Design and Implementation of Productive Training System Based On B/S Architecture

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Abstract. In order to improve the teaching efficiency of productive training courses for higher vocational students, this article discusses the design and implementation of the productive training system for higher vocational students based on B/S architecture. Including the overall system architecture, front-end，back-end and database design. Discuss how to apply front-end development technologies, such as technologies of HTML, CSS, JAVASCRIPT, AJAX, XML, PHP and MySQL database, to carry out efficient and productive practical training, thereby improving teaching efficiency and effectiveness, so that students can comprehensively apply what they have learned in the previous two years. Learn knowledge and skills, complete a comprehensive project, and lay the foundation for subsequent corporate internships.

Keywords: front-end development; Php; MySQL; productive training

1 Introduction

The educational system is three years for higher vocational students, including a total of six semesters. In the fifth semester, productive training is generally arranged for about 10 weeks. After the training, students need to enter the enterprise internship, complete the company's internship task, and complete the graduation design task until graduation. Therefore, productive training is a transitional stage that students leave the campus and enter the society into a corporate internship. From the perspective of learning tasks, students need to comprehensively use the knowledge and skills learned in the previous two years to complete a comprehensive project, to enter the business internship for students in the next step, complete the real time corporate projects, and play a role in starting up. Therefore, productive training is a very important course that helps students enter the internship stage more smoothly [1].

In order to enable students to learn better and improve teaching efficiency, this study takes the "dynamic website development" in the development of professional training courses in mobile application development major as an example to explore the design of productive training system. The design principle is to facilitate the use

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of teachers and students. The interface operation is simple and can be used for multiple classes. Users are divided into three roles of administrators, teachers and students. Administrators can manage users and other related information, including teacher management, class management, student management, semester management, etc. Teachers can log in, register, and modify passwords. Class management include the following modules: new classes, delete classes, and import students. Training tasks management include query, adding, modified, deleted, and publish training project sub-tasks. Grade management include review the sub-tasks completed by students, querying and modifying their results. Curriculum information management include uploading and deleting curriculum materials; issuing announcements, etc. Students can log in and modify the system, inquire about the project tasks, the sub-task results uploaded, check the results, download the curriculum information, etc. [2] [3].

2 The Overall Architecture of the System

The overall architecture of the system adopts the B/S architecture, that is, the browser/server architecture [4][5]. Among them, users access the training system through the browser. The system provides users with an easy-to-use interaction interface. Users use Wi-Fi or 4G, 5G networks to communicate with the server through the HTTP protocol, and can easily log in, query, upload task results, download course information, etc. The server provides data download and data upload interface to the front end users to exchange data. The server can receive requests such as login, inquiry, etc. at the front end, and make corresponding processing. Administrators can also manage user information [6] [7]. The overall function architecture of the system is shown in Figure 1:

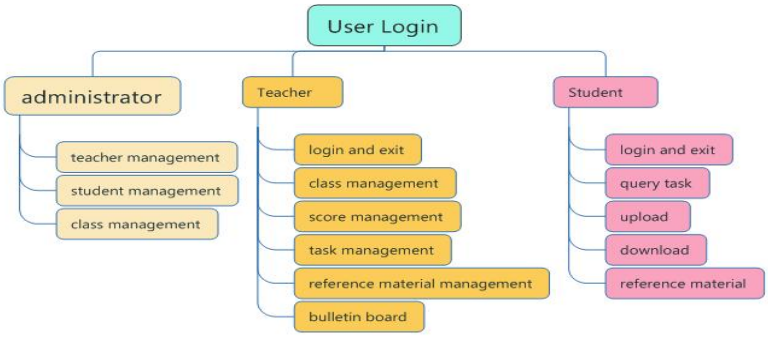

Fig. 1. System overall architecture

3 System Design and Implementation

3.1 Development Environment and Tools

This study uses the following development environment and tools: the operating system is Windows 7 and above version, the development tool is Visual Studio Code, the web server is Apache, and the database is MySQL. The front-end development uses HTML, CSS, JavaScript, JQuery technology and bootstrap framework, and the back-end uses PHP technology [8] [9].

3.2 Database Design

This system uses MySQL database for data storage, which includes multiple data tables, such as teacher table, student table, task table, class table, grade table, etc. Data tables are related to each other. Through database design, operations such as adding, deleting, modifying, and querying data are made more efficient.

3.3 Main Interface and Functions

The system interface includes user login interface, teacher management interface, student management interface, task management interface, grade management interface, announcement management interface, etc. Among them, teachers can create new classes, manage students, publish tasks, manage grades and materials, students can query tasks, upload task results and download materials. Administrators can manage system users and class information, etc[10]. The following is the detailed design of the main interfaces:

- User login interface: The user enters the user name and password, and the system determines which type of user is, an administrator, a teacher, or a student based on the user information, and enters the corresponding interface based on the user type.
- Administrator user interface: Administrators can manage related information, including teacher management, class management, student management, etc. Teacher management includes querying, adding, modifying and deleting teacher information; class management includes adding classes, querying classes, modifying classes and deleting classes; student management includes querying, adding, modifying and deleting student information.
- Teacher User Interface: Teachers can log in to the system, register and change passwords; class management, including creating new classes, deleting classes, and importing students; practical training task management, including querying, adding, modifying, deleting, and publishing practical training project subtasks; performance management, including review Subtasks completed by students, including querying and modifying grades; course material management, including uploading and deleting course materials; publishing announcements, etc. The teacher user interface is shown in Figure 2 below:

