Design and Development of Online Teaching System of Pharmaceutical Administration Management in Colleges and Universities Based on Web

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Abstract

Firstly, this paper studies the background and teaching status of pharmaceutical administration management, and summarizes the existing problems in pharmaceutical administration management's education and teaching. Then, taking the teaching practice as the starting point and according to the teaching requirements, we will reform the classroom teaching, exchange and discussion, and after-class practice. An online teaching system of pharmaceutical administration based on web technology and springboot framework is designed. Through the analysis and discussion of the teaching mode, a set of unique teaching mode in the teaching process of pharmaceutical administration is formed. In order to enhance teaching effect, improve teaching quality, deepen students' understanding and mastery of knowledge points, and improve their independent thinking ability. Applying online teaching to the teaching of pharmaceutical administration course is an important method to improve students' ability to acquire knowledge actively, and it has important teaching value in practice teaching and application. Applying it to the teaching of pharmaceutical administration course can provide some reference for teaching reform. Inspired students' thinking, changed the boring and boring content of traditional courses in the past, and achieved good results. So as to improve the teaching quality of pharmaceutical administration and strengthen students' active learning ability, ability to analyze and deal with problems and independent thinking ability.

Keywords: pharmaceutical administration; online teaching; web technology; springboot

1 INTRODUCTION

After China's accession to the World Trade Organization, people's living quality and consumption level are constantly improving, so they have higher and higher requirements for the quality, curative effect, safety and medical service experience of pharmaceutical products, thus promoting the reform of China's medical and health field [8]. In order to comply with and carry out this reform work, the society will need a large number of outstanding professionals who not only master the economic management theory and domestic and foreign drug management policies and regulations, but also know the basic knowledge of medicine, and can also engage in domestic and foreign drug economic management activities. The healthy development of pharmaceutical management can supervise and promote the safety and effectiveness of people's medication, the economic rationality and the quality of medical services. The teaching goal of pharmaceutical administration course is

to promote the development of pharmacy and ensure people's safe, effective, economical and reasonable medication [1]. In order to meet this social demand, colleges and universities have set up pharmaceutical administration management, which is an interdisciplinary major between management and pharmacy. This major requires not only mastering the process of research and development, production, operation and use of drugs, but also knowing the laws and regulations of different links such as intellectual property protection related to drugs and supervision and management of production and operation. University students studying in pharmaceutical administration management will eventually grow into senior compound talents who can not only use the methods of medical laws and regulations, pharmacoeconomics, and drug quality management to engage in related drug management, but also have the foundation of pharmacy, management, and knowledge of law and economics. They can not only work in institutions such as drug supervision and management,

health administration, drug price management, medical and health supervision, economic regulation and control, but also be competent in pharmaceutical enterprises for senior pharmaceutical administration management such as investigation and research of pharmaceutical resources, analysis of pharmaceutical market behavior and characteristics, planning and operation [7].

In pharmaceutical administration management, China, pharmaceutical education started late and developed slowly, and its teaching methods and forms are still in the exploratory stage. As the course of pharmaceutical administration involves normative courses such as laws, regulations, rules and regulations of pharmaceutical administration, it involves a wide range of knowledge and scattered knowledge points, so it is very difficult for colleges and universities to organize the teaching content of this course. There are some disadvantages in this course, such as relatively single teaching mode, boring teaching of pharmaceutical theory by teachers, lack of close combination of theory and practice, and lack of communication between teachers and students. It covers many legal provisions, and students find it difficult to understand these knowledge, which leads to students' passive learning state, low learning efficiency and poor effect. Therefore, how to realize the teaching reform of pharmaceutical administration course and improve the learning efficiency of students of this major has become a major problem to be discussed in colleges and universities aiming at pharmaceutical administration management [5]. The author thinks that using online teaching platform as an auxiliary teaching form for offline classroom teaching will play a positive role in improving the teaching situation in pharmaceutical administration management and reforming and optimizing the current teaching mode of pharmaceutical administration management major. According to the needs of pharmaceutical affairs management, this paper designs and develops an online teaching system of pharmaceutical administration management based on web technology. Online teaching can effectively solve the problems existing in traditional classroom teaching. Students can not only learn and complete tasks online, but also interact with teachers and ask questions online, which not only enhances the interaction between teachers and students, but also enables students to get real-time feedback and answers from teachers. Case analysis can also be carried out, which truly restores the specific process of hospital pharmaceutical administration management. Students can independently learn the theoretical knowledge and basic skills of pharmaceutical administration management in a relaxed atmosphere, effectively improve students' ability to understand professional knowledge and practical operation, and promote the application of student-centered teaching methods, thus improving the teaching quality and truly cultivating compound talents needed by the society.

