

Design and Implementation of Environmental Teaching System of University

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Abstract— the traditional education model has many shortcomings of low teaching efficiency, poor quality of education in China. By the promotion of continuous improvement of the computer application technology, I innovative Environmental Teaching System (ETS) was put forward. In this paper, ETS teaching system consists of three subsystems: Environmental Lecture sub-System (ELsS), Environmental Assignment sub-System (EAsS), and Environmental Test sub-System (ETsS). The ETS also have five functions, which are Environmental Classroom Assessment, Environmental Classroom Records, Email-Based Assignment Management Model, Environmental Correcting Examination Paper and Online Examination Records. ETS has many advantages than traditional education model in the teaching process, such as convenient and efficient, data intact, saving resources and so on.

Index Terms— Environmental, Paperless, Teaching System, Teaching reform, Design, online examination, education model.

1 INTRODUCTION

With continuous development of the information technology, computers and networks are widely used in peoples' lives and working[1]. More and more people use digital tools to transfer and store information rather than paper. For instance, most universities are currently conducting multimedia teaching reform with the computer technology to replace the traditional blackboard chalk[2,3]. In the traditional teaching process, the teacher has many things to do like roll call records, send and receive homework, so the paper is needed. This process is very exhausting. There are many problems to be solved, such as, the recording archiving and long-term preservation.

At present, the development of paperless examination software is also emerging in the domestic and international[4,5,6]. But functions of the system are different each other because of different developers. Generally, this can be divided into two categories:

One is the established constant software for the examination of a particular discipline. This software can't be directly used in other examination. For example, in Computer Rank Examination and Traffic Laws Examination, test questions can't be modified, this software don't have universal applicability.

The other is a big lack of software programming, most software is programmed by software engineers. These engineers usually don't understand the process of teaching. Examination is the important way to evaluate the teaching effectiveness. If you don't know how to evaluate teaching effectiveness, then you can't serve the teaching well [3].

This paper presents a new teaching system- Environmental Teaching System (ETS). ETS makes digital technology be applied to the teaching and achieve the paperless process from the class to the examination. Multimedia teaching applied in universities is a part of ETS at present. In this paper, we will detail the design and implementation of ETS based on the actual situation of Liaoning Shihua University.

2 THE PROPOSITION OF ETS

Liaoning Shihua University is founded in Dalian, in 1950. It

is the first petroleum school in China. Its major specialty are Petroleum, Machinery and Information, at present, there are 23,430 students in the school. The fundamental teaching conditions in this school are computer and network. The application of computers in daily office work is very common. For example, if the students' affairs department has any notice, it can send electronic document by email to every college. Then every college will print a paper document to students. With the help of Internet, the student selecting course and query achievement are more convenient than before (as shown as Fig.1). The area of Liaoning shihua University are 1906 acres, it consists of main school area, professional technology college and Yingkou Campus. In the 2011 ~ 2012 school year, the curriculum of the author is as follows, on Monday, the class is Instrumental Analysis in the professional technology college and the principle of Food Engineering in main school area. On Wednesday, the class is Inorganic Chemistry in the professional technology college and Physical Pollution Control in main school area. For example, the amounts of the exercise book of Physical Pollution Control for two classes are 60, and the amounts of the exercise book of Inorganic Chemistry are 61. In the form of a single paper is not conducive to save. If we allow students to complete after class, students may copy the homework. Before class, teachers need to prepare textbooks, reference books, teaching manuals, portable laptop, even a pile of exercise books. This will virtually increase the burden of teachers. The idea of ETS is from this teaching reality.



Fig.1.web of student selecting course

3 THE REALIZATION OF ETS

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In this paper, the proposed system framework(as shown as Fig.2) is shown below. ETS is consisted of three subsystems, Environmental Lecture sub-System(ELsS), Environmental Assignment sub-System(EAsS), and Environmental Test sub-System(ETsS).