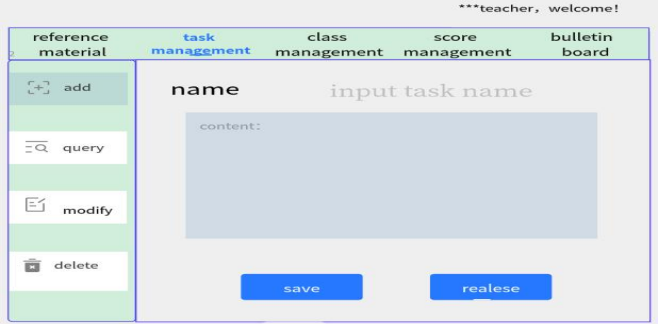

Fig. 2. Teacher user interface

• Student User Interface: Students can query tasks, view results, upload task results, and download learning materials. By dividing a large project into a dozen of small project tasks, and setting task goals for each task, giving the screenshot of running results of each task, and reference materials, students are guided to gradually complete the entire project. Students complete project tasks, submit core code and screenshots of project results.

4 Technical Difficulty and Core Algorithm

The main technical difficulty of the system is front-end and back-end data interaction and back-end data storage.

The front end sends login information (including user name and password) to the back end. After receiving the information, the back end parses the information and then accesses the database for verification. If the verification is successful, the corresponding user's classes, courses, grades and other related information are sent to the front end. After the front end receives the information sent by the back end, it analyzes the information and then displays the corresponding information according to different users, so different users can perform different operations. For example, teachers can evaluate students' grades and query results; administrators can manage user information, and students can query assignments and grades, etc.

4.1 Data from Frontend to the Backend

The frontend sends a request to the backend, taking user login as an example. The user enters the username represented by email and then enters the password. First, the above user login information needs to be obtained, which can be obtained through the $_POST variable, such as: $password = $_POST["password"];

Then query the backend database for verification through the mysqli_query function. If the verification is correct, the query result will be returned. The following is the core code:

$sql = "SELECT * FROM user WHERE email = '$email' AND password = '$password'"; $queryResult = mysqli_query($con,$sql);

The value of variable $sql refers to the query statement, and $queryResult stores the results queried through the mysqli_query function. the $con variable, which is the first variable in the mysqli_query function parameter, stores the mysqli object, which is used to execute database queries and manage connections. This variable obtains the value through the following statement. If the value is not empty, it indicates that the database connection is successful. Otherwise, database link failed.

```
$con = new mysqli($host, $dbusername, $dbpassword, $dbname);
```

4.2 Data Storage at Backend

The frontend sends registered or completed coursework information to the backend, which needs to receive, parse, verify and store to the database. Taking registration information as an example, the server-side program obtains the registration information entered by the user through the $_POST variable. First, it verifies that if the required data is not filled in. If there is, it sends a prompt message to the client; otherwise, it continues to verify whether the registration information meets the requirements, such as whether the user name consists of specific characters, whether the number of passwords meets the requirements, etc. if there is data that does not meet the verification requirements, a prompt message is sent to the client and the registration process is no longer continued. Otherwise, if all data verification is successful, the mysqli_query function is called , pass in the insert statement as a parameter, store the registration information in the database, and store the user name in the session to maintain the continuity of the user session. The core code is as follows:

```
$sql = "INSERT INTO `user ` (`user_id`, `user_name`, `password`, `mobile`)
VALUES ('$u_id', '$u_name', '$password', '$mobile',)";
$res = mysqli_query($con,$sql);$_SESSION["name"] = $u_name;
```

4.3 Backend Responds to Frontend

When students log in successfully and enter the homepage, they need to retrieve assignments, grades and other related information from the backend database and presented to the student homepage. When students click on a homework task, if they have completed it, they should be able to see their grades and homework feedback; if they have not completed it yet, they should be able to view the homework content and upload the homework result. Therefore, the backend needs to transfer all tasks to the frontend. The implementation process is as follows: First, according to the student account, use the mysqli_query function to pass the select statement as a parameter to find all the corresponding tasks and store them in the result set variable; then use the mysqli_fetch_assoc function to get each task information row by row from the result set variable and display it on the front page. The core code is as follows:

```
$sql = " SELECT * FROM task WHERE user_id = $u_id";
$result = mysqli_query($con, $sql); $row = mysqli_fetch_assoc($result));
```

5 Conclusions

This study mainly discusses how to use the B/S architecture to design and implement a productive training system for higher vocational students. The server side uses apache server and mysql database, and the client accesses it through a browser. The core technology of system implementation and application as well as data storage and interaction methods are discussed, and the core code is given. The system designs practical training tasks according to the students' productive training process, and gradually guides students to complete the practical training courses from shallow to deep, so that students can progress step by step. It has been initially used in the teaching process and has achieved good teaching results. It greatly improves the teaching efficiency of productive training courses, allowing students to learn productive training courses more efficiently. This system has a wide range of application value, and can provide a reference for the productive training of students in software-related majors in colleges and universities, and provide better foundation and learning support for higher vocational students entering the corporate internship stage. In subsequent research, the system can be improved in terms of user-friendliness, ease of use, and rich content. References.

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