2 TECHNICAL OVERVIEW

2.1 Web technology

Web is a typical distributed application structure, which usually appears in the form of website system. From the technical level, Web technology has three core parts, namely HTTP Hypertext Transfer Protocol, URL Uniform Resource Locator and HTML Hypertext Markup Language. Every information transmission and interaction in Web application will include client and server. Therefore, Web development technology can also be interpreted as a combination of client technology and server technology. Among them, the client is mainly responsible for displaying the content of the webpage, that is, the text, pictures, videos, etc. that we see when browsing the webpage. The server mainly does specific operations and interactions. For example, the function of inputting account password for verification when we log in to the web page is the code program written by the server technology. Figure 1 shows the three-tier architecture of web technology development. Generally, the development of a web-based system is based on this design architecture.
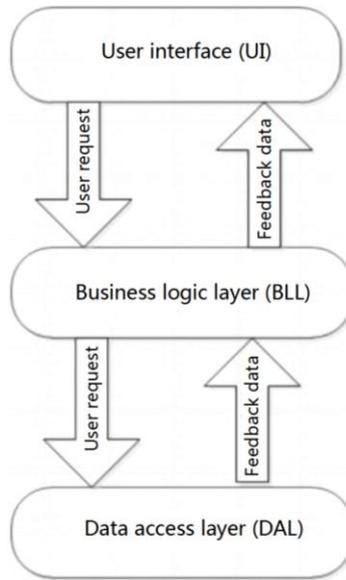
Figure 1: Three-tier architecture of Web

2.2 *Java*

Java is a programming language that can write cross-platform applications. Its biggest feature is object-oriented. The so-called object-oriented is to divide the requirements of the whole development project according to different characteristics and functions, and then encapsulate the common requirements into a unified class (the class is the object only after instantiation) [9]. The object created is not to complete a certain step, but to describe the behavior of something in the step of solving a problem. Java programming mechanism provides powerful built-in support for multithreading. Threads are divided into single thread and multi-thread. Among them, single thread refers to a single sequence of control flow in a process, in which multiple threads can be concurrent, and each thread follows the parallel mechanism to perform different tasks. Multi-threading is one of the special forms of multi-tasking, which takes up less resource space and saves the cost of resources. It can improve the programming efficiency of programmers and make full use of CPU's memory resources. Since the thread is mentioned, it is necessary to explain the process. A process refers to the memory space allocated by the operating system when the project is running, and generally contains one or more threads. However, a thread can't exist independently from a process, and the continuous running of a process can't end until all the non-daemon threads have finished running.
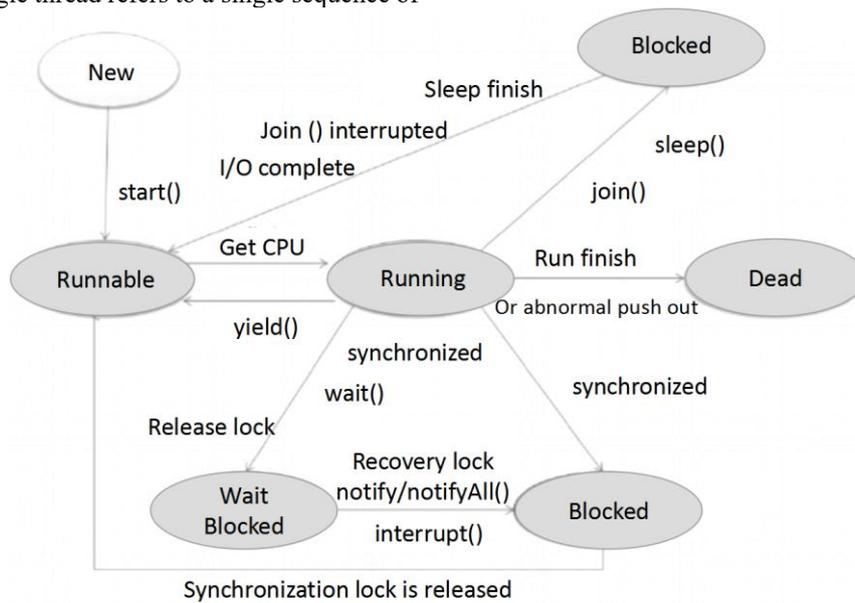

