Construction of Network Learning Platform of Construction Engineering Management Under PHP Development Environment

Rulun Peng(✉)

Chongqing College of Architecture and Technology, Chongqing, China
1033686992@qq.com

Abstract. Based on the PHP language development environment and Moodle system as the basic framework, a feasible secondary development design form is selected to complete the construction of the network learning platform of construction engineering management. In the form of Web application program under the B/S platform, the online teaching of construction engineering management courses is realized. Furthermore, it is combined with classroom teaching to form a mixed teaching mode with offline classroom teaching as the main part and online teaching as the auxiliary part, which can effectively solve many shortcomings existing in the course education and teaching of architectural engineering management major in colleges and universities, effectively improve the teaching effect and further improve the construction of professional teaching system. Taking the construction of "new engineering" as the background and based on teaching practice, it has made a new attempt to realize the infiltration and transformation of information and intelligence in higher education and teaching.

Keywords: PHP · Moodle · Construction management · Mixed teaching mode · Network learning platform

1 Introduction

With China's firm adherence to the road of reform and opening up, social and economic development has achieved unprecedented results, and all industries and fields have shown strong impetus. Among them, the construction industry, as an important pillar industry of the national economy, has also experienced a rapid development process. This process is reflected in the continuous improvement of industrial scale, enterprise benefits, technical equipment and construction capacity, all of which are of great significance to China's economic development [5]. Nowadays, China's economic development has changed from the past high-speed growth stage to the high-quality development stage, and the construction industry bears the brunt in the wave of industrial optimization and upgrading and industrialization reform. Faced with such an urgent period of accelerated development, the dilemma of shortage of talents is faced by the construction industry. All aspects of design, production, construction and management have put forward new

requirements for contemporary college students, and more and more professional comprehensive application talents have become the key to break through the bottleneck of development in the construction industry.

Faced with the dilemma of the shortage of professionals in the construction industry, higher education institutions should actively respond to the call of the state, focus on the needs of major national projects and local economic and social development, integrate the construction concept of professional disciplines under the background of "new engineering", and strive to complete the construction of the teaching system of construction engineering management specialty with the goal of enhancing the core competitiveness of talents. The talent training program for construction management majors aims at cultivating development-oriented, compound-oriented, and innovative technical and technical talents who master the professional knowledge of construction technology, have strong operational skills, fully adapt to the technical or management work of construction engineering design, construction, management, investment, development and other departments, and meet the needs of industrial transformation and upgrading in the construction industry and technological innovation of enterprises [8]. The major course of construction project management covers a wide range, and it is a comprehensive subject that crosses the knowledge of economy, management, architecture and law and takes into account the actual operation of the project. At the same time, the content of this course occupies an important position in the follow-up career planning of college students, and the post is highly targeted. However, in the actual teaching process, the teaching mode of engineering project management in most colleges and universities is still a static teaching mode based on lectures, and the course content and teaching means are obvious shortcomings, which can't adapt to the course attributes of engineering project management. Therefore, universities and teachers need to constantly introduce new teaching methods and new teaching ideas to realize the reform of the teaching mode of the course of construction project management, and effectively solve the current difficulties. In view of this, this paper thinks that based on the characteristics and advantages of current online education, Moodle course management system, its own basic structure and feasible secondary development design form, combined with PHP technology, can complete the construction of construction engineering management network learning platform. The online learning platform will be combined with offline classroom teaching methods, taking into account the theoretical knowledge learning and practical skills operation of construction engineering management courses, forming a mixed teaching mode with classroom teaching as the main part and online learning as the supplement, which can not only combine the rich resources of the network with learning tools and effective control of the classroom, but also strengthen the communication and interaction between students and teachers and students. It can not only give full play to the leading role of teachers in guiding, inspiring, supervising and controlling the whole process of education and teaching, but also fully reflect students' autonomy, enthusiasm and creativity as subjects in the course learning process. It not only improves the teaching effect, but also promotes the further improvement of the teaching system of architectural engineering management in colleges and universities.

