The Application of Paperless Network Examination in Computer Basic Course Examination

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Abstract. According to the practical characteristics of the computer course, the traditional assessment method of the course has one-sidedness and difficulty in the evaluation of the students' learning process. It is a trend to implement the reform of examination method based on paperless network examination system through the construction of open network examination platform which relies on network information. The article introduces the composition of the examination system, the construction and distribution of the examination question bank, the parameter setting, the stage learning evaluation and the learning track record. The practice proves that the reform of the examination method is not only beneficial to the process evaluation, but also beneficial to play the feedback, encouragement and evaluation analysis function. Furthermore, it can improve students' independent learning capability.

Introduction

Teaching and examination are two inseparable links in the teaching process [1]. The reform of examination methods is a systematic project involving personnel training programs, faculty construction, personnel cultivating program and teaching content reform, teaching process management, teaching quality monitoring and evaluation and other aspects [2]. The main functions of the course exam are evaluation, motivation, feedback and guidance, and guide student learning and teacher education. Reasonable and appropriate course evaluation methods can not only promote teachers' teaching effect and teaching quality, but also stimulate students' interest in learning. The traditional test requires the teacher to produce papers, print test papers, collect test papers, review papers, and analyze test papers. This is a complicated and error-prone process that has become increasingly unsuited to the needs of modern teaching [3]. The adoption of a paperless network examination method for computer-based basic courses, combined with the characteristics of paperless examinations and traditional examinations, and learning from each other's strengths and weaknesses, and the use of a networked examination system and a test question database system have greatly reduced the workload of examiners and readers. It also reduces errors caused by human factors. At the same time, it increases the operability of process evaluation. Practice has proved that it has achieved good teaching results.

Paperless Network Test System

The paperless network examination system client adopts a pure B/S architecture and uses ADO.NET technology to realize the interaction of the database in the system, which ensures that the database connection is safe, efficient, stable, and has a good openness. The paperless network examination system is divided into two modules: the teacher management platform and the examination system. The teacher management platform mainly includes the following four functions: question bank management, test paper management, statistical management and parameter management.
Exercise Database Construction and Paper Assignment

Exercise database construction and updating are the key factors that determine the success of the examination system [4-5]. The system supports the construction of a database for all subjects, and all kinds of questions. Since the questions are based on the form of HTML, they can satisfy all the traditional questions. We currently have four well-established and well-established courses including four basic courses such as Fundamentals of Computer Application, Fundamentals of Programming (C), Fundamentals of Programming (VB), and Fundamentals of Database Applications. Question types include single-choice questions, multiple-choice questions, fill-in questions, judgment questions, and various language operation questions. Objective test questions support the import and export of Word documents. Test questions can be imported into the system in batches to meet the requirements quickly. The question database, all questions support the use of pictures, audio, video and other documents. The test paper distribution method is an important part of simplifying the examination process. The system includes manual distribution and program distribution. The manual assignment directly selects the test questions from the question database to make the test papers. After the test papers are organized, the questions in the test papers may be replaced as necessary. Manual examination paper distribution is convenient and quick, and it is more suitable for quizzes. The allocation of programs increases the flexibility of test paper distribution. Each paper can contain multiple questions. Each question type can be based on the difficulty of the questions, the level of the questions, knowledge points, etc. The questions can be added. The questioning strategy for each question type can be repeatedly added, the scores for each question type can be different. The distribution method of the plan will be applied once and for all. According to the test paper created under the plan, if the number of questions is sufficient, the questions for each test paper will not be duplicated; if the number of test questions is not enough, a few test papers with repeated questions can also be generated. The combination of the two test paper distribution methods makes the assignment and creation of test papers more convenient and smart. Question database construction adopts the curriculum group teacher proofreading, module updating question bank, and course group leader rotation proofing model to give full play to the subjective initiative of the individual teachers, increase the communication and collaboration among the course group teachers, and reduce the narrowness caused by individual knowledge limitations, ensuring the quality of the questions. The number of question database is shown in Table 1.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Single-choice questions</th>
<th>Gap filling</th>
<th>true or false questions</th>
<th>operating-question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamentals of Computer Application</td>
<td>4478</td>
<td>341</td>
<td>531</td>
<td>1129</td>
</tr>
<tr>
<td>Fundamentals of Programming (C)</td>
<td>574</td>
<td>315</td>
<td>194</td>
<td>516</td>
</tr>
</tbody>
</table>

Statistical Management and Parameter Settings

This module is mainly used to control the client's performance. The user can freely define the test time, the password, and the examination method. Through flexible configuration, the test system can be better integrated with the local system, and the client performance of the test system is also more flexible. You can set up examinations according to actual needs and allocate examination papers for the sessions to achieve the purpose of using different test papers for different examinations. Provide a variety of drawing methods, such as fixed and random. At the same time, the balanced extraction probability option is provided to ensure the equalization of the test paper. In the process of selecting the judgement, candidates who have not answered the question are ignored. After the examinee hands in the paper, the test questions that the examinee did not answer by clicking the “answer” button are ignored during the system judgment process, and no judgment is made that can significantly improve the judging speed. After the test, the system automatically judges the scores, selects test subjects and
test paper assignment plans as required, analyzes the test scores of the testees, generates statistical analysis reports in excel format, and analyzes various analysis data to understand the students’ knowledge of different knowledge points. It fully reflects the teaching effect and serves as a reference for improving follow-up teaching. Taking the final exam of the computer application foundation for the fall semester of 2016-2017 school year as an example, the test analysis statistics produced are shown in figure 2.