Figure 2: Multi-threading operation process

2.3   *SpringBoot framework*

SpringBoot is an open-source lightweight web framework developed with Java language. It is designed and developed on the basis of Spring4.0, which not only inherits the original excellent features of Spring framework, but also simplifies the configuration in the process of building and developing Spring applications [10]. In addition, because SpringBoot integrates the advantages of a large number of frameworks, it solves the problems of version conflicts and unstable references of dependent packages. In fact, springboot is not a completely new framework. It is not a substitute for solving the problems existing in spring, but a package of Spring to improve the experience of Spring developers. Therefore, the programs that can be developed with spring framework can be completed by applying spring boot framework now. The characteristics of Springboot are in line with the requirements of popular microservices and distributed systems. Programmers can not only use it to quickly build an application system, but also use spring cloud cloud application development tools to build a distributed website. Spring Boot realizes auto-configuration automatic configuration combined with actuator monitoring, cli command line interface and starter dependency, which greatly reduces the complexity of project construction [2]. It quickly integrates the third-party frameworks and interfaces, including Jackson, JDBC, Mongo, Redis, Mail, etc., and does not need to configure related files by itself. This framework has the advantages of simpler code, fewer configuration documents and simpler development projects, which saves the cost to a greater extent for the development and maintenance of the whole project team.

2.4   *Development environment*

The development of pharmaceutical administration management online teaching system developed in this paper is all completed under Windows operating system. Next, the development environment of this system is explained in detail. First deploy the front-end development environment: download and install bootstrap and complete the relevant configuration. The back-end springboot framework is the main framework, MyBatis framework is used to deal with data persistence, Thymeleaf is the front-end template engine, and then the server-side development environment is built. The first step is to download and install JDK version 1.8 and add environment variables. Download maven, version apache-maven-3.5.3-bin, configure environment variables for it, and modify its local warehouse location. The second step is to download Tomcat, version Apache-Tomcat-9.0.63-Windows-x64. It will automatically find the storage path of JRE, then add environment variables to it, and then add "%catalina _ home% \ common \ lib \ servlet-api.jar;" to classpath and path respectively. And "%CATALINA_HOME%\ bin;" , and the configuration is completed with two commands. The third step is to download and install idea and establish the project to be developed. First, import the related jar package library and create a maven project. springboot integrates bootstrap framework and adds web and bootstrap dependent jar packages to its pom.xml configuration file. The fourth step is to integrate springMVC with springboot, add configuration files of springmvc in src/java/resources folder, add dependencies required by springmvc in pom file, configure the path of springmvc file in the label of init-param, and add prefix and suffix in application.properties file. Then, integrate springboot with mybatis and thymeleaf, and add the jar package dependency of the server required by this project through pom.xml file. As shown in Figure 3, inject the code of web, bootstrap framework, mybatis and thymeleaf template dependency into pom.xml, and then create a mapping relationship for Mybatis. The fifth step is to create the application.properties file under src/main/resources, configure the mysql driver and thymeleaf template, clear thymeleaf's cache, and test "hello world". Finally, download and install MySQL version 8.0.28, and complete the connection configuration. The establishment of the above development environment ensures the feasibility of the online teaching system of pharmaceutical administration in this paper.

```
<dependency>
<groupId>org . apr ingframework. boot</ groupId>
<artifact Id>spring - boot -starter - jdbc</artifactId>
</ dependency>
<!--thymeleaf Template engine configuration-->
<dependency>
<groupId>org. spr ingf ramework. boot</ groupId>
<artifactId>spr ing- boot -starter- thyme leaf</artifactId>
<version>2. 5. 4</version>
</dependency>
<!-- web dependency- -- ->
<dependency>
<group. [d>org. spr ingframework. boot</groupId>
<arti factId>spr ing -boot -starter- -web</ artifactId>
</dependency>
<!-- mybatis Configuration-->
<dependency>
<groupId>org. mybatis. spring. boot</ groupId>
<artifact Id>mybat is -spring-boot -starter</artifactId>
<version>2. 2. 0</vers ion>
</ dependency>
<!--MySQLDatabase configuration-->
<dependency>
<groupId>mysql </ groupId>
<arti factId>mysql -connector- java</arti factId>
</dependency>
```

