



Design of Enterprise Job Training Education Management System Based on J2EE

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Abstract. Aiming at the impact of severe market competition on corporate job training and education management, the performance of the corporate job training education management system has deteriorated. In order to improve the performance of the corporate job training education management system, a J2EE-based corporate job training education management system design is proposed. J2EE is used to design the overall structure of the system. Through the design of personal information management module, training course management module, training information management module, statistical management module and database logic design, the design of enterprise job training education management system is realized. The test results show that the J2EE-based corporate job training and education management system has high performance, can realize the stable and efficient management of corporate job training and education, and can effectively meet the requirements of the company.

Keywords: J2EE · Enterprise job training · Education management · Module design

1 Introduction

With the rapid development of the domestic economy, domestic companies have begun to continuously expand foreign markets. There is not only fierce competition among companies in terms of product quality and sales channels, but also the pressure of strong talents from Western developed countries [1]. In the era of knowledge economy, if an enterprise wants to achieve sustainable development, it must strive to build a learning team, and strive to cultivate the learning attitude and sense of progress of employees and managers, so that the overall quality of the enterprise is continuously improved and progressed in the development. An important factor for measuring and investigating the management level of major domestic brands and multinational corporations is the overall quality of their employees. These companies have formulated a very complete staff training system, and use a complete technical training system to train their employees. With the fiercer competition in the economic market, the requirements for employees of various positions in the enterprise are no longer as good as basic operations [2, 3]. It is

necessary to have more professional technical skills, a better attitude and comprehensive work quality in order to effectively fulfill the ever-increasing customer requirements.

Literature [4] proposed the idea of using Windows Azure cloud computing platform to build and optimize enterprise management training system, and then analyzed the needs of enterprise management training system, believed that the system should include learning module, examination module and analysis report module, and then designed according to the demand. The enterprise management training system based on the cloud computing platform, including the new test question process, the new test process, the employee training and the test process, is included. Finally, it introduces the building of integrated access control subsystem based on the Windows Azure cloud computing platform and exam management Subsystem, an online examination subsystem in an enterprise management training system. After testing, the system runs smoothly, with low cost, high safety and practicability. Literature [5] studies the design of a personnel training information management system based on a business rule engine. And implementation, through the analysis of the main business process, the design of functional modules and the description of the business data relationship, examples of the main business rules are given, and the implementation of the key rules is described in detail. The online use of the system shows that the organization, management and analysis of personnel training have been significantly improved; however, under the new situation, the traditional training content and methods have shown more and more unsuitable states, and the training effects and methods are compared. It is time-consuming and laborious and cannot meet the needs of corporate employee training.

This article closely follows the current trend of informatization, improves the training methods of small and medium-sized enterprises, introduces information technology into the entire process of enterprise employee training management, and helps enterprises establish an open network learning and knowledge sharing environment [6]. Help companies improve their staff's job competency, provide powerful data support for corporate human resource management departments to conduct fair evaluation and accurate analysis of employee quality, so as to provide various small and medium-sized enterprises with "Enterprise Training Network Courses" as the basic teaching unit. Flexible training project management methods play an active role.

Based on the above research background, this article applies J2EE to the design of enterprise job training education management system, designing the overall system structure, personal information management module, training course management module, training information management module, statistical management module, database logic design, based on J2EE. Realize the connection of various modules, build a J2EE-based corporate job training and education management system, thereby improving the efficiency of corporate job training and education management.

2 Enterprise Job Training Education Management System Design

2.1 System Overall Structure Design

The overall structure design of the system is an important process of the system development process. The overall structure design of the enterprise job training and education management system is based on the system analysis of the previous stage, according

to the enterprise goals, weighing the pros and cons of various technologies and implementation methods, defining the external boundaries and interfaces of the system, and rationally using various resources. In the process of processing, coordinate the relationship between various departments according to the overall requirements of the system, and characterize the internal and various components of the system and their mutual relationships.

