Research and Implementation of Network Examination System Based on PHP Language

QingHai Yin
Dalian Polytechnic University Dalian 116034 China, Dalian, 116034, China
yinqinghai@163.com

Abstract. This paper introduces the design and implementation of a network examination system based on PHP language. The system adopts automatic design model of system role management user model, OFFICE software design and based on segmentation, effectively realizes the teacher management, exam papers, setting input, automatic and manual setting of editing and printing etc. Experiments have proved that the system is easy to use. It has good application value and promotion value.

1. Introduction
Network examination system is to meet the new needs of the development of modern education, the management of examination further standardized, scientific, improve the quality of school running. Through the network examination system test has many advantages[1]. Such as: to improve the quality of the test paper, help to improve the efficiency of teachers, is conducive to the realization of teaching quality assessment of the standardization, fairness and separation of teaching and testing.. Therefore, the construction of item bank has become an important part of teaching reform. Due to the various types of examination subjects and various forms of examination questions, it is urgent for the universality of the question bank management system The key to the success of the item bank management system lies in the flexibility and perfection of the functions such as security, test questions input and output of the test paper and test paper. For the security of the question bank system, some systems restrict the illegal users to use the system by simply setting up the user account and password, and some systems manage the users in different levels[2]. In practice, the use of the system user identity is different, including the title of the library manager, library construction staff, teachers and other roles. Therefore, simply to teachers in grade management is to achieve safety requirements more flexible enough, in addition to a variety of users to achieve flexible division of roles, but also restrict the different users with the same role changes created by other users or exam paper[3].

To solve the above problems, this paper studies the role of the user management model and segmentation strategy based on automatic test paper, in order to improve the system safety, versatility and test efficiency, and use PHP language to implement a new network management system.

2. Design and implementation of system
The design of the system takes into account the needs of ordinary teachers and teaching managers, Figure 1 As shown: The system mainly includes system management, item bank management, test paper generation and test paper management. Besides, the system also has perfect help function. In database management module, the user through the new database and set the database structure,
database structure can be established including the required questions, knowledge points and difficulty, etc.; can then be used to edit the entry function on library entry exam questions. Starting with several key technical problems, this paper expounds the design and implementation of the system.

2.1. System security

In order to achieve flexible security, according to the identity of different users will be divided into five kinds of roles: system administrators, test bank administrators, library construction staff, the teacher, the test paper administrator. The user may have multiple identities, allowing the user to assign multiple roles at the same time. Here's a brief introduction to the permissions that each role has.

(1) System administrator: has the highest authority of the question bank system, can manage all the questions bank, test paper and user. Only system administrators can use user management functions to modify and grant privileges to other users.

(2) Itembank: responsible for the establishment and maintenance of database, you can create, modify and delete and import and export exam, and input questions; can also be automatically generating operation on the creation of their own questions, to test questions.

(3) Database administrator: this role is the corresponding database management and the goal is to manage all the questions in the system, can perform database delete, import, export and other functions, but does not allow new, modify questions, do not allow editing and entry test.

(4) Teacher: you can select the appropriate item bank, test paper using manual or automatic test function, and can save and print paper; at the same time, to set up their papers and save the papers can be read.

The item bank personnel or the teacher's role of the user, if not authorized by the system administrator can access and modify the database or create their own papers, and cannot access other users create database or paper, greatly improve the safety performance of the system. If the user wants to get access to and modify permissions of the database or test paper created by other users, it can be authorized by the system administrator through the set object permissions function in user management, and it has very good flexibility.
2.2. Test questions setting
Due to the support of all kinds of questions of entry, and for generating papers to editing and typesetting and printing again according to the requirements, which requires the general test database system with input and output powerful, because the system is to use OFFICE software to open the WOED program based on the download and install the soft Office2010 (Micro the operation of the assembly). And add the reference to Office.dll and Word.dll in the PHP development platform. So, add the following statement in PHP, and you can use the COM object that is publicly available by Word2010

```plaintext
using System.Reflection;
using Microsoft.Office.Core;
using Microsoft.Office.Interop.Word;
```

In addition, in the Word2010 entry through questions and answers to questions and answers, the contents of the edit box and Word2010 documents automatically consistent, so when you open the Word2010 edit questions or answers, corresponding to the contents of the edit box can be automatically copied to the Word2010 document; and when closing the Word2010 document, Word2010 document automatically copy to the corresponding edit box[4].

