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Design of a College Social Education System Based on Web Server

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Abstract: With the continuous development of information technology and the increasingly prominent importance of social education in colleges, establishing an efficient and convenient education management system has become an urgent need for college administration. However, traditional education management methods often suffer from problems such as untimely information transmission and low management efficiency, necessitating the use of modern network technology to optimize and improve education management. This study aims to construct a college social education system based on modern network technology, using the Apache Web application server as the foundation, to achieve information management, enhance the efficiency and quality of education management, and promote the in-depth development of social education in colleges. First, by researching the Apache Web application server, its application characteristics and functionalities are mastered. Second, combining with a MySQL small-scale database, the system's database structure is designed and built to ensure the efficiency and security of the system's data management and storage. Then, based on the actual needs of social education in colleges, the system's functional requirements are formulated, and detailed system design is conducted. Finally, using programming and network technologies, the functionalities of the system are implemented, and tests and verifications are conducted. Through the design and implementation of the system, this study has established a college social education system based on a Web server. This system not only provides convenient education management services, timely transmission and management of education information but also offers personalized learning resources and services for teachers and students, promoting the in-depth development of social education in colleges. Additionally, the establishment of this system also provides a useful reference for the construction of other college education management systems, possessing certain promotional and application value.

Keywords: College Social education System; Apache Web Application Server; MySQL Small-Scale Database; Education Management; Network Technology

1. Introduction

With the rapid development of informationization construction in Chinese higher education institutions, the traditional mode of social education has become difficult to meet the needs of education in the information age. The traditional classroom teaching mode has many shortcomings in information exchange and teaching efficiency, urgently requiring new teaching methods and management approaches to adapt to the needs of era development. Against this backdrop, informationized education modes such as remote, online, and real-time are rapidly emerging, becoming the inevitable trend for the future development of social education in universities. However, achieving the informationization construction of social education is not an easy task. Current problems include dispersed teaching resources, low management efficiency, and untimely information transmission, which not only affect the quality of teaching but also restrict the comprehensive development of social education in universities. Therefore, it is necessary to establish an efficient and convenient social education system in universities, further promoting the modernization of educational management processes and enhancing the quality and level of social education.

Kang (2023) addressed the issue of the lack of social education (IPE) case studies in current

curriculum teaching. This was achieved by optimizing deep reinforcement learning recommendation algorithms and developing a platform for managing IPE case resources. The optimized algorithm was then applied to this platform, enabling dynamic recommendation of IPE cases [1]. Ma designed a university social education evaluation system based on the Browser/Server architecture. This system comprehensively evaluates the social education of universities from the perspectives of student satisfaction, expert evaluation of teachers, and the foundational environment of social education in schools. Utilizing algorithms such as decision trees and association analysis, it analyzes the degree of emphasis placed by various schools on social education, visually reflecting the social education level and effectiveness of each university, highlighting differences in student satisfaction among different universities, and providing new ideas for the optimization of social education reform in schools [2]. Jiang proposed a construction plan for integrating social education into engineering courses based on the Outcomes-Based Education (OBE) concept, systematically tailored to the requirements and characteristics of professional courses. Using the Linux network operating system course as an example, the implementation approach of social education based on the OBE concept was elucidated. The process of excavating social elements was introduced, along with typical implementation cases illustrating methods and techniques for integrating social elements. Subsequently, through a curriculum social evaluation system emphasizing processes, practices, and capabilities, the effectiveness of curriculum social teaching was demonstrated [3]. Yu proposed a university social course online recommendation system based on JSP technology. By installing a JSP engine on the server, executing JSP code, and obtaining a fully scalable Web server, access speed to the database was enhanced. Initial data was collected from existing online education platforms, evaluation matrices and participation matrices were constructed, and data information was calculated using collaborative filtering learning methods. The recommendation system in the backend analyzed and processed data, recommending social courses with high predicted ratings to users [4]. Liu designed a multimedia-based social practice teaching evaluation system. Users could log in to the web application server via multimedia clients at the user level, select the multimedia social practice teaching courses they needed, and transfer user instructions to the intermediate application layer. At this layer, the web application server selected the corresponding teaching information from the multimedia social practice teaching information repository based on user needs and feedbacked it to the multimedia client at the user level. Finally, the multimedia client used a fuzzy comprehensive evaluation model based on multimedia social practice teaching to complete the teaching effect evaluation [5]. Wang developed an social teaching system based on the WeChat platform. It was written in Java and the system framework was built using technologies such as Servlet, Hibernate, and Web Service, achieving the informatization of social teaching [6].