<table>
<thead>
<tr>
<th>Test reliability:</th>
<th>0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average:</td>
<td>73.4</td>
</tr>
<tr>
<td>Standard deviation:</td>
<td>12.8</td>
</tr>
<tr>
<td>Distribution:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Score range</th>
<th>0~30</th>
<th>30~40</th>
<th>40~50</th>
<th>50~60</th>
<th>60~70</th>
<th>70~80</th>
<th>80~90</th>
<th>90~90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student number</td>
<td>12</td>
<td>54</td>
<td>131</td>
<td>290</td>
<td>677</td>
<td>1253</td>
<td>1896</td>
<td>130</td>
</tr>
<tr>
<td>Percentage</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Figure 1. Achievement analyzing stat.

The Advantages of the Paperless Network Test System

Flexible Examination Method, Strong Anti-cheating Function

The paperless network test has changed the traditional examination mode and has become a method characterized by "the whole process, diversification, multiple events, multiple venues, and multiple contents". Because the system randomly disassembles the order of the questions when extracting the test paper, it is difficult to cheat between two adjacent candidates [6-7]. The system is highly informatized, which integrates the construction and management of test questions, intelligent test papers, and statistical analysis. At the end of the exam, teachers with the appropriate permissions can export student papers, save paperless, do not need to staple and occupy physical space. During the examination process, according to the characteristics of the curriculum, students may be allowed to use Visual studio C++, Office, Access, and other simulation software to reduce students' rote learning and facilitate application testing.

Increase Procedural Assessment to Motivate Students to Learn Independently

The teaching model of procedural management has been the focus of teaching reform in recent years. Its purpose is to adapt to the current educational ideas and fully mobilize the enthusiasm of students for learning [8]. The paperless network examination method is flexible, and the work efficiency is high. It is convenient for the teacher to evaluate the procedural teaching at any time. When the teacher completes the teaching task at a certain stage, the teacher can arrange the synchronization test, and ask the students to complete the task within the specified time and achieve the results [9-10]. The obvious benefit of this approach is that the student's examination environment is exactly the same as the practice environment. We complete the learning and testing in stages and points of knowledge, and include the test results into the final assessment according to a certain percentage. It not only reduces the difficulty of students' learning, but also helps students to grasp their own deficiencies in the learning process and greatly stimulate students' self-learning ability, so that students can really gain something and improve learning efficiency. The process evaluation also plays a great role in promoting the teaching of teachers, helping teachers to understand students' learning dynamics in a
timely manner and arranging teaching content more reasonably. The process evaluation can increase
the interaction between teachers and students, and timely obtain feedback on teaching effects, which
helps to find problems in the teaching process.

**Effectively Improve Students' Academic Performance**

Exploration and Practice of Multi-modal Interactive Teaching and Implementation of Paperless
Network Examination have greatly stimulated students' active learning ability. The overall student
performance has improved significantly since the paperless network exam was used. As more
emphasis is placed on the assessment of the student learning process, it helps to increase students'
interest in and participation in the classroom learning process. Comparing the results of 2013 and
2014, we can see that the difference is obvious. It shows that through classroom teaching and exam
reform, most students in Grade 2014 have gradually increased their learning enthusiasm. The effect of
cultivating student application ability is increasingly prominent, and teaching reform and practice
have achieved certain results (as shown in Table 2, 3).

Table 2. Analysis of final results of program design basis (C) in 2013-2014-2 (paper).

<table>
<thead>
<tr>
<th>Score range</th>
<th>0-60</th>
<th>60-70</th>
<th>70-80</th>
<th>80-90</th>
<th>&gt;=90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>68%</td>
<td>15%</td>
<td>10%</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>Student number</td>
<td>1141</td>
<td>253</td>
<td>161</td>
<td>95</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 3. Analysis of final results of program design basis (C) in 2014-2015-2 (paperless).

<table>
<thead>
<tr>
<th>Score range</th>
<th>0-60</th>
<th>60-70</th>
<th>70-80</th>
<th>80-90</th>
<th>&gt;=90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>43%</td>
<td>17%</td>
<td>20%</td>
<td>13%</td>
<td>6%</td>
</tr>
<tr>
<td>Student number</td>
<td>752</td>
<td>305</td>
<td>341</td>
<td>235</td>
<td>113</td>
</tr>
</tbody>
</table>

**To Realize the Separation of Teaching and Examination, Promoting Teachers and Students
to Improve Together**

Because the paperless network examination using random questions and random test papers, teachers
cannot preview the test questions in advance, urge teachers to strictly implement the teaching syllabus
in the teaching process, and follow the teaching plan carefully to teach, continuously improve
teaching methods, promote the teachers to improve teaching level unceasingly, improve the
classroom teaching effect [11-12]. In addition, the coverage of the test questions is wide, so the
probability of the students guessing the subject is greatly reduced. It will prompt the students to listen
carefully to each lesson and complete each experiment independently, which has a positive effect on
promoting students' learning consciousness.

**Enhanced Information Feedback and Evaluation Analysis Function**

At the end of the exam, teachers can learn the students’ answer questions, their points of knowledge,
and the scores of various questions. It is helpful for teachers to analyze the difficulty of the questions
in time, understand the learning situation of students so that they can improve their teaching strategies
in a timely manner and develop personalized coaching to make full use of the assessment, feedback,
and promotion functions of the exam.

**Conclusion**

After more than two years of exploration and practice on the paperless network examination, the
reform of paperless network examinations in the computer basic courses has gradually matured. The
reform of the paperless network examination has greatly improved students' enthusiasm for learning.
The easy-to-use test system makes it easy for teachers to organize periodic tests to understand the
learning dynamics of students. It also saves a lot of human, material and financial resources. The
paperless network examination is more in line with the characteristics of computer courses. We
should pay attention to practical ability education and improve students' ability to use theory to solve
practical problems.

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References


