Chapter 7
Original E-Assessment Methods

Liana Stanescu
University of Craiova, Romania

Marius Brezovan
University of Craiova, Romania

ABSTRACT

This chapter presents a couple of original e-assessment methods included in the non-commercial e-learning platform developed by the computers and information technology department. The platform has been in use for over 10 years in both University of Craiova and University of Medicine and Pharmacy of Craiova. Thus, two original e-assessment methods specially created for medical e-learning that use a medical imagistic database acquired in patient diagnosis process are presented. These two methods use content-based image query and content-based region query. Furthermore, the chapter aims to present two methods for question generating: a semi-automated method that uses tags and templates defined by professors, while the second one, automated, is based on domain ontologies developed for course content available in the database of the e-learning platform. The next discussed topic refers to an automatic assessment of narrative answers using the space vector model, a technique coming from information retrieval domain.

INTRODUCTION

E-learning has been and remains an intense research field in the last decades, supporting and improving the teaching, learning and communications process between participants, professors or students, especially when the two mentioned parties are dispersed. In order to achieve maximum potential, the e-learning process must have solid educational and pedagogical methods at base.

In the learning process, the evaluation of the participants occupies an important place. The electronic assessment techniques are agreed by students and offer a lot of advantages to professors and institutions that use such methods.

Considering all the benefits regarding e-learning and e-assessment, at the Computers and Information Technology Department an e-learning platform was developed, used for more than 10 years in the University of Craiova and also in the University of Medicine and Pharmacy Craiova.

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Although there are platforms that offer complete options and are successfully used in many universities, like Blackboard (http://www.blackboard.com/learning-management-system/blackboard-learn.aspx) or Moodle (https://moodle.org/?lang=ro), we chose the solution of designing and implementing our own non-commercial platform in order to answer specific requirements from the two universities, but especially for implementing our own modules resulting from e-learning research work, that is an active research domain with a large team in our department.

The main goal of our e-learning platform is to give students the possibility to download course materials, take tests or sustain final examinations and communicate with all parties involved. To accomplish this, four different roles were defined for the platform: sysadmin, secretary, professor and student.

A sysadmin user has the following tasks in the e-learning platform: adding/ deleting secretary type accounts, visualizing and monitoring the all users' activities using a log file that stores all these activities

The logging facility has some benefits: an audit may be performed for the application with the logs as witness; security breaches may also be discovered. The overall activity of users represents valuable data. This data may be off-line analyzed using machine learning or even data mining techniques so that important conclusions may be obtained regarding the quality of service for the application. The quality of service may have two indicators: the learning proficiency of students and the capability of the application to classify students according to their cumulated knowledge.

A secretary user type must manage sections, professors, disciplines and students, using the well known operations: add, delete or update. The secretaries have the possibility of searching students using different criteria such as name, section, year of study or residence. They also have a large set of available reports regarding the student's status.

The professor user type has as main task the management of the courses he teaches. The professor sets up chapters by specifying the name and the course documentation. Only students enrolled in a section in which a discipline is studied may download the course's document and take tests or examinations. Besides setting up the course's document for each chapter, the professor manages test and exam questions. For each chapter the professor has to define two pools of questions, one used for testing and one used for exams. He specifies the number of questions that will be randomly extracted to create a test or an exam. This way of generating tests and exams is intended to be flexible enough for the professor. The teacher can offer the students diverse examinations or testing variants. A question may contain pictures, and thus equations, images, formulas or other graphics may be embedded in it. For each question the professor sets up the visible answers and the correct answers. There are two implemented formulas that may be used for calculating grades. For each discipline the professor chooses and sets the formulas that will be used for all tests and exams taken at that discipline (figure 1). The e-learning application offers the teacher a number of reports and views for tracking the students' activity, the grades or training activity.

The student user type can download course materials for the disciplines at which he subscribed, take tests and exams (figure 2) and communicate with other parties involved, such as professors and secretaries. They can take tests and exams with constraints that were set up by the secretary through the year structure function.

A record of sustained tests is kept for all students. In fact, the taken test or exams are saved for later use (for example, the teachers need different reports). Thus, a student or a professor may view a previously taken test or exam if needed. For each question it is presented what the student checked, which was the correct answer, which was the maximum score that could be obtained from that question and how many points the student obtained. At the end, the final formula used to compute the mark and the grade itself is presented.