The main model structure of the enterprise job training education management system studied in this paper: The main users of this system include training teachers, system administrators, corporate administrators and corporate training employees. Different people have different needs for information. For corporate training teachers, the different content or courses of training lead to different needs for the content and form of training information. For teachers who have completed corporate culture or employee quality training, they may only a small amount of training materials, PPT and video information are needed. As a teacher of professional competence training for enterprise employees, the demand for training resources will be very huge, and rich and detailed professional training materials need to be provided [7]. Some trainers not only can use the system well, but also need to help system administrators update and maintain database resources. Based on the module design process, referring to the characteristics of different training resource types, a complete training process management module is constructed in turn, and each module corresponds to a different set of data resources, such as classification, retrieval, deletion, and modification. These operations need to be hierarchically controlled according to the user's authority. Therefore, it can be concluded that when designing a J2EE-based enterprise job training and education management system, on the one hand, it is necessary to clarify the relationship between the main modules of the system, and on the other hand, it is necessary to design the access control of the internal data of the system. The following is the design of the role-based data access control model established by the system, and the overall structure of the system is built with the relationship between users, roles, various functional modules and various training resource objects, as shown in Fig. 1.

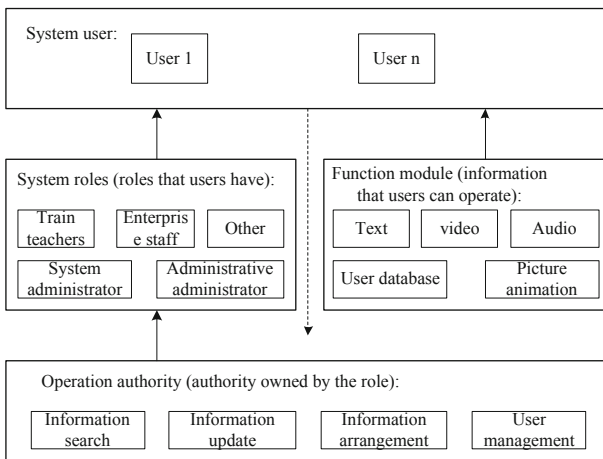


Fig. 1. System overall architecture diagram

The management of permissions in the system mainly uses role-based access control. The core of RBAC is that users are only associated with roles, and roles represent permissions. The advantage of this design is that for users, only roles are needed. Yes, and a role can have various permissions and can be inherited. RBAC logically separates users and access permissions, and this design idea facilitates permission management. Discuss with multimedia data information. For static authorization, during system design and demand analysis, the type of system role can often be determined. For example, in a multimedia system, there may be information publishers, information reviewers, and information Viewers, administrators and super administrators. These roles have also been bound to corresponding operations during design.

2.2 Personal Information Management Module Design

There are many users of the training system, which will generate a large amount of user personal information, which is very necessary for the management of system users' personal information. This module is mainly provided to the users of the system to manage their personal information. For example, corporate training students change their basic personal contact information, passwords, permissions, etc. The specific functions are shown in Fig. 2.

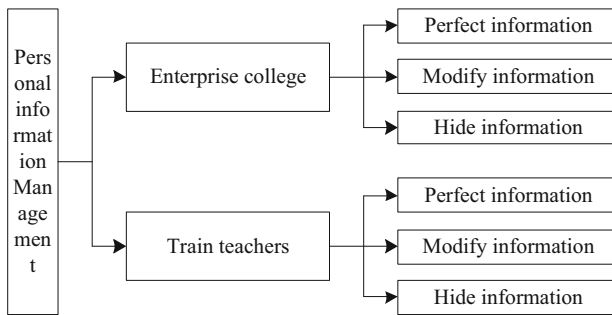


Fig. 2. Personal information management function diagram

The modification and improvement of personal information by users is only for individuals, and other users with the same level of access rights cannot view them. Only the system administrator can perform unified operations on it through the system user information management module.

2.3 Training Course Management Module

This module is mainly operated by enterprise training employees and training teachers. The human resources department of the enterprise arranges related training subjects according to the training plan and requirements, or the trainees determine their own training arrangements according to personal skill requirements and job positions [8–10]. Enterprise employees can query and browse the teaching content and requirements of

each training course, and choose according to personal training needs. Training teachers can manage the teaching content of training courses and training resources online within the scope of authorization. The specific functional module structure design is shown in Fig. 3.