2   Key Technology Introduction

2.1   PHP

PHP is a general server-side scripting language, which is mainly used for Web development to realize dynamic Web pages. As a CGI, PHP can support databases efficiently and concisely, and it is also one of the earliest server-side scripting languages to embed scripts in HTML source documents [3]. It belongs to the server-side scripting language. Compared with other languages, the biggest difference of PHP is the embedded scripting language, which can be directly stored in the same folder as HTML code. When executing the output, the server interprets the PHP code, embeds the result in the position of the script statement, and sends it to the client together with the HTML code to complete the response of the request.

The design concept of PHP is multi-process model and weakened type language. Multi-thread model aims to separate different user requests and not interfere with each other. However, with the increase of traffic, multi-process model can't cope with the concurrency of massive requests, so now PHP basically runs under the management of PHP-FPM, and deals with high-traffic access requests by enabling standby processes and recycling processes. Weakened type refers to the unclear type of variables when they are declared, so as to improve the convenience and efficiency of PHP application development.

PHP has become an excellent solution for the development of Web applications because of its cross-platform, high compatibility, open source and easy-to-learn habits. In the actual development process, LAMP or LNMP mode is mostly adopted, namely Linux, Apache, Mysql and PHP or Linux, Nginx, Mysql and PHP. There is little difference between them, both belong to synchronous development mode, and the requirements for hardware configuration are basically the same. As shown in Fig. 2, the basic process of handling user requests for PHPWeb applications in two modes, in which when a request comes in, the Web server forwards the request to PHP-FPM, which is a FastCGI service with a process pool architecture and a built-in PHP interpreter. The FPM is responsible for interpreting and executing the PHP file generation response, and finally returns it to the Web server and presents it to the front end. Many business logics are implemented in PHP files, including accessing Mysql and Nosql, calling third-party applications and so on [4] (Fig. 1).

2.2   Moodle Platform

Moodle is the abbreviation of Modular Object-Oriented Dynamic Learning Environment, which is a course management system emerging with the development of online education. Since its birth in 2002, it has quickly won wide attention for its open source, convenient operation, modular structure design and rich functions. Moodle platform is a learning management system or virtual learning environment that conforms to constructivist teaching ideas. For students, the platform covers all the functions of e-Learning system, and effectively changes the way students receive knowledge education in the network environment. For teachers, the platform can effectively improve the construction quality of online courses and support diversified teaching methods to improve the teaching quality of courses [9].
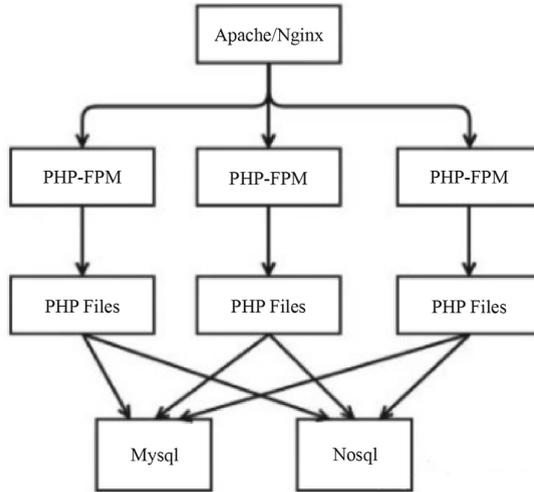
Fig. 1. The PHP application processing request process

Moodle platform is developed based on PHP language environment, and its core lies in its highly modular structure design. Common technical standards, such as shared library, data abstraction layer and cascading style sheets, are widely used in the platform to define interfaces, so as to increase the overall flexibility and scalability of the platform. It is convenient for teachers and users to choose to add or delete a certain functional module according to the characteristics of the course and the actual teaching needs, which effectively reduces the difficulty of using the platform and improves the efficiency of teachers' use of the platform. The overall architecture of Moodle platform is based on the B/S three-tier structure, as shown in Fig. 2, which can effectively separate the user interface, business logic control and data access, make it easy to apply and understand the platform, and greatly reduce the difficulty of subsequent upgrade and maintenance.

