



# Construction of University Educational Administration Management Information System Based on J2EE Framework

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**Abstract.** Under the background of the rapid development of information technology, it is necessary to build a scientific and reasonable educational administration management information system in order to create a good teaching environment, create a good school spirit and style of study. Therefore, the author of this paper uses the SSM of J2EE standard as the project framework and Javaweb technology to develop a college educational administration management information system. This paper integrates the functions of the system from the user's point of view. In order to improve the transparency and fairness of the overall work of educational administration, the J2EE-based university information management system has developed the teacher client and the student client in addition to the conventional client, thus improving the efficiency of the administrator's educational administration information management. The design of this system contributes to the process of scientific information management in colleges and universities in China.

**Keywords:** J2EE · Javaweb · university educational administration · information system

## 1 Introduction

Educational administration is a crucial link in the campus management of colleges and universities, and it is an important work to ensure the orderly arrangement of teaching plans and maintain the teaching order. Whether the educational administration is efficient or not will have a direct impact on the work of talent training objectives in colleges and universities. Moreover, colleges and universities are different from educational schools of other ages, facing more information about students and disciplines, and the management environment will be more complicated. Therefore, colleges and universities should attach importance to the educational administration of colleges and universities, make it more efficient and convenient, and lay a good foundation for talent cultivation. Educational administration in colleges and universities is characterized by heavy daily workload, so it is a complex dynamic management and a multi-level structure. Educational administrators comprehensively manage the school's educational work, manage the educational operation as a whole, and publish and share various teaching resources.

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It can be said that the educational administration is an important bridge between the main bodies of the university campus. However, in the background of the current information age, many college educational administrators have rigid ideological problems. For the management of teachers and students, too much attention is paid to “management”, blindly notifying and assigning tasks, and the sense of service is not strong. It is rare to think from the perspective of major groups such as teachers and students on campus, and to optimize the system, which does not reflect the due “people-oriented” concept.

With the continuous expansion of the teaching scale in colleges and universities, with the increasing number of teachers and students, the educational administration involves a wide range, complicated affairs and heavy workload. However, the educational administration still stays at the stage of serving fewer teachers and students, and still adopts the traditional manual paper-based work mode, which leads to the long time-consuming educational administration, high error rate and low work efficiency. This traditional way of educational administration will inevitably affect the school experience of teachers and students, and seriously affect the efficiency and quality of educational administration. Therefore, colleges and universities should look for new ways to systematically, scientifically and professionally manage their educational administration [2]. With the rapid development of information technology, information technology enhances the ability of information dissemination, storage and sharing, so information system is used more and more widely in all walks of life. With the advent of information system, the efficiency and level of information management in all walks of life have been effectively improved in a scientific and standardized way. If the information management system can be applied to the management of colleges and universities, it can break the information barriers of educational administration departments, teachers and administrators, strengthen the information exchange among schools, teachers and students, reduce all kinds of information transmission errors in management, and improve the authenticity and effectiveness of information transmission, so as to conduct more scientific management of related bookstores in colleges and universities [3].

According to the above description, the author of this paper thinks that SSM based on J2EE specification should be selected as the project framework, and the educational administration management information system of colleges and universities should be developed by using Javaweb technology. For teachers, this system can help them simplify the management of students’ achievements. For university administrators, the system stores the data information such as courses, teachers and students in a unified system, which is convenient for comprehensive management of various affairs, and then optimizes the rational allocation of various educational resources on campus. For students, students can take the initiative to participate in the course selection process. In this paper, Internet technology is used to develop the system, and according to the characteristics of user groups, the interface functions are easy to operate, and the running process is stable and fast.

The development of this system enables students to actively participate in course selection and study plan, and also simplifies the complexity of student management for teachers. The information and data involved in the daily management of the system are stored in a unified database, which facilitates the unified management of educational resources and helps to optimize the allocation of educational resources. The system gives

full play to the advantages of the Internet, its business functions are easy to operate, and the system is stable and responsive. The development of this system can effectively improve the efficiency of administrators, teachers and students in managing educational information, improve the service quality and reduce the time cost of users. This system comprehensively promotes the innovation of educational administration, strengthens the informationization of educational administration, and promotes the sustainable development of educational administration in colleges and universities.