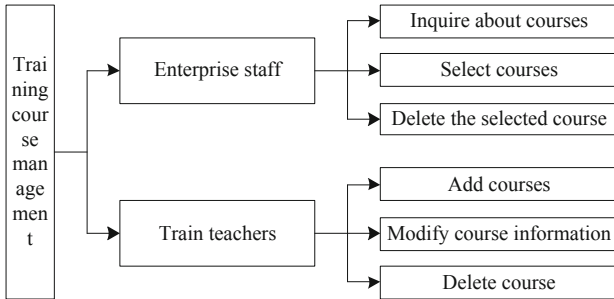


Fig. 3. Training course management function diagram

2.4 Training Information Management Module

This module mainly focuses on the operating procedures designed to manage the relevant information of the staff training process. Basically, the module structure is divided into three stages: early, mid, and late training. The users used are trainees, trainers, and system administrators. The information involved includes: information about employees participating in the training, training class and course information, Train students online learning, training evaluation information and other information management based on this, the system module structure design is shown in Fig. 4.

2.5 Statistical Management Module

This module is mainly provided to system managers (person in charge of corporate training) to perform statistics on various information in the training. The module structure can be divided into trainee information statistics, training resource statistics, trainee training results report statistics and system operation log statistics. The functional module structure is shown in Fig. 5.

The training information statistics of trainees mainly help the person in charge of corporate training to make statistics on the training that employees have participated in, so as to facilitate the annual training summary, view the training effect, and facilitate the formulation of the company's employee training plan for the next year. The statistical information includes statistics on the personnel participating in various departments of the enterprise, statistics on training participation in various regions, and statistics on employees participating in training subjects.

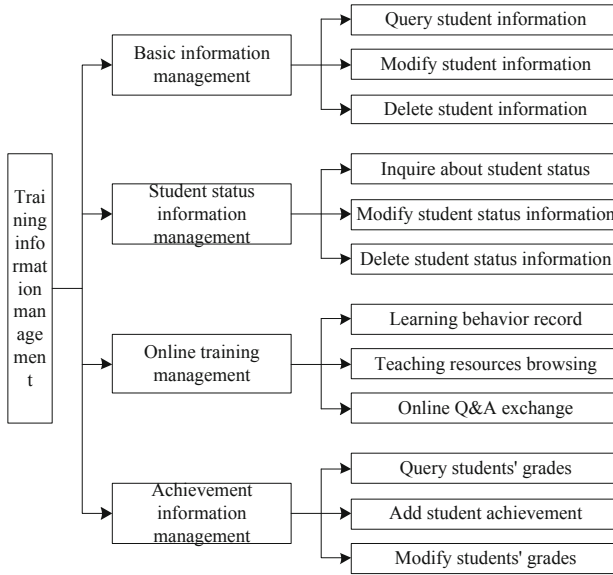


Fig. 4. Function diagram of student information management

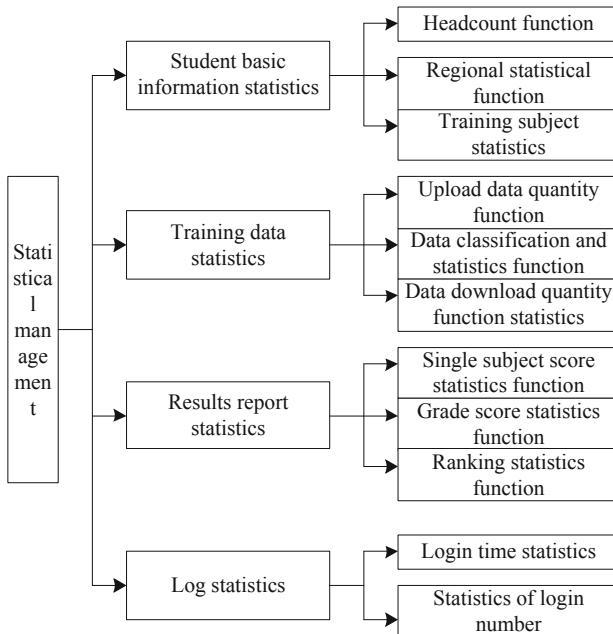


Fig. 5. Statistical management function diagram

Training data statistics are used to count the use of training materials in different training subjects during the training process, so that human resources management

departments can choose appropriate training materials. The statistics include: the type of training materials, the number and content of existing training materials. The number and type of training materials downloaded by trainees, through the above three types of data statistics, can provide an intuitive decision-making basis for training materials.