In the practical application process, Moodle platform provides convenience for teachers and students to carry out online teaching of professional courses with preset functional modules, and teachers can independently create an interactive online teaching environment that conforms to the current course attributes and meets the teaching needs. Among them, the preset function module is also called the standard curriculum activity module, which mainly includes resources, homework, testing, investigation, communication, forum, evaluation and so on. The establishment of each functional module meets the basic requirements of three dimensions in the virtual learning environment, namely, technical management dimension, learning task dimension and social communication dimension [2]. The technical dimension reflects the tool attributes of Moodle platform; Learning tasks reflect the main functional attributes of Moodle platform; Social communication points out that users with different roles need to express the emotional connection between individuals through regular or necessary communication and interaction, which reflects the social attributes and enhances the sense of belonging of the group. It is more helpful to improve users' sense of learning and satisfaction, and has a positive role in promoting the teaching effect of the course.
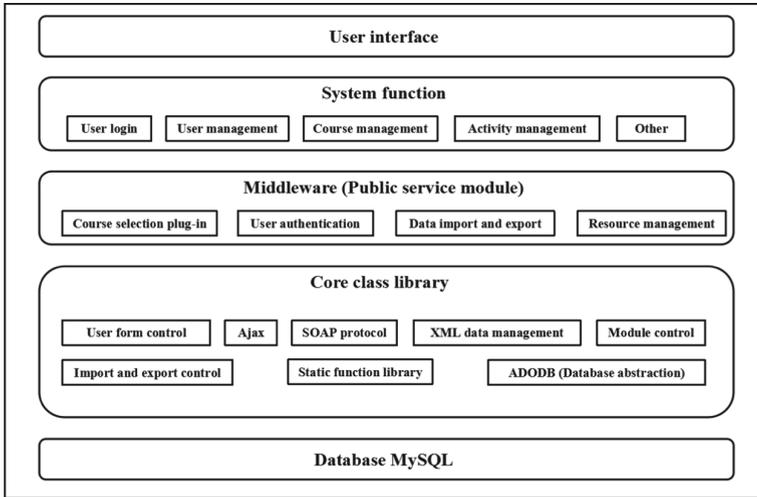
Fig. 2. Moodle platform architecture diagram

2.3 Secondary Development of Moodle Platform

The strong application performance of Moodle platform not only reflects its preset functional modules, convenient and efficient operation, but also reflects the secondary development characteristics of Moodle platform. The secondary development of Moodle platform focuses not on the modification and adjustment of the core code and preset function modules of Moodle platform, but on the design and development of external function modules or function modules with new function requirements, that is, around the structural framework of main directories and files under Moodle platform, the development of function modules is completed with the help of third-party development tools.

The secondary development method of functional modules under Moodle platform includes several steps: selecting development template, creating module language pack files, detailed design and development, module import, deployment and adjustment, etc. [6]. The development template will contain all directory structures of Moodle platform functional modules, as shown in Table 1. The development template with complete directory structure is not only the standard for the secondary development of functional modules, but also provides necessary guarantee for the compatibility and running stability of subsequent functional modules. For example, after completing the front-end page input function design, the user should continue to handle the back-end server-side logic control, mainly including key steps such as input content, page content update, input content deletion, form content display, etc. The key codes are shown in Fig. 3.

After detailed design and development, copy the folder of the new functional module to the overall directory structure of Moodle platform, and its key path is Moodle/mod. After the Moodle platform is restarted, it will enter the maintenance mode, and the system will automatically detect all modules or plug-ins, and automatically prompt to discover newly registered functional modules. For the new function module, Moodle

Table 1. Directory structure of Moodle platform module

Files/folders	Function
mod.html	The form interface to use when you create or edit a module
version.php	Version control, higher than the version number to complete the upgrade operation
icon.gif	Display chart of the module
db/	Database folder
db/mysql	Control imported into the system database, resume module database and sql script that inserts initialization data into the system database
index.php interface	Content display of newly created module
view.php	View the content interface for the individual module details
lib.php	The Method (function) library in the module
config.html	Set up the page for the new module

platform will default its folder name to the function module name, read the sql file in db folder, and complete the data initialization operation after executing the script program, which will officially mark that the new function module can be used normally.