When you edit the test questions or answers in Word2010, copy the content to the corresponding edit box. Because the Rich Text Box object used by the Word2010 document and the edit box does not have the same connection as the OLE technology, it is hoped that the document content can be copied to the corresponding edit box when the Word2010 document is closed. Use a Word2010 Document Before close to open event here, the event was activated in the Word2010 document before closing, by capturing the event, in the document before closing will copy the contents of the Word2010 document to the corresponding edit box. To use this event, after creating the Word2010 application object, first create the delegate function of the event with the following code.

```plaintext
App .Document Before Close +
new Microsoft .Office .Interop .Word .ApplicationEvents4 Document Before Close Event Handler (doc Before Close);
```

Then in doc before Close the following code is written in the process:

```plaintext
private void doc before close(Microsoft .Office .Interop .Word .Document doc , ref bool Cancel)
{
    doc .Content .Cut();//Copy the contents of the Word document to the clipboard and clear the contents of the document
    rtxst .Select All(); // Select edit box rtxst The whole content
    rtxst .Paste(); // Paste the contents of the clipboard into the edit box RTX TST and replace the original content
    Cancel =true ; // Prohibit document closing (to prevent re calling word recreation when editing)
    app .Visible =false ; // Hide word application objects
```

By using the same technology, the content of the test paper can be written into the Word2010 document, so that the powerful Word2010 word processing software can be used to rearrange and print the test paper.

2.3. Test paper combination
In order to improve the success rate and quality of test paper, the test paper strategy phase system, will test process is divided into precise matching, matching and matching roughly three stages, when the exam sufficient, each stage can not successfully test after entering into the next stage, the third stage test if unsuccessful, then the test paper failure[5]. The process of generating test paper is described as follows:

Phase one: Exact matching stage, Randomly selected from the database satisfy all conditions set questions: when the item is added to the exam, exam score and the questions, knowledge points and difficulty of the current score will not exceed the requirements set value, and from the database will be deleted, and the success that until the test score and current the requirements set out by the same score
or exam questions all visited. If the test paper is not successful and there are still available questions in the test bank, it will be transferred to the second stage.

Second stage: Priority matching stage: Randomly selected from the database to meet the priority conditions set priority: questions and knowledge priority or priority difficult questions, namely when the item is added to the exam, score requirements over the set of all priority conditions set the total score of the test paper and test paper in the current scores are not, and from the exam will be delete it until success or test questions in the test questions all visited. If the test paper is not successful and there are still available questions in the test bank, it will be transferred to the third stage[6].

The third stage: rough matching stage: Randomly selected from the database to meet the conditions of the test scores: when the item is added to the paper, the current total score exceeds the set requirements not from the exam papers, and remove it, until success or test questions in the test questions all visited. If the test paper is not successful, the test paper fails.

The first phase of the test paper to ensure meet all conditions; and the second stage is not successful in the first stage under the condition of the relaxed topic conditions, only consider the priority conditions; and the third stage is to further relax the conditions based on the second stage of test paper can not succeed, only consider the total constraint. The process of generating test paper not only takes into account the requirements of the proposition as much as possible, but also takes into account the success rate of the test paper generation, and the most scanned item bank 3 times, the efficiency of the test paper is higher. After the completion of each test paper, the actual system will show the actual score of each item of the test paper, and the teacher can decide whether to go to the next step (the adjustment part) according to the score of the request. If there is a big difference from the set requirements, you can retest paper.

It can be seen that the above process can meet the requirements of the proposition as much as possible in the test paper strategy, and give full play to the initiative of the teacher, and effectively ensure the quality of the test paper[7].

3. Experimental test
In order to analyze the effect of automatic test paper generation, the author established a test bank containing 500 test questions, 6 types of questions and 10 knowledge points, and carried out a large number of test paper generation. For the establishment of the question bank, if the test paper set up the requirements of the score are integer scores, the test paper to achieve 100% success rate. Because the proposition relates to questions, knowledge points, difficulty and score etc., any automatic algorithm can not guarantee generating papers meet all the requirements, even manual generating test paper also exist deviation, the deviation is too large will not be accepted papers, so I hope to cover the actual generation of papers and the requirements of proposition deviation analysis and test questions[8].