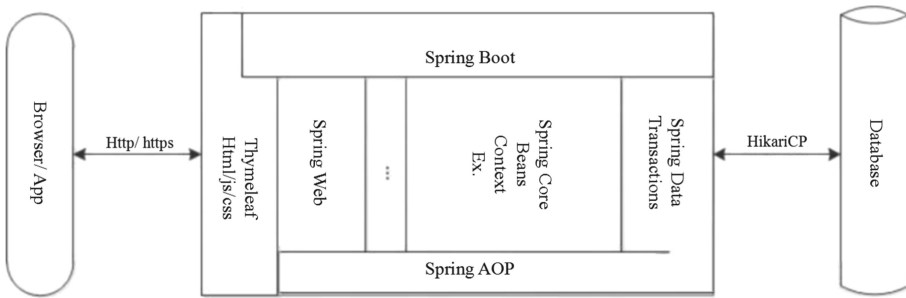
## 2 Key Technology

### 2.1 J2EE

J2EE company is a technical specification standard specially used for developing web applications, which comes from Sun Company. J2EE can be used to solve the technical problems that developers usually encounter when creating enterprise-level applications. J2EE technology has strong advantages, such as higher compatibility, stronger portability and the ability to support secondary development and application. The concrete structure of J2EE specification is four layers, namely, client layer, web layer, business layer and EIS layer, in which the client layer is on the client side, the web layer and business layer are on the J2EE server side, and EIS is on the database server side. Unlike many conventional web application technologies, J2EE is based on components rather than on the platform itself. Because of this characteristic, developers' work in developing web application systems is more efficient and concise. In this way, developers can focus on the key functional business logic, and such application software will be more comprehensive and high-quality. Although J2EE components and JAVA components are very similar, they are still quite different. For example, J2EE components need to be assembled in a web application development software according to J2EE specifications. The component responsible for the client is applet, the web component running on the server is Java Servlet and JSP, and the business logic component responsible for the server is EJB. [10].

### 2.2 Springboot

Springboot is a lightweight web application development software based on spring. It is developed by the same company as spring, and it also uses J2EE specification. Compared with spring, ingboot requires fewer files to be configured, and many file systems will be automatically configured, so that developers will be more efficient and faster in their development work. It can be said that springboot is an upgraded version of spring's function expansion. As shown in Fig. 1, spring mainly includes components and principles such as Spring JDBC, Spring MVC and Spring ORM. SpringBoot contains the core (IOC) and (AOP) of Spring and encapsulates some extensions, such as Stater [8].



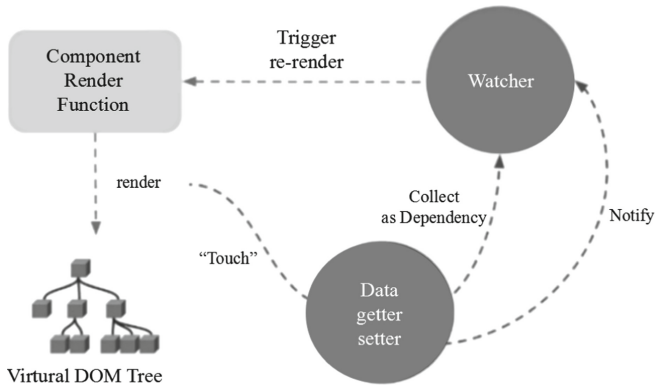
**Fig. 1.** Springboot architecture diagram

### 2.3 Vue

Vue is used to build a progressive framework of user interface. The meaning of progressive means: the least claim. Every framework will inevitably have its own characteristics, thus it will have certain requirements for users. These requirements are opinions, which are strong and weak, and their strength will affect the way they are used in business development. The development of Vue.js mainly revolves around MVVM mode, which essentially belongs to JavaScript MVVM library with concise API. The development mode of the application development framework pays more attention to the development of viewmodel, because it can automatically respond to the changes of data in time. In this process, you can also modify the data and the content displayed on the page according to the binding relationships, provided that these binding relationships are declared in advance. Two-way data binding is the greatest advantage of vue. By realizing the two-way data binding through MVVM, developers don't have to operate dom objects anymore and have more time to think about business logic. The data binding principle of Vue is in-depth response principle, and the schematic diagram is shown in Fig. 2. When you pass an ordinary JavaScript object into the Vue instance as the data option, Vue will traverse all the properties of this object, and use Object. Define Property to convert all these properties into getter/setter [1].

### 2.4 Development Environment

According to the needs of the educational administration management information system in colleges and universities, this paper adopts the method of separating the front end from the back end in the development process. The front end is written in HTML+CSS+JavaScript language, and the back end is developed in JDK 1.8 using SSM framework of Spring+SpringMVC+Mybatis. The front-end framework is developed by using vue.js and webform tools. And Spring MVC choose spring boot version 2.6.0. College management system involves the course selection process, and this function needs to face the problem of high concurrency in a short time. Therefore, Nginx+Tomcat++Redis+MySQL is used to choose the server architecture of the system. Apache Tomcat 9.0 is used as the Web application server, and MySQL 8.0 is selected as the database management system server. The function of Redis is mainly used to cache the intermediate data between the system and MySQL, which can improve the speed and