The performance report statistics mainly perform statistical analysis on the assessment results of trainees in various departments, regions, and training subjects of the enterprise, and can be output in the form of reports, such as Excel files. On the one hand, the management of training results helps to understand the actual situation and results of employee training, on the one hand, it can also promote the importance of trainees to training, and at the same time facilitate the enterprise to formulate training teaching plans. In addition, training results can be used as the basis for employee year-end assessment [11–13].

System log statistics is a function set for information statistics on the use of the enterprise training system, and at the same time to ensure the security of the system. Through the system log, you can understand the operation of each functional module of the training system. If there is a problem with the program, the system log can help the administrator locate system errors and make corrections.

2.6 Database Logic Design

The content of the logical structure design of the database is to briefly explain the data structure used by the system or subsystem. The logical structure design mainly uses the entity association diagram for graphical representation, and its constituent elements are entities, attributes, and connections. According to the data entities obtained by the requirement analysis part, the logical relationship between them is established respectively, and the E-R diagram of the main entities of the system is obtained. The main attributes of an enterprise employee entity include basic employee information, performance information, training plan information, and demand information, as shown in Fig. 6.

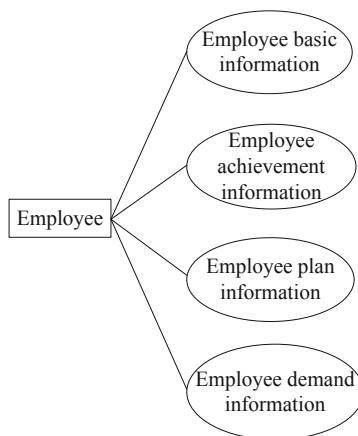


Fig. 6. Training employee entity attributes

Figure 7 shows the various entities in the employee training module, which are mainly used to represent the basic data information of different business departments of the enterprise. The entity attributes include department code, department name, department head, department office location and other attributes.

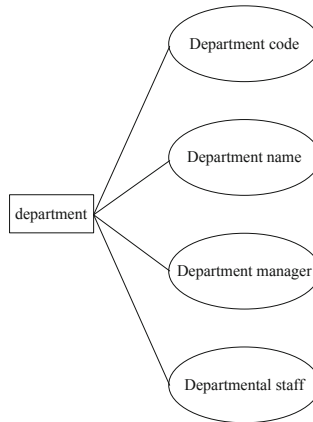


Fig. 7. Department entity attribute diagram

The training course entity is mainly used to indicate the main content information of employees participating in the training. Its entity attributes mainly include the following attribute information, such as course code, course name, training hours, training category to which the course belongs, relevant equivalent training, etc. [14–16], its ER The model design is shown in Fig. 8.

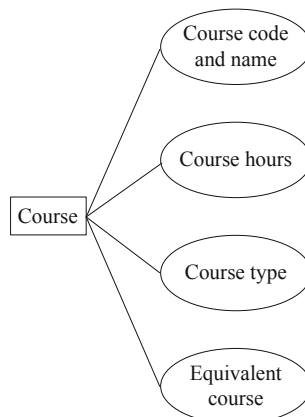


Fig. 8. Course entity E-R diagram

Instructors are training teachers who mainly undertake training courses and content teaching in the training system [17–19]. They can come from experienced employees

or managers from different departments of the company, or they can hire staff from professional training institutions. Its entity attributes are mainly used to describe the relevant information of the teacher, such as the trainer’s number, name, academic qualifications and other personal attributes. At the same time, it can include third-party data information such as the time, place and teacher evaluation of the teacher responsible for the training course [20]. The entity structure model is such as Shown in Fig. 9.