2.4 Development Environment

According to the system development requirements and the use requirements of the above key technologies, complete the configuration and deployment of the development environment. The overall design and development environment of the construction management network learning platform will take into account the requirements of Moodle platform construction and secondary development. The overall development of the system is based on Linux operating system, with CentOS as the version, PHP as the basic development environment, 5.5 and above as the language version, Apache 2.4 as the Web server and MySQL 8.0 as the database. As for the secondary development of Moodle platform, we also need to rely on the IDE—PHPStorm, an integrated development tool of PHP, to realize the detailed code realization of functional modules.

There are two different ways to install and deploy each part of the software. One is to install individual software one by one, and the other is to choose the integrated development and installation package. For this platform, LAMP is selected as the development mode, and EasyPHP or XAMPP can be selected as the integrated installation package, which includes Apache server, MySQL database and PHP [7]. After the basic environment is installed, copy the installation files of Moodle platform to the root directory of Apache server. This system adopts Moodle 3.1.1. During the installation of Moodle platform, it is necessary to check the database, server and other items, and ensure the installation order of each software first. After all the functional modules are installed, basic operations such as configuration of main account, basic platform settings, language support, user management, etc. will be entered [1]. For PHPStorm, version 2018 can be used normally after the configuration of environment variables, server and database

```php
requrie_once('config.php file path');
require_once('lib.php file path');
require_once('edit_form.php');
require_login();
if($USER->username=='guest')
{
require_logout();
echo "<META HTTP-EQUIV=\"Refresh\" CONTENT=\"0; URL=Path to the login page\" >";
die();
}
$context = context_system::instance();
$page -> set_context($context);
require_capability('user:edit',$context);
$url = new moodle_url('/user/edit.php');
$PAGE->set_url($url);
$PAGE->set_title(get_string('Modify user information','lang_user'));
$id = optional_param('id',0,PARAM_INT);
echo $OUTPUT->header();
$mform = new greet_edit_form('/user/edit.php?id='.$id);
if($mform->is_cancelled())
{
redirect($url,'Returns the user list',null,\core\output\notification::NOTIFY_INFO0);
}elseif($formdata = $mform->getdata())
{

unset($formdata->submitbutton);
if($id)
{
$formdata->id = $id;
$return id = $DB->update_record('user',$formdata);
}else
{
$return_id = $DB->insert_record('user',$formdata);
}
if($return id)redirect($url,'Returns the user list',null,\core\output\notification::NOTIFY_INFO0);
}else
{
if($id)
{
$info = $DB->get_record('user',['id'=>$id],'id,username');
$mform->set_data($info);
}
$mform->display();/
}
echo $OUTPUT->footer();
```

Fig. 3. "Input function" back-end logic implements key code
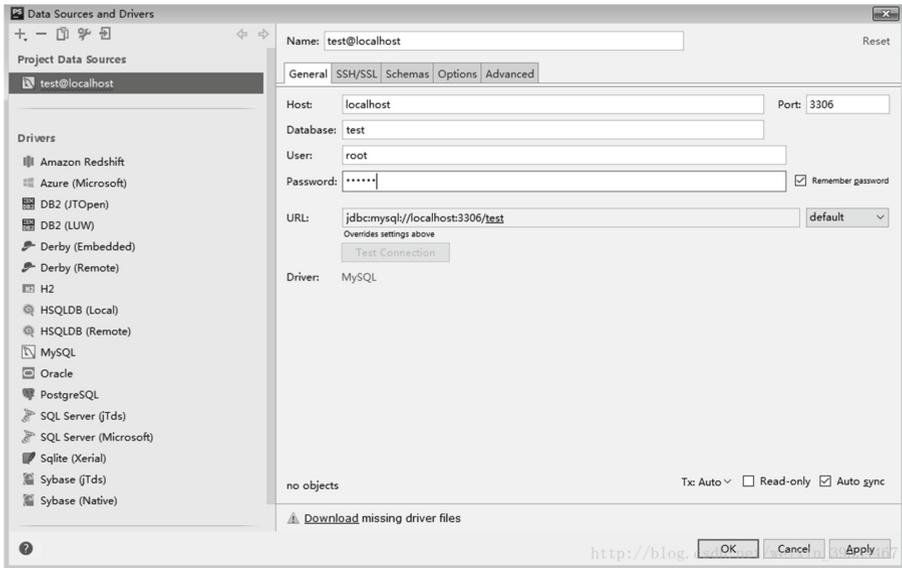
Fig. 4. The PHPStrom configuration of the Mysql database interface

settings are completed, as shown in Fig. 4. Through the introduction of the above key technical theories, the overall environment of the system development, the configuration of related software and tools are determined, and the technical feasibility of the overall project of the network learning platform of construction engineering management is also clarified.

