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Research Article

Educational Resource Management System Based on JSP Technology

Qin Xu[1]
Chengdu University of Technology

Zhongli Zhou[2]
Chengdu University of Technology

Dexiang Yang[3]
Chengdu University of Technology

Abstract

A perfect educational resource management system can effectively improve learner efficiency and reduce unnecessary waste of manpower and material resources. For this, using JSP website development technology, this paper studies the design and implementation of educational resource management system based on JSP technology. Through the analysis for the needs of educational resource management system, the functional composition of each module in the system was determined. Besides, the architecture, interface, fore-end function module and backstage management module were designed and implemented in detail. The test results of the system indicate that this system basically meets the preliminary design requirements and can realize the effective management of educational resources; but it can also be further optimized from the aspects of program structure and algorithm quality etc. This study provides methods and ideas for building a more efficient educational resource management system, and has a certain role in promoting the intelligent construction of educational resources management.

Keywords

JSP Technology • Dynamic Website • Educational Resource Management • System Design and Implementation

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[1]College of Management Science，Chengdu University of Technology，Chengdu 610059, China. Email: qin-x99@163.com

[2]College of Management Science，Chengdu University of Technology，Chengdu 610059, China. Email: zzl@cdut.edu.cn

[3]**Correspondence to:** Dexiang Yang, College of Management Science, Chengdu University of Technology, Chengdu 610059, China. Email: ydx@cdut.edu.cn

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With the rapid development of computer and Internet technology, people's lives have been made more convenient and work efficiency has been promoted. In particular, the educational informationization degree of the education industry has been increasing day by day. Under this circumstance, the traditional educational resource management model can no longer meet the actual demand. Therefore, it has become the focus of people's general concern and research on how to effectively manage the digital educational resources in an integrated manner, avoid waste of manpower, material resources and resources, and improve the efficiency of learning and management.

At present, many colleges and universities have included educational resources intelligence and digital sharing construction in the medium and long-term development plan (Stukalina, 2010). The educational resource management models and theoretical research abroad is relatively mature, and have achieved certain results. Using the Internet to improve teaching effects has become the development trend of educational resources management. Currently, the LOM model of IEEE is a relatively complete educational resource management system model (Ashcroft & Watts, 2004). Since China's dynamic webpage development started late, the research on China's college educational resource management system is still in its infancy, with Internet teaching and dynamic webpage teaching as the main direction (Ha Ler & Jackson, 2010). Besides, during the design and implementation of educational resources management system, it has blindly pursued a perfect and complete system, but neglecting the current actual situation, resulting in the problems such as improper coordination between the subsystems, repeated development, and insufficient sharing of the system (Zhao *et al*., 2014), and finally a waste of human and material resources. JSP is a dynamic web page technology standard, full-called as Java Server Pages (JSP). Web applications developed with JSP are cross-platform and can run under Linux or other operating systems (Li & Liu, 2008). JSP technology is easy to be integrated into a variety of application architectures, to support highly complex web-based applications. It is a popular web development technology (Zheng, 2013).

Based on the analysis above, with reference to the relevant research results of educational resource management system at home and abroad, as well as the existing achievements of computer network course resource management, this paper determines the design goals of the system through the analysis for daily educational resource management needs of colleges and universities, and also analyses the surface structure and the underlying architecture of the system layer by layer. Then, the JSP website development technology was used to design and implement each functional module. Finally, the modules and the whole system of the system were tested. The results show that the system basically meets the initial design requirements, but still need to be further optimized in terms of the program structure and algorithm quality in order to achieve the best design results.

System architecture and preliminary design

System requirements analysis

Educational resource management is one of the core contents in daily teaching management of colleges and universities. For the gradually increasing educational resource information, the educational resource

management system shall effectively reduce the workload of administrative staffs. The system should be designed to meet the needs of the general public and users, providing users with a practical interface that has a high data throughput, good security and scalability, and can respond quickly.

Operability and practicality are two basic functions of the system (Rahman *et al*., 2016). The practical functions are related to information service function module, user personal management module, forum, and resource service management centre. System management module are the main functional modules of educational resource management, for the convenient of users. The teacher management module is a sub-module of the educational resource management system designed from the perspective of the administrative staff, including functions such as input, viewing, adding, saving, and website management. Combined with the needs of college teachers and students, the system can be divided into students' school roll management, teaching management, achievement management and student online learning.