Therefore, the knowledge points and relative deviation mean and coverage rate are introduced as statistical parameters. For any test paper generated successfully, the relative deviation of knowledge points is the actual number of knowledge points. The average relative deviation of knowledge points reflects the deviation degree between the actual score and the required score of the knowledge points generated by the test paper; the knowledge point coverage rate reflects the degree of knowledge points covering the knowledge points required to generate the test papers. Table 1–3 shows a representative set of experimental results. In this experiment, requirements of full 100 hours, continuous test 15 times; while setting test paper, questions and difficulty points set with reference to the test distribution database, and because knowledge more, the knowledge requirements of scores are set to 10; In addition, considering the reasonable layout of the test papers that the participants usually want to generate, the priority of the question type is taken as the priority. Table 1 shows the actual score data of the knowledge points with relatively large deviations (the table header is a knowledge point requirement score). Table 2 shows the statistical results of the relative deviation mean and coverage of the type, knowledge and difficulty in the group experiment[9].

From table 2, we can see that there is almost no deviation in the test paper, and the mean deviation between the knowledge points and the difficulty ranges from 4% to 34%. In addition, only fourth and
sixth of the two test paper coverage rate of knowledge did not reach 100%, in strict sense, these two sets of test paper is unacceptable.

Table 3 is the statistical results according to table 2, if the relative mean deviation range allows questions, knowledge points and difficulty are less than 30% of the cases (i.e. if the requirements of 10 points, the actual generated score of 7 points or 13 points, this is usually acceptable), each received automatic test paper the possibility of reaching 80%. In fact, if you set the test paper plan, you can take full account of the distribution of test knowledge points, the effect will be better.

Table 1 Distribution map of test paper knowledge points

| Experiment times | Knowledge point 1 | Knowledge point 2 | Knowledge point 3 | Knowledge point 4 | Knowledge point 5 |
|------------------|------------------|------------------|------------------|------------------|------------------|
|                  | 10 points        | 10 points        | 10 points        | 10 points        | 10 points        |
| 1                | 10               | 8                | 10               | 11               | 10               |
| 2                | 9                | 10               | 11               | 10               | 12               |
| 3                | 10               | 11               | 9                | 10               | 10               |
| 4                | 10               | 8                | 10               | 10               | 11               |
| 5                | 8                | 10               | 11               | 12               | 10               |
| 6                | 10               | 12               | 10               | 9                | 8                |
| 7                | 10               | 11               | 8                | 11               | 10               |
| 8                | 11               | 10               | 9                | 10               | 11               |

Table 2 Deviation and coverage statistics of generating test paper

| Questions | Knowledge point | Difficulty Questions | Coverage rate |
|-----------|----------------|----------------------|---------------|
| 1         | 100            | 10                   | 100           |
| 0         | 90             | 9                    | 100           |
| 1.2       | 100            | 6                    | 100           |
| 0         | 100            | 11                   | 100           |
| 2.3       | 80             | 20                   | 100           |
| 1         | 100            | 40                   | 100           |

Table 3 Experimental result

| Mean range of relative deviation | Number of test papers | Percentage |
|----------------------------------|-----------------------|------------|
| ≤20 %                            | 4                     | 20%        |
| ≤30 %                            | 9                     | 40%        |
| ≤40 %                            | 10                    | 70%        |

4. Conclusion

In this paper, several key technologies, such as security, input and output and automatic test paper, are discussed. Because the system implements role-based user management and a certain degree of autonomous authorization mechanism, it provides more flexible security[10]. By using the Interoperability Technology of computer design language, the seamless integration with the system can be realized, and all kinds of test questions besides video can be input and powerful editing and outputting function of the test paper can be realized. The experiment proves that the success rate of the test paper is greatly improved, and the acceptance rate is good. The system has improved in security and test paper technology. Through the trial, the system is easy to use, stable, reliable, and has good
use value.

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