Construction of Online Learning Platform for Computer Network Technology Course Based on B/S Architecture

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Abstract. With the development of science and technology, information communication has become the key link of transaction communication among countries all over the world, and computer network has become an important carrier in the information age. The social demand for computer network technology talents is increasing day by day. In order to meet the needs of the country and society, this paper combines Web technology with multimedia technology to build an online learning platform for computer network technology courses based on B/S architecture. The platform development takes Windows 10.0 as the operating system, B/S architecture as the development framework of the platform, and C# as the programming language. With the layered advantages of MVC, the system functions of the teaching platform are refined. The platform uses the qualitative and quantitative AHP to evaluate the teaching effectiveness, which provides a more perfect teaching guarantee for cultivating high-quality technical talents. The measured results of fuzzy comprehensive evaluation model show that the construction of online learning platform can effectively improve students' practical ability and professional level.

Keywords: computer network technology · online learning · blended learning mode · B/S architecture

1 Introduction

With the advent of the information age, computers account for an increasing proportion in people's lives and work, and computer-related technology industries also rise. In this regard, the Ministry of Education has launched the "new engineering" education development strategy to cope with the new round of scientific and technological revolution and industrial transformation and support China's service innovation-driven development [1]. As the basis of system development and operation, computer network technology should focus on cultivating students' practical ability and innovative spirit in the teaching process. However, the teaching content of Computer Network Technology is intertwined with other disciplines, and the knowledge system is complicated, which increases the teaching difficulty. At the same time, traditional classroom teaching often

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only pays attention to the teaching of book theoretical knowledge, ignoring the cultivation of practical ability. This form of teaching seriously affects the development of students' ability and cannot meet the needs of the present society. The teaching mode of computer network technology needs to be innovated urgently. In order to ensure the cultivation of high-quality technical talents, the author combines the current teaching practice, innovates the teaching mode of computer network technology, and adopts a diversified teaching mode with online teaching as the mainstay and offline teaching as the supplement [2]. Based on this teaching mode, this paper constructs an online learning platform for computer network technology courses based on B/S architecture. This platform not only innovates the teaching mode, but also provides students with opportunities for online training, so that students can consolidate their knowledge and increase their practical skills in operation.

2 Key Technology Introduction

2.1 B/S Architecture

B/S architecture, that is, the browser/server structure that emerged with the rise of Internet technology, is evolved from the C/S structure. Under this structure, browsers are generally used to build user interfaces. B/S structure combines a variety of Script languages and ActiveX technologies, thus forming a brand-new software system construction technology. The main features of B/S structure are strong distribution, convenient maintenance, simple development and strong sharing, and low total cost of ownership. In the B/S framework, users express their requirements at the client, and input the corresponding parameters, and then access the server through the network. First, the logic layer solves the user's requirements, then the data requirements are transmitted to the library, and the specific content is executed by the server. Finally, the business logic layer accepts such feedback information, thus generating a web page that meets the user's needs. The specific process of B/S operation is shown in Fig. 1.

2.2 Development Process

According to the introduction of the above related technical contents, the configuration and deployment of the development process of online learning platform for computer network technology courses based on B/S architecture are completed. In order to further improve the various functions of the platform, B/S architecture and other related technologies will be adopted during the construction. Visual Studio 2019 is selected as the bottom development tool, and Windows 10.0 is used as the platform-based operating

Fig. 1. B/S operation flow chart

system. IIS 10.0 version is selected as the web server, and SQL server 2019 is selected as the data storage tool to improve the overall operation ability of the platform [3]. During the overall development of the platform, the following steps will be followed: First, select the Visual Studio 2019 tool in the desktop, open it, and create the required project in the File section, and name it. Then, select ASP.NET Web in the application, and simply preset the configuration attributes and paths of the new project. Click Next, select MVC mode in the pop-up work window, and then carry out subsequent detailed operations. After naming, the online learning platform can be subsequently written. After the specific functional modules are configured, the system is tested, and it is packaged and put into IIS after it is correct [4]. Finally, create a new website project in IIS, select the physical path under advanced settings in the management page, and deploy it. After the basic settings are completed, an online learning platform for computer network technology courses based on B/S architecture can be built.

3 Functional Implementation

3.1 Student Side

In the learning module, student users need to carry out follow-up learning according to the learning tasks assigned by teachers. Considering the difficulty of learning computer network technology, the platform has made a detailed linear planning for the learning content of student users, and adopted a step-by-step teaching method to start teaching [5]. For example, after understanding the definition of computer network, students learn the OSI reference model and the composition of data communication system, and then learn the construction of computer network system after mastering certain basic theories. This simple learning method can better arouse students' interest in learning and consolidate their basic theoretical knowledge [6].

In the training module, the platform builds a real simulated training environment for student users. Students need to choose the forms and ways of participation before starting the training. After the selection, the platform will generate corresponding virtual scenes according to users' needs for use [7]. For example, the system adopts situational, case-based and planned training scenarios, combined with the construction of network platforms in various directions such as safety, commerce, teaching and history or the application of other technologies to enhance the training effect. Student users can fully understand their own strengths and weaknesses in the training process, so as to make targeted self-planning and lay the foundation for the long-term development [8].

3.2 Teacher Side

Compared with the function of student side, the teacher side pays more attention to the guidance, organization and management of educational activities. In this module, teachers and users need to upload the course resources in advance, and classify them according to the file format when uploading. The course resource upload code is shown in the following example:

Table 1. Student learning results assessment form

Comprehensive evaluation of students			
Measures layer	Weighted value	Item Score	Final score
Course completion	A1 = 0.171	84	14.364
Homework completion	A2 = 0.125	85	10.625
Training completion	A3 = 0.256	81	20.736
…	…	…	…

```
// Manual implementation process
private void upload(HttpServletRequest request) throws IOException,
 UnsupportedEncodingException {
/*
request.getParameter(""); // GET/POST
request.getQueryString(); // Obthe data submitted by get
request.getInputStream(); // Get the data submitted by post */
```

After uploading resources, teachers and users need to arrange learning tasks in advance to ensure the stable development of online learning. In the data center module, teachers and users can view students' study duration, training results and course completion, which can be used as the scoring basis for students' usual grades [9]. After the overall online learning, teachers and users need to adopt multiple evaluation methods to comprehensively evaluate the achievements of the learning subjects. Teachers and users can directly use the calculation formula of the platform to operate. The platform uses AHP algorithm model to calculate the comprehensive learning results of students, as shown in Table 1. The formula for calculating the weight value of the learning results is shown in Formula 1, where λmax represents the weight value, C represents the hierarchical level, and X ranks the weight vector [10].

$$\lambda_{\max} = \sum_{\mathrm{i}}^{\mathrm{n}-1} \frac{(CX)_{\mathrm{r}}}{\mathrm{n}X_{\mathrm{i}}} (i = 1) \tag{1}$$

4 Conclusion

With the development of Internet information technology, the society has stricter requirements for network technicians, and new standards have been put forward from professional skills to practical ability. As the guide of education, colleges and universities should formulate corresponding teaching measures according to the current social needs. Therefore, this paper combines Internet information technology with college teaching, and uses web technology to innovate the teaching mode of computer network technology in colleges and universities, enriching students' study life and expanding their knowledge reserves by using various functions of the platform. Online learning mode is closer to

the life and study habits in modern students, which improves the teaching effectiveness of computer network technology and further promotes the construction of high-quality education system.

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