Development and Application of Online Teaching Platform of "Introduction to Art" Based on JSP Technology

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Abstract. "Introduction to Art" is a required course of basic theory for all art design majors, but there are still many difficulties in teaching methods in colleges and universities. Constructing the "online + offline" hybrid teaching mode can effectively solve many problems. Therefore, using modern information technology and online high-quality educational resources, the author of this paper has constructed a set of online teaching platform of "Introduction to Art" based on JSP technology. The platform uses Java language for overall development, introduces SpringMVC framework for process building, and combines MySQL database technology to set up two login roles of students and teachers, thus establishing an equal and open platform for learning and communication between teachers and students. At the same time, the system also provides a new mode for the education of "Introduction to Art", which effectively improves students' learning interest and efficiency, and helps art design students to consolidate their basic knowledge and cultivate their artistic sentiments.

Keywords: Introduction to Art · Online teaching · JSP · SpringMVC · MySQL

1 Introduction

"Introduction to Art" is a course to study the basic laws of artistic activities. As a required course of basic theory, it is of great significance to art design students. However, there are still many problems in the teaching of this course for a long time. First of all, the content system of "Introduction to Art" course is complex, with many related interdisciplinary subjects and abstract and profound principles, which leads to students' low interest in this course and insufficient attention. Secondly, teachers mostly use courseware as the main medium of instruction, and the teaching process is still teacher-centered, with oral instruction and knowledge instillation as the main focus, without paying attention to communication and exchange with students. Thirdly, the classroom lacks originality and fun, students' subjectivity is not revealed, and their participation and enthusiasm are not high. Finally, the course assessment methods are mainly based on the final closed-book examination, and the content is mostly the restoration of knowledge points, lacking independent thinking and practical significance for art [1]. Obviously, if the traditional

teaching method of "classroom-centered, textbook-centered, teacher-centered" is continued, not only will the teachers' teaching work be ineffective, but also the students' learning activities will be unsatisfactory, which will seriously affect the development of the art discipline. At present, many colleges and universities in China have started various beneficial attempts of teaching reform, among which online teaching is one of the important tasks. Online teaching provides a new teaching mode for higher education, which makes learning scenes break through time and space constraints, realizes the high integration and optimization of teaching resources, enriches teaching activities, maximizes the interaction between teachers and students, and highlights students' dominant position in learning. Therefore, the construction of "online + offline" hybrid teaching mode has become one of the important efforts of the current college teaching reform [2].

To sum up, according to the above analysis of the current problems in the course of "Introduction to Art" in colleges and universities, the author of this paper believes that we should actively seek an online teaching scheme, develop an online teaching platform for "Introduction to Art", introduce SpringMVC framework in Java environment for process building, and combine MySQL database technology to build an online teaching platform for "Introduction to Art" with rich resources and powerful functions. This system can effectively solve many problems existing in current teaching, form a beneficial supplement to the traditional teaching mode, and promote the reform of teaching work of art-related majors.

2 Main Technologies

2.1 J2EE

J2EE is an enterprise application development specification. At the client level, the application supports C/S or B/S architectures to meet the various development needs of users. In the Web layer, the components supported by J2EE are JSP pages or Servlet programs. Both JSP and Servlet can get the requests from users in time and forward the requests to the Enterprise Bean on the business layer for processing. In the business layer, Session Beans realizes the temporary session between the business layer and the customer layer. The data of Session Beans will not be saved, but Entity Beans will save the data. Essage-Driven Beans allows business layer components to receive JMS messages asynchronously [3].

2.2 JSP

JSP is a dynamic web page, which is deployed on the server. Its main function is to respond to the client's request, and then send the execution result back to the client. The principle of JSP is to separate Web page logic from web page display, which makes the development of web application simple and convenient. JSP is a simplified Servlet, because JSP will be compiled into HttpJspPage class when it is accessed, so JSP is essentially a Servlet. Servlet is the technical foundation of JSP, and the development of large-scale Web applications needs the cooperation of Servlet and JSP. Like Java, JSP is object-oriented, cross-platform and secure [4].
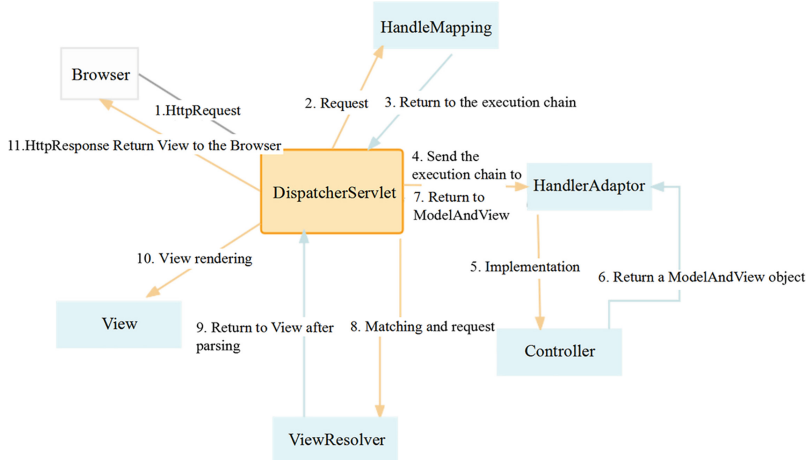
Fig. 1. SpringMVC workflow flow chart

2.3 Spring MVC

Spring MVC is a lightweight Java language framework. Through the separation of Model, View and Controller, the division of roles of web applications is realized, the running burden of control layer is reduced, and the response speed of users' needs is accelerated. The workflow of Spring MVC is shown in Fig. 1. Spring MVC has many advantages, such as easy extension, support for multiple view technologies, integration with Spring framework, support for mapping strategies of multiple request resources, and clear division of labor among components [5].