Figure 3: Injection of the dependency code

3   REQUIREMENTS ANALYSIS

3.1   *System requirements analysis*

The online teaching system of pharmaceutical administration designed in this paper will be supported by Web development technology and MVC design pattern. The purpose is to solve the main problems and contradictions existing in the process of education and teaching in pharmaceutical administration management at present, and optimize the teaching mode in pharmaceutical administration management, so as to meet the different "teaching and learning" needs of teachers and students. The construction of this platform will meet the actual teaching needs of teachers and students, and combine the online teaching with the habits of contemporary college students in obtaining information and learning knowledge, so as to promote the reform of teaching mode in pharmaceutical administration management and further improve the education system in colleges and universities. Make students' learning process more practical. Its main users are teachers and students. The basic functional requirements of the student module include learning materials, case analysis, simulation tasks, discussion and questioning. Teachers are the guides and encouragers of learning in this system. By uploading learning materials, case analysis and tasks, they guide students to carry out targeted learning and practice, and use the chat room function to communicate with students online and encourage them.

3.2   *Global design*

Figure 4 shows the overall architecture of this system. The design of this system mainly adopts MVC design pattern, and the application layer uses Bootstrap to build Web pages, which gives full play to the responsive development characteristics of Bootstrap and effectively solves the compatibility problem. According to MVC, the service layer is divided into three parts: view layer, control layer and model layer, and the data layer uses MySQL database. The overall interaction of the system is as follows: users submit form requests in the application layer, and the front end sends JSON-formatted strings to Thymeleaf template engine in the view layer through Ajax asynchronous interaction. Thymeleaf analyzes and queries parameters after receiving the front-end requests, sends them to springMVC for processing and injecting parameters, and then gives them to the corresponding interface of the control layer for processing [6]. The control layer uses the SpringBoot framework, defines three main interface classes: controller, service and DAO, and is responsible for the process management and business logic. In the model layer, Mybatis is used as the data persistence of the business, which is responsible for operating the entity class that implements the business to access the database.

If additional data operations are needed, the definition of Mybatis can be used for customization. The design of the database is to use MySQL to keep the data persistently.
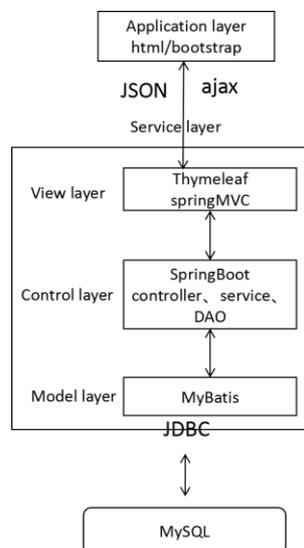

Figure 4: Overall architecture

4   FUNCTION IMPLEMENTATION

The online teaching system of pharmaceutical administration management in this paper divides the functional blocks into student client and teacher client through demand analysis. This system is developed based on web technology. Teachers and students don't need to download any application programs, so they can access it quickly and conveniently by inputting the website address of this system on devices that support and install browsers. For security reasons, when the two major user groups register and log in to this system, they need to enter not only the account password but also the correct verification code to successfully enter the system. As shown in Figure 5, the verification code written by springboot verifies whether the correct key code is entered.