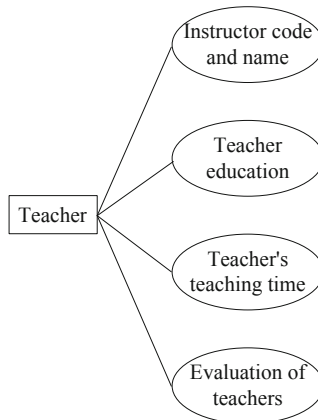


Fig. 9. E-R diagram of teacher entity

The entity content of the training resource includes the relevant description information of the educational resource, including the description of the existing resources in the enterprise knowledge management module, such as resource name, type, main content introduction, etc., and other attribute information such as training cost and training resource demand. The model is shown in Fig. 10.

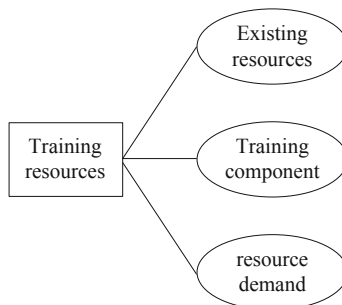


Fig. 10. E-R diagram of training resource entity

Integrating the above-mentioned independent system main entity attribute diagrams, and according to the enterprise training business management data flow diagram, the mutual management between different entities in the enterprise training management

system can be established respectively, such as the relationship between trainers and training courses is a one-to-many relationship. That is, one trainee can be responsible for the teaching of multiple courses, and at the same training time, any company employee can only participate in the training of a certain course.

3 Test Analysis

3.1 System Test Type

The main task of software testing is to conduct preliminary acceptance third-party testing of the J2EE-based enterprise job training and education management system. The main content of the test is: interface test, system function test, safety test, fault tolerance test, usability test, regression test for problems found in supervisor test, and system performance test.

3.2 Analysis of Performance Test Results

The performance test is performed after the functional test is completed. The test environment should be as consistent with the user environment as possible. The performance test cases mainly involve the problem of the entire system architecture. Therefore, once the test cases are generated, the changes are generally not large, so the performance test is repeated. The utilization rate is generally relatively high. If the user does not propose performance indicators, design various test indicators according to user needs and the experience of test designers. Multi-user concurrent performance testing is the core content of performance testing, including all multi-user related tests. This article takes all users into consideration when performing performance testing, and uses the automated performance testing tool Load Runner to simulate the operation of the actual system to ensure the accuracy of the system performance testing.

In this system, a series of operations of trainee users, such as “student training courses and announcements viewing, online training course project selection, training resources and assignment submission” are tested as a set of combined services, and the test examples are within 500 whether users are online at the same time can be normal. Use Load Runner’s recording tool to record the above three businesses, and each business is assigned a certain number of users. The specific test data and results are shown in Table 1.

As shown in Table 1, the average response time, data transmission rate, network utilization rate, CPU utilization rate and denial of service error rate of the J2EE-based enterprise job training education management system are all due to other systems, which reflect the superiority of the designed system. Applying it to enterprise on-the-job training can effectively improve the level of enterprise on-the-job training and education management.

Table 1. System performance test data and results

Concurrent client	10	50	100	150	200
Average response time	0.044 (s)	1.253 (s)	2.475 (s)	4.238 (s)	4.873 (s)
Data transfer rate	5143 (KB/s)	4753 (KB/s)	4238 (KB/s)	3826 (KB/s)	3655 (KB/s)
Network utilization	16%	28%	48%	56%	70%
Average memory usage	28%	35%	44%	51%	54%
CPU usage	9%	15%	42%	48%	56%
Denial of service error rate	0%	0%	1.2%	2.2%	3.6%

4 Concluding Remarks

This paper proposes a J2EE-based corporate job training education management system design, modular design of corporate job training education management, combined with database logic design, to achieve the corporate job training education management system design, test results show that the system has high performance.

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