

# Design and Implementation of Comprehensive Training Management System for Vocational Colleges

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## ABSTRACT

This article elucidates the necessity and effectiveness of developing a comprehensive training management system for vocational colleges by investigating the current status of comprehensive training management in vocational colleges and analyzing the problems existing in the old management system of Lishui Vocational and Technical College. Developing a comprehensive training management system based on ASP can promote centralized management, decentralized operation, and resource sharing of comprehensive training teaching, leading traditional training management towards digitization, paperless operation, intelligence, comprehensiveness, and modernization. This system to some extent achieves goals such as information disclosure, transparent procedures, clear responsibilities, and standardized management in the process of comprehensive training management, effectively avoiding errors caused by human factors. Particularly, its convenient data statistical method provides a scientific basis for teaching management analysis and decision-making. The concise, generous, and user-friendly system interface ensures that a large amount of information is conveyed clearly, accurately, and effectively. Moreover, the system adds data validation functions at various data entry interfaces, greatly enhancing the correctness of data aggregation.

## KEYWORDS

Comprehensive training, ASP, B/S, SQL Server

## 1. INTRODUCTION

China's higher vocational education bears the mission of cultivating high-quality technical and skilled talents for frontline production, construction, service, and management. It adheres to the principles of serving and guiding employment, emphasizing both vocational ethics education and vocational skills training. It vigorously promotes the integration of industry and education, school-enterprise cooperation, and on-the-job internships as distinctive features of education. Comprehensive training is an essential part of vocational education. It not only assesses students' practical skills in applying their professional knowledge but also serves as a platform for developing students' comprehensive qualities and problem-solving abilities. Strengthening the management of students' comprehensive training processes is crucial for ensuring the quality of comprehensive training, stimulating students' enthusiasm for learning and practice, encouraging their individual development, and improving the quality of talent cultivation. This is a problem worthy of in-depth research.

## **2. PROBLEMS EXISTING IN COMPREHENSIVE TRAINING MANAGEMENT IN HIGHER VOCATIONAL COLLEGES:**

### **2.1. Insufficient Understanding of the Importance of Comprehensive Training among Students, Lack of Clear Positioning:**

Due to the expansion of enrollment in universities and the pressure of employment, the time for graduation comprehensive training coincides with the period when students are busy seeking employment. Students have insufficient understanding of the importance of graduation comprehensive training and have unclear positioning. They tend to treat internship arrangements by the school perfunctorily, only focusing on solving the employment problem quickly. In the actual training process, most of the internships arranged by students themselves are either irrelevant to their majors or have little connection with them. The unfamiliar work environment and repetitive assembly-line operations make students skeptical about the applicability of their professional knowledge during internships, leading to a loss of motivation. This results in wasted time and the inability to develop skills. Consequently, normal internship plans cannot be effectively implemented, the objectives of internships are difficult to achieve, and graduation comprehensive training becomes merely a formality.

### **2.2. Inadequate Decentralized Comprehensive Training Management Mechanism:**

Currently, higher vocational colleges generally adopt a decentralized mode of graduation comprehensive training. While this approach allows students to freely choose internship units and methods based on their characteristics and actual situations, it lacks effective supervision by schools and teachers during internships, and students face difficulties in communicating with teachers when encountering problems during internships. Long-term, multi-location off-campus internships for college students, while enhancing their practical skills and job adaptability, also pose challenges in educational management, particularly in safety education and management during off-campus internships. For example, accidents may occur during internships, or students may become demotivated or develop negative habits due to adverse influences. Since there is no effective management method in place, schools adopt a lenient and laissez-faire attitude towards managing students' off-campus internships. Therefore, the lack of a sound management mechanism makes it difficult to achieve satisfactory results in decentralized graduation comprehensive training.

### **2.3. Unclear Responsibilities in Student Management between Internship Units and Schools, and Ineffective Communication Among the Three Parties:**

Comprehensive training is a stage-based internship, and companies often view student internships as burdens due to market competition and commercial confidentiality issues, resulting in low willingness to accept interns. Even if they accept student interns, they often provide positions with low technical content and repetitive assembly-line production tasks. Limited internship content and opportunities make it difficult for students to learn analytical and problem-solving methods. The inability to fully motivate students during internships and to develop their problem-solving abilities makes theoretical learning ineffective. Moreover, the talent cultivation plans of schools are not effectively integrated with the needs of the job market, leading to a gap between students' skills and market demands. Students' practical skills often fail to meet the actual requirements of the job positions. Internship units are also unwilling to invest time and effort in training short-term interns. Therefore, establishing a platform for communication and exchange between internship units, schools, and students is necessary.