3 Requirement Analysis

3.1 System Requirements Analysis

The network learning platform of construction management will be based on the basic technology and ideas of Web application development, aiming at various shortcomings existing in the current daily education and teaching of construction management in colleges and universities, combining with the current social needs and the concept of "new engineering" discipline construction, and innovatively using the mature Moodle course management system to build a network teaching platform that meets the practical application needs of teachers and students. It caters to the life and study habits of contemporary college students in the form of online education, and combines with offline classroom teaching to complement each other's advantages, thus promoting the reform process of blended teaching mode and further improving the education system in colleges and universities.

The platform will support users with different roles, teachers and students, to apply for account registration by submitting materials, log in and use the system with unique identification information, and complete the corresponding permission allocation and management according to the platform application requirements of different user roles.
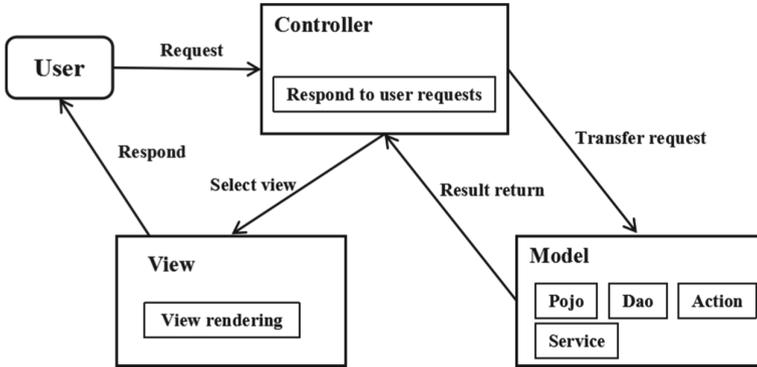
Fig. 5. Overall architecture diagram of the system

Among them, student users have the functional rights to choose courses, participate in teaching activities, obtain teaching resources, and exchange information. Teachers have all the management rights of the courses they teach, including creating courses, uploading and maintaining teaching resources, assigning and marking assignments, organizing tests, answering questions interactively, and managing students comprehensively.

3.2 Global Design

The network learning platform of construction management will be designed based on Moodle platform, adopting B/S architecture, and complete the overall design and development in MVC mode in PHP language environment. The overall framework structure is shown in Fig. 5. The platform will complete the virtualization construction of the course learning environment according to the actual application requirements of different user roles. The front-end mature client browser technology is adopted, and the business control relies on the basic modules, secondary development modules and various types of plug-ins published by Moodle platform, and the relational database is used in the data layer to complete the storage of system data. Under the "LAMP" development mode, the Linux operating system, Apache server, MySQL database and PHP language are combined to make full use of their advantages and build an open source, stable and cross-platform safe network teaching platform [10].

4 Detailed Function Implementation

4.1 Student Side

When users log in to the online learning platform for the first time, they need to complete the personal information filling and auditing according to the operation guide to complete the system registration. As the students are the main body in the learning process of the course of construction engineering management, the functional design of students will be divided into three parts: before class, during class and after class. In the pre-class part, the main function modules are two parts: viewing course information and selecting courses.

Before choosing a course, students can check all the basic information of the course, including the course arrangement, teacher information, course syllabus, teaching plan, etc., which makes it easier for students to choose courses more clearly and conveniently. After completing the course selection, the system will automatically add the student information into the course management to form a corresponding relationship.

In the learning part of the class, students can use any device terminal connected to the Internet to complete the course content learning at any time. The courses include video teaching courses based on massive open online course, such as "Construction Project Organization and Management" and "Construction Project Schedule Management". At the same time, the learning platform will also provide various forms of teaching resources such as text, pictures, PPT, etc. On the one hand, it is convenient for the centralized preservation of teaching materials in the classroom teaching process, on the other hand, it can also enable students to grasp the learning progress independently and consolidate their knowledge content conveniently. The homework and test functions are two assessment methods supported by the platform, namely, process assessment and summative assessment. It is convenient for students to judge their learning effect by this, so as to follow up the leak detection, fill in the gaps and improve the focus.