The above studies demonstrate the diversified progress of information construction in the field of social education in universities in recent years. Although each study has made meaningful explorations and contributions in its specific field, there are also some common or specific shortcomings. Firstly, there is a single application of technology and algorithm optimization. For example, although Kang Shouchong improved the accuracy of case recommendations by optimizing deep reinforcement learning recommendation algorithms, the enhancement of system scalability and user interaction experience may be limited. Secondly, there are limitations in functional design and application scenarios. For instance, Ma Sizhen's evaluation system mainly focuses on evaluation and analysis, lacking support for actual teaching interaction and resource sharing. Thirdly, there are restrictions on application in specific fields. Although Jiang Huijuan's research combines the OBE concept with curriculum social construction, providing a systematic construction plan, it mainly focuses on engineering courses and may not be directly applicable to other disciplinary fields. Fourthly, the iteration of technological frameworks is relatively slow. Yu Zijia's research is based on JSP technology, which

was effective at the time. However, with the continuous emergence of new technologies, consideration may be needed for a more modern technology stack to improve system performance and user experience.

This study not only optimizes recommendation algorithms but also combines the latest web technologies and user interface design concepts to enhance the overall performance, security, and user experience of the system. The designed system not only covers evaluation and analysis but also supports multiple functions such as teaching resource sharing, online interaction, and personalized learning, suitable for various teaching and learning scenarios. The system framework and implementation plan designed in this study have high generality and can be flexibly configured and customized according to the characteristics and requirements of different disciplines. By adopting modern web technologies (such as React or Vue.js) and server-side technologies (such as Node.js), the system ensures cutting-edge and efficient performance while being easy to maintain and upgrade. This study has important theoretical significance and practical value for promoting the informatization construction of social education in universities, driving innovation in education and teaching modes, and improving education quality. Moreover, the research results can also provide reference and reference for the informatization construction of education in other universities and related fields, with certain promotion and application value.

2. Technical Foundation

Web server technology is an important information technology that encapsulates data processing programs within a central server and processes data in a centralized manner. In modern network architectures, web servers play a crucial role in carrying and processing user requests, providing web pages and applications, and other services. Its advantages are mainly reflected in the following aspects [7].

2.1 Cost-Effectiveness

Web server technology is characterized by its low cost. Compared to traditional client-server models, web servers reduce software and hardware construction costs through centralized management of data processing programs and resources [8]. A powerful server can serve multiple clients at the same time, significantly saving resources and maintenance costs.

2.2 Decentralization

Web server technology achieves decentralized information processing. Traditional client-server models often risk single points of failure, while web servers centralize data processing programs and resource management in the central server, making data processing and resource management more centralized and controllable, reducing the risk of system failures, and enhancing system stability and reliability [9].

2.3 Data Interaction

Users interact with web servers through client tools such as browsers. Web servers receive user requests and provide corresponding web pages, applications, or other data resources accordingly. Users can communicate with servers through simple HTTP requests, achieving data transmission and exchange [10].

2.4 Unified Management

Web server technology enables unified management of data resources. By storing data in databases and processing and managing it on the server side, effective maintenance and management of data resources can be achieved. Administrators can manage and monitor data through the server's management interface, ensuring data security and integrity.

2.5 Data Security

Web servers provide foundational data support for web applications through databases and ensure data security through various security mechanisms (such as access control and encrypted transmission). Server-side can implement user identity verification, access control, and other security policies, effectively preventing unauthorized access and data leakage risks.

In summary, as one of the core technologies of modern information construction, web server technology plays an important role in various network application scenarios. It not only reduces costs and improves efficiency but also achieves centralized management and security

of data resources, driving the progress of information construction and promoting the development of a digital society.