System architecture design

Surface structure. Based on the analysis of system requirements, JSP technology was used as the front-end development tool, to divide the educational resource management system structure into two parts: online learning area and teacher workspace (Yuanyuan & Hongmei, 2011), as shown in Fig.1. The online learning area mainly provides students with subject knowledge, online Q&A, subject discussion, online test and job processing etc. Through the teach workspace, the teachers can publish various information related to courses and teaching, correct student's uploaded homework, conduct test management and student management.

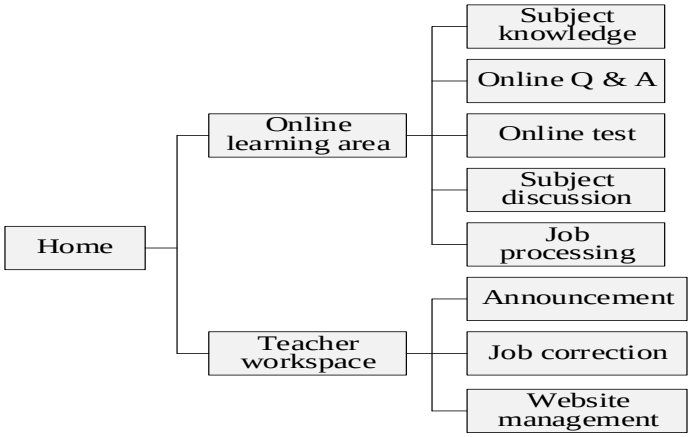

Figure 1. System surface layer (website front design) structure diagram.

Underlying architecture. The underlying architecture is a backstage management layer architecture and database architecture that supports the fore-end architecture. It should include the main modules such as system maintenance management, teaching plan management, course scheduling management, achievement management, students' job roll management, and teaching evaluation management.

Specific design and implementation of system

Interface design

Interface design style. In order to reflect the vitality and interactivity of the system, the interface design should adopt the combination of dynamic and static web design based on the principle of simplicity and applicability (Reinhardt & Dada, 2005). The function of web should be arranged according to the importance from high to low, and the most important functions should be topped. The page layouts should be reasonable, and the colour and fonts have good visual effects.

Login interface design. The login interface should include the registration and login interfaces of administrators, teachers, and students. To ensure security, users can enter the corresponding interface only after they have successfully registered and entered the correct username and password.

System front-end function module design

It's already mentioned above that the system front-end function module contains more. So, in this section, its specific design and implementation were described by only taking the online test module and notification release module as the examples.

Online test module. Students can make self-test through the online test module before and after class. The system will automatically display the results and wrong questions according to the students' test conditions, making it convenient for students to prepare and review. At the same time, teachers can also use this module for teaching tests, online correction of test questions, and results release. Fig.2 shows the flow chart of the online test program.

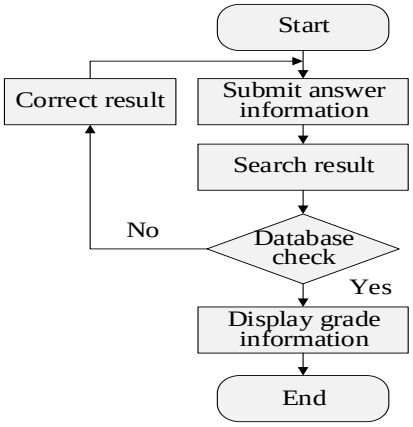

Figure 2. Online test program flow chart.

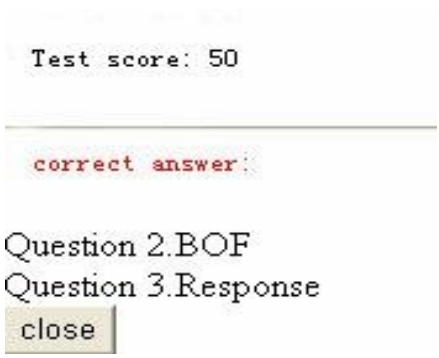

Figure 3. View the results of the results.

Fig.3 shows the results of the student test after clicking to view the results.