2.4 MySQL Database

MySQL database is an open source relational database. Its biggest feature is that it stores data in different tables, so it is more flexible and convenient to manage and use data. MySQL can be transplanted to other platforms, has a distributed data management system, and the database can be freely shared. MySQL has become the database choice favored by many enterprises because of its advantages of free, simple operation, small memory occupation, fast running speed, rich interfaces (C, C#, JAVA, PHP, Python, etc.) and cross-platform (Unix, Linux, Windows).

2.5 Development Process

According to the above application requirements, we can complete the configuration and deployment of the online teaching platform development environment of "Introduction to Art". Firstly, the operating system of the system is Linux, Tomcat 8.0 is selected on the Web server, Eclipse is selected as the bottom development tool, JDK1.8.0_91 is used as the Java language development kit, and MySQL5.8 is selected as the database server.

The selected version of SpringMVC framework is SpringMVC5.3.20, which needs to be downloaded from Spring official website. Development kit JDK1.8.0_9 needs to
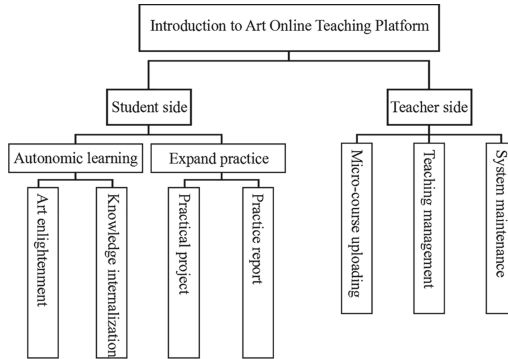
Fig. 2. Structure diagram of kinetic energy module of online teaching platform of "Introduction to Art"

be downloaded from Oracle official website. After getting ready, configure SpringMVC in Eclipse2020: create a new project in Eclipse2020, copy the jar package to the WEB-INF/lib directory, and configure the web.xml file, which is mainly divided into four aspects: writing the configuration file [servlet-name]-servlet.xml, Configure the front-end controller DispatcherServlet, the initialization parameters of contextConfigLocation, and the listener Listener, and then start running. In the framework of SpringMVC, the data layer is responsible for implementing business logic, and the view layer displays data to users. The control layer is responsible for the communication between the data layer and the view layer, and completes the quick response to the user's needs through division of labor. After all the development environments are ready, design specific functional modules, as shown in Fig. 2. After the design of all system functional modules is completed, the simulation operation test is carried out. After the test, package all the system files, and then deploy them in Tomcat. After setting the IP address, they can be provided to the client.

Through the introduction of the above key technologies and theories, the selection of the overall environment for system development and the configuration of related software and toolkits, we have made it clear that the online teaching platform of "Introduction to Art" is feasible.

3   Function Implementation

3.1   Student Side

Students enter the online teaching platform of "Introduction to Art", click on the "Student Entrance" to register and log in. After logging in, they will see two sections, namely "Autonomous learning" and "Expand practice". The specific functional modules are as follows:

1) Autonomic learning
"Autonomic learning" only needs to supplement the traditional classroom teaching from

two stages: before class and after class, manage each part carefully and enlarge the teaching effect.

The "Art Enlightenment" section is aimed at the pre-class stage, and its main purpose is to stimulate students' interest in learning, so that students can be curious about art and have a certain degree of understanding of the classroom content before they are exposed to a large amount of theoretical knowledge in the traditional classroom, thus changing the traditional "preview before class" into "warm-up before class" to improve their learning initiative. Students click to enter "Art Enlightenment", and they will see all kinds of online small game entrances divided by art categories. For example, painting, sculpture, calligraphy, architecture, music, dance, poetry, novels, movies, animation, etc., all kinds of arts set up different games. For example, the painting category has an interactive video "The Night Revels of Han Xizai", the music category has music rhythm games of world-famous piano music, and the novel category has AI sequel relying on big data and so on. The main technologies used in this part include: ajax function will be used in games that need pseudo-instant function, javascript function will be used in client data calculation, and MySQL will be used as database support [6]. The code of some music rhythm games is intercepted here, as shown in Fig. 3.