**Fig. 2.** Data binding principle of Vue

stability of the system. Redis caches data in memory, and then transmits access data and request data to the back end through Nginx [5]. Using IDEA 2021.1.3 (Ultimate Edition) can easily build a springboot project, select the corresponding maven dependency, and simplify the initial building and development process of Spring applications. Springboot has a built-in tomcat server, which can start a service in the form of jar and quickly deploy and publish web services. Springboot uses starter dependency to automatically complete bean configuration, resolve conflicts between beans, and introduce related jar packages. We can see that we have introduced three dependencies, and pom.xml has helped us to add them. It is these starter dependencies that help us to do a lot of configuration. After setting up the springboot project, you can write code in it and run it directly. Based on the introduction of the above technologies and usage modes, we have determined the system development environment, and obtained the technical feasibility of the educational administration management information system of colleges and universities based on J2EE.

### 3 Requirement Analysis

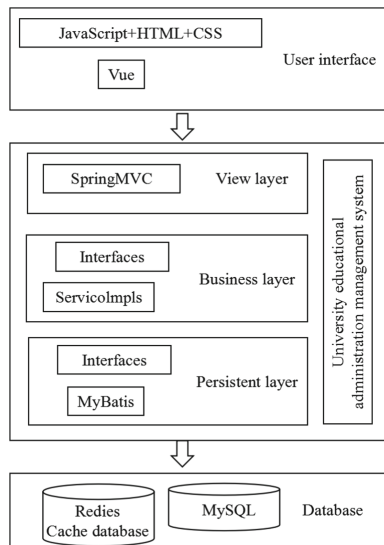
#### 3.1 Functional Requirement

In order to improve the transparency and fairness of the whole work of educational administration, the J2EE-based university information management system has developed a teacher client and a student client in addition to the conventional administrator client. Teachers can learn the latest teaching schedule and curriculum plan of each semester in time, manage students' academic achievements, and learn about students' learning situation. Through the system, students can quickly choose elective courses according to their own interests and learning situation, and can also quickly obtain information such as electronic curriculum schedule and academic achievements. The academic affairs administrator client mainly develops two functional modules: user rights management and information maintenance. In addition to the above functional requirements for users, it is also necessary to ensure the stability of the system, the feasibility and compatibility

of secondary development. To be beautiful and concise, the page should be operable by teachers and students who are not information management professionals.

### 3.2 Overall Design

In the J2EE-based information management system of colleges and universities, we have adopted the most popular SSM framework based on J2EE specification, which is realized by combining Spring+SpringMVC+Mybatis, each with its own functions. In the development process, B/S architecture is adopted to separate the front and back ends. The overall design structure of the system is shown in Fig. 3. The user interface of the client is written in HTML+CSS+JavaScript language, and the framework is Vue.js. The back-end adopts SSM framework based on springboot software, which is divided into view layer, persistence layer and business layer. The data storage system is divided into redis cache database and mysql database server. The above structure can reduce the complexity of system development by hierarchical processing, and at the same time, this structure can greatly improve the efficiency of system development. The view layer is developed by SpringMVC, which separates the controller of the system from the model object, so that the request from the front end can be processed more efficiently, and the data returned by the server can be responded and fed back in time. Business layer is responsible for designing and calculating business logic. The data persistence layer is responsible for accessing data, adding, deleting and searching, and mybatis can be used in the persistence layer to realize advanced mapping [9]. The testing method adopted by the system is black-box testing. The test results meet the project expectations.



**Fig. 3.** Overall system architecture diagram

## 4 Functional Implementation

According to the needs of different users, J2EE-based educational administration management system in colleges and universities develops three user ports: the student port, the teacher port and the administrator port, and the administrator sets the permission levels for the three types of users. Login to the system through the user's account password will jump to the common home page, and the home page will display various notices and news of campus management, which will be updated by the Academic Affairs Office. The system also has the humanized function of pop-up prompt. 30 min before class and exam, the system will automatically pop up a window to remind students and teachers to attend the exam or class at the designated place in time.

### 4.1 Student Client

After students log in to the system through their student ID and password, they can see three main functional modules: course selection, electronic schedule and score inquiry. At the beginning of each semester, students click into the course selection subsystem to browse the courses that can be taken in this semester, and the courses are listed in the form of spreadsheets. After the students have selected the elective courses, they can add them to the selected courses and submit them, so that the course selection process can be completed. The relevant code of the controller of the course selection business process is shown in Fig. 4. At the beginning of each semester, student users can click to enter the electronic curriculum schedule to see the curriculum arrangement of elective courses and compulsory courses in this semester. The class schedule is displayed in the form of a spreadsheet, and the floor of the classroom is marked below each class. It can effectively reduce the error probability of students missing class due to remembering the wrong time, and can also prevent students from blindly going back and forth when looking for classrooms. When the student user clicks to enter the score query module, he will jump directly to the electronic score sheet of the latest semester, and enter the completed course page. At the same time, the student user's completed credit points and average scores will be counted at the bottom of all the course information listed on the page. At the top of the results query function page, students can find the results of previous semesters and the results classified by disciplines [7].