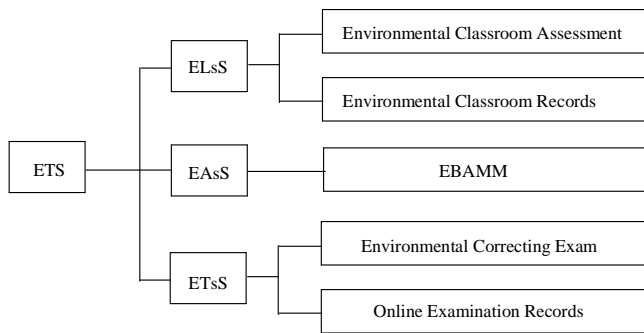


Fig.2.Framework of ETS

3.1 Environmental Lecture sub-System(ELsS)

ELsS includes Environmental classroom assessment and no paper classroom records.

1) Environmental classroom assessment

In the traditional classroom, teachers check the attendance rate by the roll call. When there are so many people, such as University Physics and basic course, the roll call will take up the large amount of teaching time. Environmental classroom assessment uses computer image recognition to complete the assessment work before class, it makes more teaching time available than before. We can install a fingerprint collector in each of the door of the classroom, students can complete sign before the class. Even the number of students is too much; the teacher can know instant students attendance by the fingerprint identification signed. When they enter the school, the school shall collect students' fingerprints to prevent signing for somebody else, and establish a database of students for ETS as shown in Figure 3:

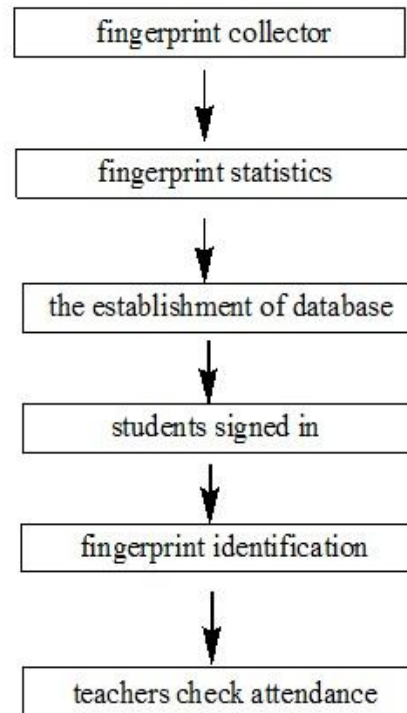


Fig.3 Framework of environmental classroom assessment

2) Environmental classroom records

Environmental classroom records is no longer follow the traditional teaching model which teacher lectures on the podium and students records by pen and paper. Students can download the PPT by the computer before class. If students don't understand the contents of the PPT, they can mark directly on it[7,8,9]. Students can add the focus of the content on the courseware. There may be many practical problems in the process of no paper classroom records, because we have no experience. Such as the intellectual property rights of the PPT, for this, we can take the following measures. The teacher can set password to the courseware, then tell students. And students need to land by their student id before download the important courseware. So we can guarantee the safety of the intellectual property right.

3.2 Environmental Assignment sub-System (EAsS)

In the traditional operation mode, teachers correct though the page; sometimes they need stand with scribbled pain. In every school year, the school leaders will spot check occasional of teachers work situation. So teachers need to save assignments to prepare for the examination in next semester. EAsS is more convenient than traditional operation mode, because a series of work about the operation will finish on the Web. For example, teachers can use the Amendment function of "Word" software to mark assignments. The marked content will be shown in red, which is very eye-catching. Teachers can use the Annotation function to write reviews of operations to provide students with specific comments and suggestions. The annotated part will be shown in red too. Then teachers can return marked and annotated assignments to students by the Internet. All records are preserved in the "Operation Database".