## **2.4. Outdated Management Methods and Limited Application of Modern Technology and Tools:**

With the promotion of "Internet + Education," domestic universities have also built their own campus networks of a certain scale. Many universities have adopted models of resource sharing through campus networks or using management software for teaching management based on this foundation. Although traditional comprehensive training management involves computer participation and management, most systems operate in a standalone environment and suffer from disadvantages such as simple functionality, high data redundancy, difficulty in system updates, and high maintenance costs.

## **3. RESEARCH OBJECTIVES**

The objective of this study is to develop a web-based comprehensive training management system for higher vocational colleges, which can facilitate centralized management, decentralized operations, and resource sharing in comprehensive training education. This system aims to digitize, paperless, intelligitize, integrate, and modernize traditional training management. Instead of redundant data backups, system data will be stored uniformly, reducing data redundancy and ensuring data consistency. We can upgrade the existing comprehensive training management system from a standalone or local area network structure to an Internet-based structure on the basis of the campus network. With the application of this software, academic administrators, teachers, and students can all log in to the system through the network platform with authorized identities to conduct relevant information inquiries and modifications. Real-time information exchange among them also becomes possible, making the communication platform smoother. This greatly improves the effectiveness of information, saves a lot of manpower, material resources, and financial resources, and facilitates quick access to relevant information and extraction of historical data. To a certain extent, it achieves information transparency, procedural transparency, and further standardization of management, effectively avoiding errors caused by human factors. Especially, its convenient data statistics method provides a scientific basis for accurate analysis and decision-making in teaching management, enabling schools to comprehensively manage comprehensive training. Additionally, the concise, generous, and user-friendly system interface ensures clear, accurate, and powerful communication of large amounts of information. Moreover, the system adds data validation functions at various data entry interfaces, greatly enhancing the correctness of management data aggregation, thus achieving the desired effects in comprehensive training work.

## **4. ANALYSIS AND SELECTION OF SYSTEM IMPLEMENTATION TECHNOLOGIES**

The comprehensive training management system adopts a modular design approach and selects ASP web technology and UltraEdit software as the application development tools in the B/S architecture. The database used is SQL Server 2014. For database connectivity, JDBC technology is employed to extend the functionality of the Web server-side. The user interface on the front-end is designed using Dreamweaver software. The friendly and convenient user interface allows users to easily input, browse, query, modify, and analyze data using the simplest input devices such as mouse and keyboard, thereby improving work efficiency.

## **5. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS**

The comprehensive training management platform designed for colleges mainly includes modules for system configuration management, school management, on-the-job training management,

graduation project management, data statistics management, and document information management. It meets the needs of comprehensive training management and serves as a practical teaching management system for various departments and levels within the school. The specific functionalities of each module are as follows:

### **5.1. System Configuration Management**

System configuration management is primarily aimed at managing users at various levels within the system. The system needs to set permissions based on users' responsibilities and management scopes. To ensure security, permissions should be scientifically and reasonably divided into categories such as system administrators, teaching assistants, teachers, and students. System configuration management includes basic settings, role management, permission management, academic year management, teacher types, and comprehensive settings.

### **5.2. School Management**

School management includes department management, research group management, major management, class management, student management, and teacher management. Major management involves managing information for all majors within the college, while class management includes details like class names, majors, class teachers' names, and the number of students. Student management includes student information such as student ID, name, gender, date of birth, ID number, birthplace, and political affiliation. Administrators can add, delete, and modify student information as needed. Teacher management involves inputting teachers' basic and work-related information, including their employee ID, title, gender, and age.

### **5.3. On-the-Job Training Management**

On-the-job training management primarily involves overseeing the process of on-the-job training. It includes settings for internship locations, internship units, contract units, weekly internship reports, questioning and assignments, communication records, student scoring, internship summaries, and company recruitment information. Administrators can monitor students' on-the-job training progress, understand the specific internship units and positions, as well as the progress and outcomes of the internship.

### **5.4. Graduation Project Management**

Graduation project management involves supervising the process of students completing their graduation theses or projects during their internships. It includes comprehensive project management, topic statistics, project proposals, graduation theses, comprehensive scores, and student achievement summaries. It enables graduation project supervisors to effectively supervise and manage students' progress and completion of graduation projects, while also facilitating the collection and management of relevant graduation project materials by administrative staff.

### **5.5. Data Statistics**

Data statistics involve analyzing the specific situations and outcomes of comprehensive training. This includes overall statistics, departmental statistics, teacher statistics, student statistics, and more. It allows for the analysis of various task indicators covered in comprehensive training based on different roles, enabling scientific analysis and management of the training process with planned objectives. This ensures that comprehensive training management is not just a formality but effectively enhances students' practical skills.