### 4.2 Teacher Client

Teacher client mainly has two main functional modules: schedule and score entry. When the teacher clicks into the schedule, he can see the schedule of this semester. The timetable is displayed in the form of a spreadsheet, and the place of class and the majors and classes participating in this class are marked at the bottom of each class. The schedule function also provides the arrangement mode of classification by major and by course. When a teacher chooses to classify by major in the list, he can see the schedule of students that the teacher needs to attend in a certain major. According to course classification, the teacher can see the schedule of the same course in this semester. When the teacher clicks into the score entry module, the teacher user can see the list of the students' scores taught. The teacher manually enters the scores of the course for each student on the

```

//Course selection operation
@RequestMapping(value = "/stuSelectedCourse")
public String stuSelectedCourse(int id) throws Exception {
//Gets the current user name
Subject subject = SecurityUtils.getSubject();
String username = (String) subject.getPrincipal();
SelectedCourseCustom selectedCourseCustom = new SelectedCourseCustom();
selectedCourseCustom.setCourseid(id);
selectedCourseCustom.setStudentid(Integer.parseInt(username));
SelectedCourseCustoms = selectedCourseService.findOne(selectedCourseCustom);
if(s == null) {
selectedCourseService.save(selectedCourseCustom);
} else {
throw new CustomException("You have chosen the course, and you cannot choose it again");
}
return "redirect:/student/selectedCourse";
}
}

```

**Fig. 4.** Controller related code of course selection business process

scoring form page, and after checking all the scores, click Submit. After submission, the scores entered by teachers will be automatically inserted into the scores of each student. At the bottom of the page, students' highest score, students' lowest score, class average score, class failing number and class failing rate will be calculated [6].

### 4.3 Academic Affairs Office Administrator Client

The academic affairs administrator port is mainly developed with two functional modules: user rights management and information maintenance. In the administrator permission management module, the permissions of teachers and students are activated and adjusted. When entering the course information maintenance, the administrator is responsible for importing and maintaining the electronic information files of teachers and students. When importing and maintaining information, administrators use encryption module to transmit sensitive information and important files, thus further improving the security of campus data. In addition to maintaining user information, the administrator also needs to import and maintain the class schedules required by teachers and students. In addition, administrators need to maintain and upgrade management system services, which can be maintained and upgraded remotely through virtual intranet, remote desktop and other technical means, which can reduce the chances of going back and forth to the central computer room, improve work efficiency and reduce maintenance costs [4].

## 5 Conclusions

Under the background of the increasingly developed Internet technology, the information management industry is booming, and the education industry should also pay attention to improving the scientific information management of colleges and universities, so as to improve the comprehensive management level of the campus. Based on the present situation, the author puts forward the development system to optimize the management



system. Due to the limited ability of developers, there are still many problems in this system, such as outdated functions, lack of certain innovations, and insufficient security measures. It is hoped that university administrators will attach importance to information education management, increase investment and attract more and more outstanding talents to improve the system. More talents should be added to maintain the university management system to promote the sustainable development of the campus educational administration, and the system can be optimized and changed to a certain extent according to the development of the campus, and upgraded in time. I hope this system can effectively improve the quality of campus management and become a more scientific and stable educational administration management system.

## References

1. Du H (2020) Analysis on the Innovation and Safeguarding Measures of Educational Administration in Colleges and Universities in Educational Administration System. Employment and Security 19
2. Guo P (2022) Construction and Implementation of Educational Administration System in Big Data Universities. Teacher Expo 03
3. Hu B (2021) Research on Informatization Construction of Educational Administration System in Colleges and Universities. Education Informatization Forum 06
4. Han Q (2018) Design and Implementation of Educational Administration System in Colleges and Universities Based on J2EE. University of Electronic Science and Technology of China 06
5. Li B, Zheng Y (2021) Information Analysis of Educational Administration in Colleges and Universities under the Wisdom Management Concept. Shanxi Youth 05
6. Ming O (2019) Design and Implementation of Educational Administration System in Colleges and Universities Based on J2EE. Jiangxi University of Finance and Economics 06
7. Zuhua R (2019) Design and Implementation of Educational Administration System of College Course Selection Based on SSM. Capital University of Economics and Business 06
8. Chengyu S, Yu J, Lu Z (2021) Construction of Intelligent Management Information System for University Laboratories Based on internet plus. Digital Technology and Application 10
9. Zixin W (2020) Scientific Analysis of University Management Based on Informatization. Business News 05
10. Hui Z, Bian J, Zhang F (2020) Experience and Enlightenment of Information System Construction in Colleges and Universities. Education Teaching Forum 07

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