3. Research Methods

This study aims to build an social education system in colleges and universities to enhance the educational effect through information technology. A design method based on a three-layer architecture was chosen, including the data access layer, business logic layer and presentation layer, aiming to create a system that is both flexible and efficient to meet the current needs of social education in colleges and universities. These three parts cooperate with each other to form the complete functions and processes of the system (Figure 1).

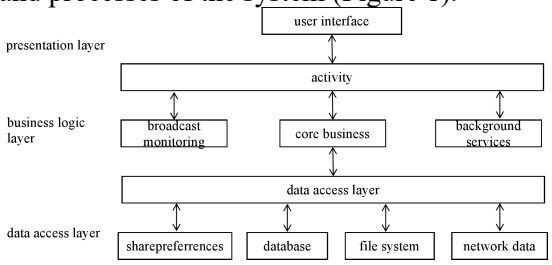

Figure 1. Overall Structure of the System

The social education system for colleges established in this research possesses a clear overall structure, comprised of three key components: the data access layer, the business logic layer, and the presentation layer. These components collaborate with each other to form the system's complete functionalities and processes (Figure 1).

Within the system structure, the data access layer plays the role of carrying and managing the system's underlying data. The core device is the Web database, which stores various data necessary for the system's operation, including user information, teaching resources, and course information. These data are connected to the business logic layer through the Internet, providing vital support for the system's normal operation. Simultaneously, users can also perform operations such as adding, modifying, and deleting data in the database through calls from the presentation layer and business logic layer, thus achieving flexible management and application of system data.

The business logic layer is the core of the entire system, with the Web server as its core device. Various data processing programs are installed in the business logic layer, implementing the core business functions required by users. Through the Web server, users can easily call various educational services and resources provided by the system, facilitating the transmission and exchange of teaching information. The flexibility and efficiency of the Web server enable the system to quickly respond to user requests and provide stable and reliable services.

The presentation layer serves as the interface for user interaction with the system, with the user's PC being the core device. Users can easily access applications on the Web server through a browser installed on their PC, enjoying various educational services provided by the system. The design of the presentation layer directly affects the user experience and the system's usability, necessitating careful consideration of the user interface's friendliness and the convenience of operation.

These three layers are interconnected and interact with each other, together forming the complete architecture of the college social education system. The data access layer provides data support, the business logic layer implements core functionalities, and the presentation layer offers an interactive interface for users. Working in coordination, they provide strong support and assurance for the informational construction of college social education.

4. System Design and Application

4.1 Database E-R Diagram Design

The E-R diagram of the database conceptual design scheme established for the social education system of colleges and universities in this study is shown in Figure 2. The system consists of entities such as users, user permissions, courses, test papers, and comments. Taking user as an example, this project consists of five elements such as ID and user name. The specific structure is shown in Figure 2.

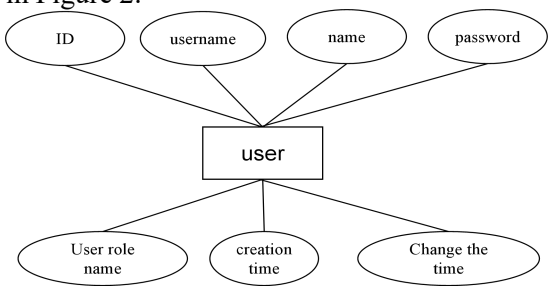

Figure 2. Database E-R design

4.2 Database Table Design

The social education system of colleges and universities uses MySQL small database to store system data, and improves the data through rational database table design to streamline the data structure and improve the efficiency of database use. This study established a user table (user), user permission table (user_right), test paper table (test_paper), test paper details table (test_paper_details), test paper score table (test_paper_score), suggestion table (suggestion), and course schedule (course) for the database.), comment table (comment) and other 8 database tables. Next, the user table is used as an example to show the design plan of the database table (Table 1).

