mode of "internet+education", and with the help of the online open internet platform, music students can get rid of time and space constraints and professional constraints, observe and study anytime and anywhere, and have discussions with classmates. It can also improve the communication between teachers and students without facing teachers' questions. The learning module of the platform enables teachers to achieve communication and students to learn. This form of online music teaching is not only a new development direction of higher-quality and more efficient music education in colleges and universities, but also a more fruitful contribution to the reform of the overall education mode in colleges and universities. It promotes the public awareness and influence level of Internet+education, and makes functional and institutional preparations for the future construction of China's Internet universities, Internet conservatories and other ambitious development goals.

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