Notification release module. The notification publishing module involves the JSP files for notification release, modification, and deletion of notification content update, teacher-end notification, and student notification list design etc. Fig. 4 shows the flow chart of notification content update.

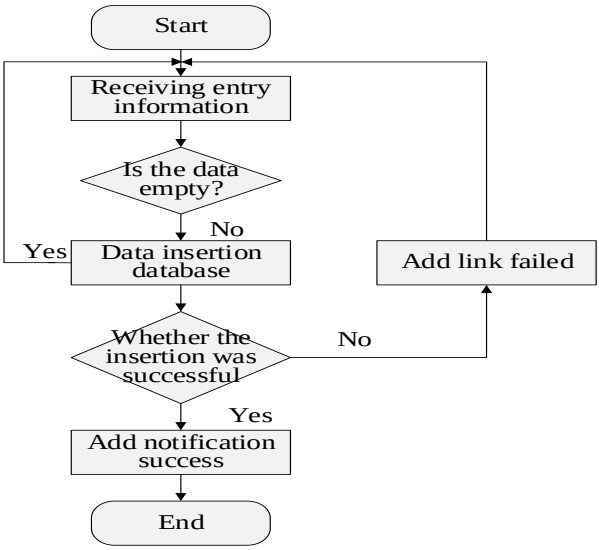

Figure 4. Notification content update flowchart.

System backstage management module design

In order to manage a large number of educational resources in an efficient and standardized way, this paper analyses the role of the different educational administrative staffs in the educational management system based on their actual work, and then adopts the UML to model the educational resource management system. Fig. 5 shows a UML test legend for scheduling management.

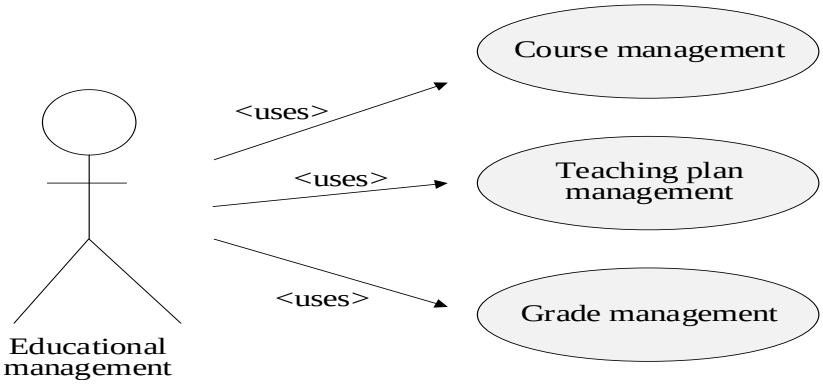

Figure 5. UML test legend for scheduling management.

System testing

After completing the system design, based on the principles of general-part, top-down, and step-by-step test, the combination of manual test and machine test method was applied to conduct the performance test, safety test and stress test for the system module, subsystem and whole system, in order to verify the accuracy of the whole system data, the availability and integrity of the function, as well as ensure the effective operation of the system . The test results are shown in Table 1. It can be seen from the table that the overall operation of the system is relatively good, meeting the initial design requirements, but there still exist some detailed problems. Thus, it is necessary to further improve the quality of the algorithm and optimize the program structure to promote the overall performance of the system.

Table 1
Test Result Analysis Table

Defect level	Number of defects	Processing opinions
System surface defect	40	Has little effect on the system, and is tested after modification
Main system defect	29	Although it is a major defect, it does not have a major impact on the operation of the system
Serious system defect	2	Make design changes, redevelop related modules and test

Conclusions

At present, all colleges and universities in China have included the intelligent construction of educational resource management into the medium and long-term development plan. This paper conducts research on the educational resource management system based on JSP technology. The specific conclusions are as follows:

(1) Through the analysis for the needs of the educational resource management system, the goals of the system design were determined, and the surface structure and the underlying architecture of the system were also designed in detail;

(2) The system architecture, interface, fore-end function module and backstage management module were designed and implemented;

(3) After the system design is completed, the performance test, safety test and stress test of the module were conducted for the system modules, subsystems and the whole system of the system. The results show that the system can meet the initial design requirements. But in order to promote the overall performance of the system, further research is required to improve the algorithm quality and optimize program structure.

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