Table 1. User Table

Field name	Null	Data type	Description
Id	YES	timestamp	ID
gmt_update	NO	timestamp	change the time
gmt_create	NO	Int(255)	creation time
userrole	NO	Varchar(255)	user role name
name	NO	Varchar(255)	name
password	NO	Varchar(255)	password
username	NO	Int(11)	user name

4.3 System Functional Design

4.3.1 Mooc Data Module

This module primarily provides users with two main services: material management and course learning. Users can download learning materials from the database through the material management feature and access expert lectures online through the course learning feature. Students can choose learning materials based on their individual needs.

4.3.2 Ideological Perception Module

This module mainly offers users two primary services: questionnaire surveys and suggestion submission. Questionnaire surveys are a common method for understanding the social status of college students. After students submit their responses, the Web server in the social education management system will tally the survey results using pre-installed programs, aiding social education staff in formulating teaching guidelines. Ordinary users can also share insights from their study of social subjects and offer various teaching suggestions through the suggestion submission feature.

4.3.3 Teaching Management Module

This module mainly provides users with two main services: teaching material management and activity recording. Social education staff can manage various teaching materials, such as lecture slides and teaching plans, through the teaching material management feature. The system's backend Web database can also store large volumes of teaching materials, such as videos, music, and lecture slides, and automatically record the number of clicks and playback duration of multimedia. The activity recording is responsible for storing information about large outdoor activities, including news, videos, and photos, with administrators possessing the appropriate permissions managing the relevant data.

4.3.4 Inspection and Assessment Module

This module primarily offers users services such as online class inspections, theoretical tests, and usage logs, which respectively facilitate online remote teaching, online exams, and course records.

4.4 System Functionality Implementation

4.4.1 System Deployment

The development platform used by the college social education system is specified as follows: (1) FileZilla Server FTP server; (2) MySQL small database; (3) Apache Web application server; (4) PHP programming language; (5) Microsoft Server 2019 operating system.

A Microsoft Server 2008 main server is set up in the computer lab of higher education institutions, with XAMPP integrated software installed. This software package includes the FTP server FileZilla Server, MySQL database, and Apache Web application server. FileZilla Server, MySQL, and Apache configuration files are set up individually, foundational data is imported into the database, and finally, access permissions are configured in FileZilla Server.

4.4.2 Functionality Module Implementation

Taking the inspection and assessment module as an example, its primary function is theoretical testing, an important means of understanding learning outcomes. The front-end online test main page is shown in Figure 3.

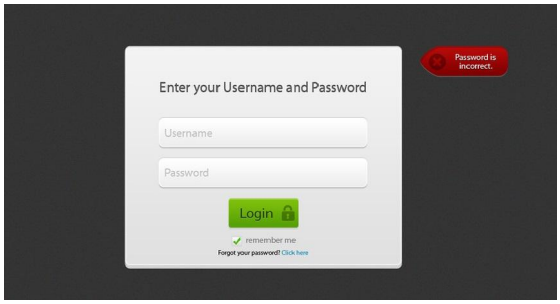

Figure 3. Online Test System Page

5. Conclusion

This paper has detailed the design philosophy of a college social education system based on Web servers, elucidating the overall functional structure of the system and the relationships between Web servers, PC clients, and MySQL databases. Through this research, a college social education system that integrates modern network technology and educational management concepts has been successfully established, providing new ideas and methods for the informatization construction of college education management. However, this study also has certain limitations. Firstly, in terms of system functionality design, although efforts have been made to ensure the system's completeness and practicality, some functions still need further improvement and optimization. For example, the application of the system on mobile device platforms is relatively weak and requires further enhancement in development work on mobile devices such as Android and iOS to meet the needs of different user groups. Additionally, the system's user interface design and interaction experience need to be improved, necessitating further optimization of the user operation process to enhance system usability and user satisfaction.

Future research should continue to focus on refining and optimizing the system, especially in expanding applications on mobile device platforms. Moreover, exploring the application of cutting-edge technologies like artificial intelligence and big data analysis could provide more intelligent and personalized services for the college social education system. It is also essential to strengthen cooperation with college education management departments and educational research institutions to jointly promote the informatization construction of college social education, provide more convenient conditions for college students' social courses, and promote innovation and improvement in educational and teaching models.

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