4.1   Student client

Learning materials: After students log in to the system, click on the function of learning materials. You can see that this module is divided into two parts, namely, data downloading and video teaching. The learning materials are collected by teachers according to teaching requirements and teaching contents, and have strong pertinence. Students can enter the sub-module of data downloading, choose the materials they need and download them to their own devices for easy viewing and reading. The video teaching sub-module contains a large number of learning videos, which is convenient for students to understand and absorb the knowledge in class. Students click to enter the video teaching and choose the parts that they are interested in or lack, such as "The Intensive Lecture of Pharmaceutical Administration and

Regulations Test Center" and "Pharmaceutical Administration" of China Medical University. The system will automatically save the viewing progress, so that they can study next time.

Case analysis: Open the case analysis page, and you can see typical hospital cases collected by teachers. Students can download and view real cases for reflection and summary, and submit learning feedback. For example, regarding the "Qiqihar No.2 Pharmaceutical Factory Incident" among the types of counterfeit and inferior drugs as a case, "Armillarisin A Injection" should have used propylene glycol as the solvent, but the employees in charge of purchasing drugs in the hospital used diethylene glycol as an industrial raw material instead of propylene glycol as a medical auxiliary material. More than ten patients died during the use of this drug. Based on the case summary and analysis, they wrote down their views on this medical accident and submitted them to the platform. Case teaching can strengthen students' understanding of knowledge points and play a role in applying knowledge.

Simulated tasks: Teachers will regularly publish some simulated tasks according to what they have learned in the course. Click this module to enter the task list. The system will mark the completed tasks as gray, the unfinished tasks as black, and the newly released tasks as red, which is convenient for students to check and avoids the problem of students repeatedly completing a task. Select a task to view according to the color prompt of the student list. For example, there is a task in the task list that requires the team to simulate communication on the spot in the knowledge link of drug complaints. The task details include not only the task requirements but also specific examples, such as a

doctor-patient dispute caused by a drug complaint accident in a hospital. Students download specific examples for viewing, complete role-playing through collaboration with roommates or classmates, and upload the recorded task video to the title corresponding to the simulated task. After the teacher reviews it, the system will send a notice [3].

Discussion questions: This module is also divided into two sub-modules, namely, discussion area and chat room. By entering the discussion area, students can discuss their learning experiences with their professional classmates. By entering the chat room, students can choose the object they want to chat with and enter the dialogue page for communication. It is mainly convenient to contact teachers, ask questions to teachers online and receive real-time feedback from teachers.

4.2   Teacher client

In this system, the function of the teacher module is very different from that of the student module. Teachers have the right to modify, add and delete. They can not only add video courses, but also modify uploaded materials, add or delete tasks, etc. Through these ways, teachers guide students to learn theoretical knowledge, understand the real workflow of the hospital and complete simulated practical tasks, thus improving students' learning efficiency and teaching status [4]. The only module with the same permissions as students is the chat room. Teachers click this function to view students' private messages and answer questions through online chat, so as to promote the communication and interaction between teachers and students and alleviate the embarrassment caused by identity pressure when teachers and students face to face.

```java
@RequestMapping(value = "/checkVerify")
    public boolean checkVerify(String code, HttpSession session) {
        try {
            //Get random number from session
            String random = (String) session.getAttribute("RANDOMVALIDATECODEKEY");
            if (random == null) {
                return false;
            }
            if (random.equals(code)) {
                System.out.println("Correct verification code");
                return true;
            } else {
                System.out.println("Wrong verification code");
                return false;
            }
        } catch (Exception e) {
            e.printStackTrace();
            return false;
        }
```

Figure 5: Verification code verification code

5   CONCLUSIONS

The realization and use of pharmaceutical administration online teaching system, through exploring the application of pharmaceutical administration course, and guiding students in the form of learning materials and videos, can help students understand theoretical knowledge more deeply, guide them to develop their thinking and research problems, and summarize the relevant knowledge of pharmaceutical administration. Case analysis and simulation tasks arouse students' interest, stimulate students' enthusiasm and initiative, inspire students' thinking, and improve students' ability to analyze and solve problems in the process of learning new knowledge. Making full use of modern educational technology, carrying out information-based teaching, making innovations in teachers' roles, teaching contents, teaching methods and interactive ways, and developing three-dimensional teaching resources suitable for students' active learning can arouse students' learning enthusiasm, improve learning effects and enhance their professional ability and quality.

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