The "Knowledge Internalization" section is aimed at the after-school stage, and its main purpose is to help students systematize the knowledge they have learned in class, instead of being a jumble of disorderly knowledge, internalize knowledge, deepen their understanding and perception, and make art no longer a written knowledge of lofty and few. Students click to enter "Knowledge Internalization", and they will see three entrances, namely "Interactive Communication", "Review Micro-course" and "Homework Mutual Evaluation". In "interactive communication", teachers can initiate topics, such as "What are the basic evaluation criteria for artistic works?" "What are the basic responsibilities of artists?". Students can discuss freely with teachers and classmates according to their own understanding, and deepen their understanding and thinking about art [7]. The important technology used in this part is Vue + Spring boot, and some

```
//Generate small squares in four tracks randomly
function CreateBlock() {
    var crackNumber = Math.floor(Math.random() * 4); //Track number
    var blockNum = Math.floor(Math.random() * 3 + 1); //Number of track slide
blocks, 1-3 blocks
    var fatherBox = document.getElementsByClassName("crack" )[crackNumber];
//Find the parent element
    for (var i= 0; i< blockNum; i++) {
        var block = document.createElement('div');
        fatherBox.appendChild(block);
        block.timer = null;
        //Get the length of the track
        var target = fatherBox.offsetHeight
        startMove(block, target);
    }
}
```

Fig. 3. Some codes of music rhythm games

```
/*const {defineConfig }= requirel(@vue/cli-service")
module.exports = defineConfig({
    transpileDependencies: true,
    lintOnSave:false
})*/

module.exports = {
    pages:{
        index:{
            entry:'src/main.js',
        }
    }
}
```

Fig. 4. Code of "Interactive Communication" module

codes are shown in Fig. 4. In the "Review Micro-lesson", students can watch the video of micro-lesson produced by the teacher, and the video duration is mostly within 10 min. The main content is to integrate the scattered knowledge points in the class into a knowledge map to help students form a knowledge frame and deepen their memory. The micro-lesson part mainly uses Flash plug-in. In "Homework Mutual Evaluation", students can check the homework assigned by teachers, which is mainly written homework, in order to review and deepen what they have learned in class. After submission, all the students in the class can see that students can grade and comment on other students' homework, with 60% for students and 40% for teachers. In this way, students' initiative and enthusiasm can be improved [8].

2) Expand practice
"Expanding practice" is mainly aimed at the problem that traditional teaching mode emphasizes knowledge over practice, and it mainly migrates the pre-work and follow-up work of practice to online.

In the "Practical Project", there are practical activities initiated by teachers, and there are also practical activities organized by students spontaneously. For example, the aesthetic direction of architectural art, there are field visits to local landmarks; Aesthetic direction of calligraphy, there are activities of calligraphy exhibitions and exhibitions in schools, and so on. Students can check the information of practical activities, including time, place, main work contents and requirements for submitting practical reports, etc. Students can choose to join practical activities, and then they can communicate and exchange practical experiences in the activity group. In "Practice Report", students can submit practice report after practice activities, which can be in the form of words, such as practice report, practice experience, pictures or videos, such as activity photo album and activity flash video. Students can turn their individual learning achievements into collective wisdom by publishing their practice reports online [9].

3.2 Teacher Side

Teachers click to enter the online teaching platform of "Introduction to Art", click to enter the "Teacher's Entrance" to register and log in. After logging in, you will see the

Table 1. Course Information Sheet

Name	Data type	Required fields	Major key	Annotation
ID	int(11)		PK	ID
LE_CODE	varchar(40)	✓		Course number
LE_NAME	varchar(200)	✓		Course name
STATUS	int(11)	✓		Status
HOUR	bjgint(20)			Class hour
ENTER_URL	varchar(200)			Course cover pictures
KEYWORD	varchar(500)			Keywords
AUTHOR	varchar(500)			Author
VISITCOUNT	int(11)			Number of times viewed
MAKE_TYPE	int(11)			Production type (standard/non-standard)
REMARK	text			Course instructions

following three sections: Micro-course uploading, teaching management and system maintenance. The specific functions are as follows:

In "Micro-class Uploading", teachers can record online classes or upload recorded micro-class videos, and manage video materials, including checking the number of students, publishing new class announcements, editing course information, adding after-class exercises, adding/deleting videos, etc. The micro-course upload needs the support of the server database, and the course information table in the stored data is shown in Table 1. In "Teaching Management", teachers can reply to questions raised by students, manage classes, groups and student accounts, including identity verification, account addition/deletion, check, grade and comment on students' homework, initiate practice activities and evaluate practice reports. In "System Maintenance", teachers can monitor the operation of the whole system, modify and adjust the problematic links, and upgrade and refine the functions [10].

4   Conclusions

The online teaching platform of "Introduction to Art" based on JSP technology provides rich learning resources and practical opportunities for art design students in colleges and universities, improves students' learning enthusiasm and learning efficiency, and establishes an effective mechanism for teachers and students to exchange ideas freely. Besides consolidating knowledge, it focuses on imperceptibly cultivating artistic sentiment, laying a foundation for the teaching of specific art majors. In the future exploration and research, we will continue to deepen the reform of the teaching mode of "Introduction to Art", so that the online teaching of "Introduction to Art" can exert greater influence, cultivate outstanding students with professional knowledge, artistic sentiment and practical ability, and make contributions to the development of Chinese art culture.

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