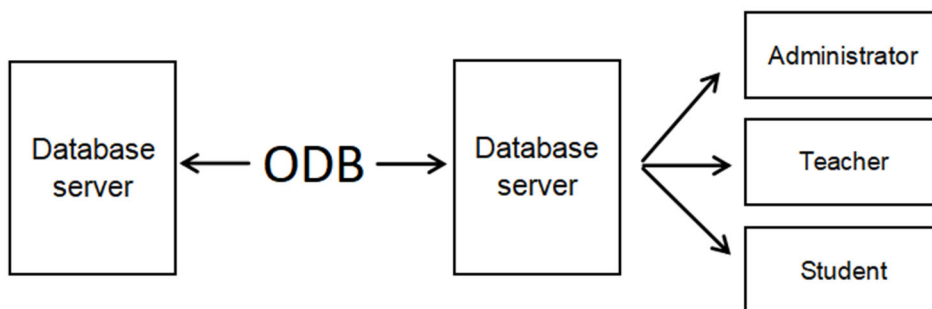
## 5.6. Document Management

Document management categorizes and manages the documents required for comprehensive training. This includes document types, notification management, document uploads, student document downloads, topic types, question responses, link management, etc. Administrators can centrally manage all relevant document information, making it easier for users to find the information and materials they need quickly and clearly.

## 6. SYSTEM DESIGN AND IMPLEMENTATION

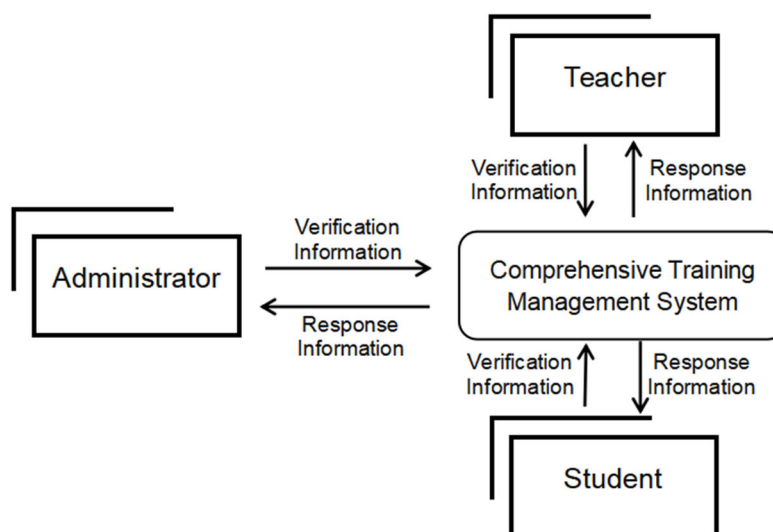
### 6.1. Data Flow Design of the System

The comprehensive training management system has three main types of users: system administrators, teachers, and students. Depending on the role of the system administrator, they can be further divided into system maintenance administrators, teaching administrators, student counseling administrators, etc. Different administrators have different permissions. The detailed structure of the system is shown in Figure 5.1.



**Figure 5.1** Detailed Structure Diagram of the System

The top-level data flow diagram of the comprehensive training management system is shown in Figure 5.2. This diagram reflects the overall data flow situation of the comprehensive training management system and illustrates the data flow relationships between system administrators, students, teachers, and the training management system.



**Figure 5.2** Top-Level Data Flow Diagram of the Comprehensive Training Management System

## 6.2. Database Design

Database design plays a crucial role in the entire system design. The database serves as the foundation of an information system, and the quality of its design directly impacts the system's performance, efficiency, and overall quality of implementation.

In the Comprehensive Training Management System, all data is stored in the database server. Data from client machines must be promptly uploaded to the database server for processing and storage. Communication between the database server and front-end terminals occurs via the campus network bus, primarily utilizing TCP/IP and HTTP protocols. For transmission of user account and password information, SSL or encryption mechanisms are employed. Communication between the server and backend database utilizes JDBC and T3 protocols, with specific critical information (such as accounts and passwords) encrypted as an additional security measure.

Database security management is integrated into the system design. In addition to establishing effective management mechanisms for security, regular or irregular backups of the database are essential functions of the information system. In case of unforeseen security incidents, emergency measures should be taken promptly to restore or recover the database.

## 7. CONCLUSION:

The establishment of a comprehensive training management system is of great significance for the management of comprehensive training in higher vocational colleges. It fundamentally changes traditional management methods and tools, enhances work efficiency, and to a certain extent achieves goals such as transparency of information, clear procedures, and standardized management. Particularly for those of us engaged in teaching and administrative roles, this system effectively reduces errors caused by human factors.

This system was developed based on the actual comprehensive training management model of Lishui Vocational and Technical College, taking into account the two major teaching components of on-the-job internships and graduation projects. The design of this management system also fully considers the actual situation of our college. After testing and operation, it has been proven that the system has basically achieved its goals, with user-friendly interface design, simple operation, and the ability to provide services such as resource sharing, teacher-student communication, and supervision. However, due to various factors such as lack of development software experience and time constraints, there are still many areas of the entire training management system that need improvement. There are still many functional modules that need to be modified and perfected in the future.

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