Teachers can correct assignments in any place with Internet access; they don't have to carry the operation of this exchange between the office and home. So teachers are very convenience by EPAsS and their work efficiency will be improved significantly^[10]. We will create the Email-Based Assignment Management Module(EBAMM). The entire process includes that Authentication, Students enrolling, Operation inputting, Assigning homework, Receiving operation, Grading assignment, Publication of the results and assignment statistics. As shown in figure 4:

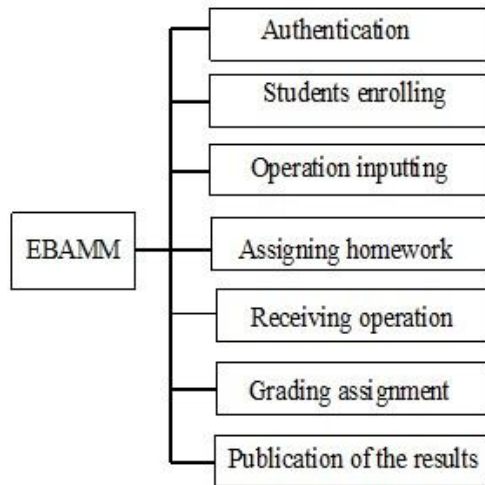


Fig.4 Framework of Email-Based Assignment Management Module

- (1) Authentication. EBAMM^[11,12] requires only the registered users to use the function of system. So, teachers can found account, set password, fill the teaching work Email and other personal information before use the system.
- (2) Students enrolling. Students shall enroll in the system before use Email to submit assignments to reduce burden of teachers. Students send personal information (such as student id, name Email address, etc.) to teachers according to the regulation of the format, teachers receive Email by the system; students' information will be filtered and wrote by the system to realize the automatic input of students' information.
- (3) Operation inputting. Teachers input homework to the system and establish homework library before assign the homework. The homework can be formed by group volume with the help of the external database system and can also be introduced directly by external files. At the same time, the answer of homework will be saved in the system database.
- (4) Assigning homework. Teachers first choose the assignment questionnaire; make sure contents of homework, then set the due time. The system will write the information to database with the request of teachers, and take the questionnaire out of the database, then send to students in the form of Email attachments.
- (5) Receiving operation. Students shall name the task accessories by the specified way before submit operations, in order to teachers can save assignments orderly.
- (6) Grading assignment. The system will chose all the home-

- work that not given the result from the database, then teachers can correct the homework documents by the computer. After reviewing the homework, teachers will give achievement and comment, and write into database.
- (7) Publication of the results. The system will chose all the homework that have given the result but not release (default is "not release") from the database, and send the answer and excellent students' assignment to every student by Email to contrast.
- (8) Assignment statistics. The system has the function that automatic statistics, which can give detailed statistical reports. When the submission deadline arrives, the system will list the statistics of students have not submitted the assignment, and generate automatically reminders email, then send to the appropriate mailbox.

Problems of no paper assignment have been solved detailed by EBAMM. EBAMM system not only saves resources and saves time and effort, but also makes for saving assignment. The educational administration departments can retrieval of database through the Internet to check the situation of grading assignment.

3.3 Environmental Test sub-System (ETsS)

ETsS consists of no paper correcting examination paper and online examination records.

In the traditional examination process, the school requires a lot of manpower and material resources^[13]. For example, the school needs to print a large number of papers, needs invigilator during the examination and requires teachers marking papers after exam. It is a waste of paper resources and time. Every academy need to save examination papers to prepare for educational administration department to check up on it at the beginning of each semester. The process of ETsS is shown as follows, Establishment of test database – Select test questions - Test online - Marking subjective questions online - Teachers marking objective questions by computers - Submit - Uniform marking the papers and Store the results in the database - To save.