In the after-class part, students support personal center, forum area, chat room and other functional modules, all of which are realized based on the secondary development of Moodle platform. Among them, under the personal center, students can check the course learning progress, homework and test information, personal information, and share their own learning dynamics, supporting other students and teachers to check, pay attention, comment and praise, which increases the social attributes of the online learning platform and stimulates students' interest. The forum area can support different users to discuss and answer questions in the learning process, and the content is open to all users. The chat room is only for users in a single course or group, and the content is not public. The above two forms take into account the communication and exchange of users, which is convenient to build a good learning atmosphere, and can also complete students' comprehensive evaluation of courses and teachers.

4.2   Teacher Side

Compared with the functional design of student side, teacher side pays more attention to the guidance, supervision and control of network teaching activities of construction engineering management course. As the organizer of the course, teachers and users complete the overall design of online course teaching according to the teaching requirements of the course. Among them, it includes making syllabus, arranging teaching plan, designing and making teaching contents, and determining evaluation standards. After logging in to the online teaching platform, the teacher completes the improvement of the course information and the uploading of the course content and teaching resources in order to achieve the standard of course creation and complete the preparation before class. In the classroom stage, teachers are mainly responsible for the assignment and marking of homework, and the organization and implementation of tests. In the after-class stage, teachers will also be able to participate in forums and chat rooms to help students answer questions, and at the same time, they will be able to know the current situation of students' study in time. In the after-class stage, the teacher can develop the

```
$htmL .= '</table>' ;
$htmL .= "<br><br>";
mysqli_ close($Link_ id);
$PAGE->set_ context($context);
mysqli_select db($Link_ id, $CFG->dbname);
$htmL .="User management user data list<br>";
$htmL .= '<table border=1>';
)$htmL .= '<tr><td align=center>Serial number</td>
<td align=center>Account number </td>
<td align=center>Name</td>
<td align=center>Course ID</td>
<td align=center>Full name of course</td>
<td align=center>Creation time</td></tr>';
//$result=mysqli_ query($link_ id, "SELECT mdL_ user .username AS un，mdL_ user .firstname
AS Ufn，mdL_ course.id AS cid, mdL_ course
$sqL = 'seLect * from mdL _user';
$result = mysqLi query($Link_ id, $sqU);
mysqli_ data_ seek($result, offset: 0);
$i=0;
)while($record=mysqli _fetch. object($result))
$i++;
$htmL .= '<tr><td align=center>' .$i. '</td>
<td align=center>' . $record->id. '</td>
<td align=center>' . $record->auth. '</td>
<td align=center>' . $record->firstname. ' </td>
<td align=center>' . $record->lastname. '</td>
<td align=center>' .date( format: 'Y-m-d H:i:s', $record->timemodified). '</td></tr>';
$htmL .= '</table>' ;
$htmL .= "<br><br>";
mysqli_ close($Link_ id);
$PAGE->set_ context($context) ;
```

Fig. 6. The teacher side user management function module implements the key code

student management module for the second time according to the needs, that is, under PHPStorm, he can define the form fields of the module by himself, such as serial number, student account number, student name, course ID, etc., and can control the function value and running process of the module by himself. The key codes are shown in Fig. 6.

5 Conclusions

The network learning platform of construction management is a comprehensive solution to the problems existing in the current teaching activities in colleges and universities under the background of "new engineering" construction, combining with the current teaching needs and aiming at cultivating comprehensive professionals. With the help of the application advantages of platform information technology and Moodle course management system, the network teaching mode of construction engineering management specialty course is introduced, and it is further combined with classroom teaching to form a mixed teaching mode. It can not only combine the rich resources of the network with the effective control of learning tools and classrooms, but also strengthen the communication and interaction between students and teachers and students, effectively improve the teaching effect, further improve the construction of professional teaching system and promote the process of educational informatization reform.

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