Design of a Student’s Online Examination System Based on Web

Qiu-ting JIA
School of Science, Qilu University of Technology, Jinan, China

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Abstract. With the popularization and application of CAI (Computer-Assisted-Instruction), as an auxiliary module, online examination system attaches close attention. This paper describes the design and implementation of an online examination system for students based on Web. The online examination system, used for college students, adopts B/S structure based on WAMP development environment. Functional modules such as examining online, automatic assembling examination paper, automatic scoring and so on, are implemented in the online examination system. Through the browser, students can access the examination system server, request the appropriate subject papers online. If the answer is complete and submitted within the prescribed examination time, the score will be created by the system automatically, and sent back to students. For the ability of addition and management of multiple subjects, the system can be commonly used for most of online examinations.

Introduction

A variety of test types are increasing, the examination requirement for subsequent rising out of the traditional manual title, exam candidates, artificial Marking, performance evaluation and statistical analysis of examination papers form has been unable to meet the needs of a modern examination. With the rapid development of the Internet, great changes in examination have been happened. The students on line examination has come into people’s vision gradually, and become a new power for the development of educations. Paper, rooms and manual marking are not needed in the new examination. Compared to the traditional examination mode, the on line examination has many incomparable superiority. Multiple steps, such as the organizing and printing of papers before the examination, the distributing and collecting of papers during the examination, the marking and arranging after the examinations, are reduced to one or two steps. Students on line examinations achieve non-paper and automatic examinations, lighten the heavy burden of organizing and marking during examinations, and greatly improve the fairness and justice of examinations, make the examination to be scientific and normalized.

Currently, design of automated online examination system based on Client/Server structure, has safety stable characteristics, but the Client needs to undertake artificial maintenance, does not apply to the use of mass exam. Students online examination system based on Web has very strong flexibility and convenience for it can be carried out in different places and it can be used not only int an internal network but also can’t be used in the Internet. This paper describes the design and implementation of an online examination system for students based on WEB. The main content is organized as the following:

1) In the introduction part, after analyzing the problems in the traditional examination work, the online examination system based on the WEB technology is introduced.

2) Development tools and technologies such as WAMP Server, Apache, PHP, MySQL database and B/S architecture, which is adopted by the development platform, have been introduced in the second section.

3) System analysis, the two main modules of the whole system are described in the third section.

4) The results obtained by the system and the deficiencies found in the using time are present in the last section.
Development Platform

B/S Structure

The B/S structure refers to the browser and server structure. Through the browser, users log in the online examination system and take an exam following the prompts. In this way, only a very small part of the work will be implemented at the front browser, while most of the other work is performed on the background WEB server. The B/S structure helps to reduce system consumption and maintenance cost. The working principle of the B/S structure is shown in Figure 1.

![Figure 1. B/S structure.](image)

Development Tool

In order to achieve the safe, convenient and efficient performance requirements, selecting a good development platform is essential before the development of the system. The system development tool is the WAMP Server server software including Apache, PHP and MySQL.

WAMP Server is an integration software package including Web Apache server, PHP interpreter and MySQL database. WAMP Server supports the Chinese language and can be installed with a key, which makes the computer users can easily build a Web development platform. The most important point is that the WAMP Server is completely free of charge.

![Figure 2. System architecture.](image)

Design of System

Administrators, teachers and students are three kinds of users of the system. And then the system is divided into three function blocks for services may be provided for these three kinds of different type of users.

Overall Design

The whole system is divided into three modules: administrator module, teacher module and student module. The administrator module do the functions of system management, teacher-user management, examination-question-library management and issue announcement; The teacher module includes maintenance of teacher information, student-user management, test management module, automatic organizing of examination-paper, examination-paper management, examination-paper analysis, result statistics and so on; Student module includes student information
maintenance, online examination, score inquiries and other functions. The overall design is specified as shown in Figure 2.

**Database Design**

It is very important for the network examination system which needs a lot of data processing and data storage, to establish a simple and efficient database system. Prior to the establishment of the database, it is required to use the E-R diagram to study the relationship among the data entities such as administrators, teachers, student, examination papers, examination questions, questions library and so on.

An examination paper is composed by examination questions while a question may be appeared in different papers. Each entity has its own properties. For the limited space, only several key entities will be introduced in the following:

**Student Entity.** The student has several attributes such as student ID, name, professional class, examination card number, password, contact information and so on. Attributes with details are shown in Figure 3.

**Examination Question Entity.** The examination question entity mainly include: question ID number, question content, question type, difficulty degree, value, course name, correct answer, and etc. Attributes with details are shown in Figure 4.

**Examination Paper Entity.** A examination paper is a set of questions which are selected from a question library composed with a certain number of questions according to the procedure setting made by the teacher. Each examination paper contains a paper ID, a paper name, a question library ID, generation time, generator, contents of the paper, the total score of the examination paper, the beginning of the answer time, the end of the answer time and other information. Attributes with details are shown in Figure 5.

**E-R Chart for Examination Paper and Questions.** An examination paper is composed by a certain number of questions while a question may be appeared in different papers. The E-R Chart of examination paper and questions is shown in the Figure 6.
Summary
The focuses of this paper is the design of online examination system, which can also be used as a normal learning process of students to practice. And at the same time, the online examination system can be used to enrich the teaching means of teachers, stimulate students’ interest in learning and improve the utilization of the education system.

Although the online examination system has obtained certain fruits in the actual teaching process, there are many aspects need to be improved for the urgent time and the author’s level. And the aspects need to be improved is shown in following:

1) Interaction of human-computer interface.
2) Acceleration of server response speed.
3) The connection to some other systems, such as the educational administration manage.

With the development of science and technology, online examination will certainly be the trend of social development. And with the use of new technology and closed combination with demands, online examination system will have a more robust performance and fresh vitality in the future.

References