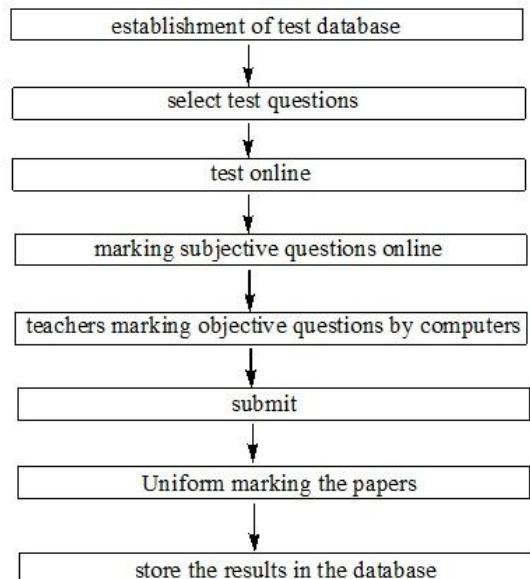


Fig.5 Framework of Environmental Test sub-System

The environmental correcting examination paper system can use the machine-readable to read over objective questions that greatly reduce the workload of marking. The machine-readable is very simple. All universities have the corresponding conditions. The system shall have the function which is Online Subjective Marking. Teachers can mark the examination paper online. The same questions can also be marked by many reviewers online, respectively. Scores derived from the weighted average. So the result will be more objective than before, and the quality of marking examination paper will be improved^[14].

The problem we need to note on online examination records is cheating. The examination records of ETS makes students test by computers. Schools need to install the device identification code to the existing computer room to ensure that students themselves take exam. In the examination room, real-time surveillance cameras have been installed on each test computer. Candidate login screen will appear after fingerprint identification through the computer. Then candidates can input the information into the examination system for examination. Some problems in the examination process such as window control, taskbar control, hotkey shielding and some messages of the application have been resolved already^[15].

Whether the online examination system can really play a role in practical applications, it requires a large number of test questions. If the number of questions is small, students may be a simple answer back, which deviate from the original intention of the network test. If there are a sufficient number of questions, students will turn to understanding the basal knowledge. Students will find their blind spot of knowledge in the process of study, and keep abreast of new knowledge. It will greatly promote the development of teaching. To this end we should establish our own Test Bank. In the beginning of each semester, there are some groups of teachers that teach the same course, they will set questions, then proofread questions each other in the same group. We will publish each teacher's name on the landing page of the examination system. On the one hand students will understand the workload of teachers, the other hand, if there is some problems of questions, teachers will be informed and correct errors in time. And teachers will enhance their sense of responsibility. So the test database will run long-term with health.

4 THE STEPS OF ETS ENVIRONMENTAL TEACHING SYSTEM IMPLEMENTATION

ETS actual implementation of paperless education system needs to solve some problems.

4.1 Technical issues

ETS system will break the traditional mode of education; it will be fully able to carry out based on existing technology. The whole ETS teaching paperless system will not be off computers and networks from paperless system in the classroom to the end of the environmental examination system, so this requires the school should invest a lot of money to improve related facilities, such as multimedia resources and device identification code.

4.2 Pre-training

Currently, there is no one university has fully implemented a environmental paperless education system, of course, which requires pre-service training of college teachers before the implementation of ETS teaching system.

4.3 The implementation from the part to the overall

Take Liaoning Shihua University for example, the school has three campuses and this is a new measure, some problems need to explore, so the next step is to test in a campus.

5 CONCLUSION

The obvious feature of ETS education system is that the use of computer information technology platform replaces the traditional blackboard mode. First, the advanced computer system determines the scientific of paperless teaching system; and application of device identification code increase the credibility of ETS system. Computer can process and save data, comparing to traditional education model, so the test scores will get more accurate data. Moreover, the environmental paperless system has changed the traditional teaching model, such as environmental paperless record, examination and assignment be recorded online. Which save a lot of resources, but also improve the teaching efficiency. With the information age coming, computer and network applications become more and more common, ETS paperless teaching system is bound to spread widely, it will play a huge role in the conservation of resources and improve efficiency and teaching quality.

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