

# Encouraging student's learning potential with Testing Assistant

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## Abstract

*Keeping students satisfied is a tough job that needs constant improvement in the teaching/testing process. This is why course planning and student evaluation are key components of a successful didactic activity, but they are also time-consuming, especially during a professor's free time. Nowadays, as the European Parliament and Council recommends, the role of teachers is to inculcate the lifelong learning concept in the formal teachings of students. For this purpose, it became established to develop a professor's required competences in order to integrate digital technology in the didactical process, encouraging in this way the student's learning potential. In this paper we present „Testing Assistant”, an educational software tool which integrates student and course management as well as a complete testing system with automated feedback.*

## 1. Introduction

The teaching process has come a long way since blackboard, pencil and paper were a symbol of academic activity. A professor spent precious time generating quizzes and correcting student's answers. Then it would take days until the results were displayed. As desktop computers were becoming more and more a part of our lives, the revolution finally came up. Communication between the student and the professor became evermore efficient as courses were posted as documents on the internet, results displayed on web pages accessible to everyone and professors could be contacted on their email address.

While communication within universities got more and more specialized, integrating teaching/testing/communication into one system was the next step. This is how eLearning software came to life, featuring online courses with partial and final assessment. Over time, online learning could become more efficient than learning using classical methods (face-to-face courses, notes using pen and pencil, etc.). Besides that, it is generally available 24/7, thus offering more freedom in the learning process. Nowadays, as the European Parliament recommends, the role of teachers is to inculcate the lifelong learning concept in the formal teachings of students. For this purpose, it becomes established to develop a professor's required competences in order to integrate digital technology in the didactical process, encouraging the student's learning potential.

Further, in a few words, we bring some *pros* and *cons* arguments about using computers in a student's teaching / learning / testing process, emphasizing the advantages and disadvantages of *eLearning* systems. The affective factor has a key role [4]: in the classical evaluation in front of a professor and his colleagues, the student could be too excited to give a good answer, or could be unsure, or he could feel embarrassed in case he fails. In this situation, *online* testing obviously represents an advantage for any student. On the other side, the support and the trust required by any student who fails cannot be replaced by the “soul devoid” computing system. This situation illustrates a disadvantage of an *online* testing system. Another disadvantage of an *eLearning* system refers to losing (reducing) a student's communication skills, extremely important in the

real world, because it has been found out that many times, computers science students are unable to efficiently communicate verbally, to work in a team and also sell their work.

In this work we will exhibit the benefits of using Testing Assistant, where it is used, how it was implemented as well as a general presentation focused on its main modules.

## 2. The Testing Assistant tool. Structure. Functionality

First of all, Testing Assistant is an educational testing system that is free and is due to be used primarily in higher education. Secondly, as from its educational part, it can manage an entire university: specializations, subjects, administrators, professors and students. Last but not least, it provides a simple and intuitive exam management system that fits any workflow, supporting exam schedule, timed exams and highly editable quizzes, with 4 types of questions.

The system is currently prepared to be used in the authors' university and high school. In its first phase it will be used by two professors and their students, and if it performs well, usability will be extended. Partial and final assessments will be planned ahead and available to students 24/7 as well as online courses and lessons.

Testing Assistant was developed using evaluation versions of Visual Web Developer 2008 and Microsoft SQL Server 2008 and is running on a server using IIS (Internet Information System 7.0). Programming languages that are used are ASP .NET with C# source code and AJAX extensions.

Testing Assistant is a web application that runs in client-server mode to ensure optimum performance for the client-side, having as a single requirement an internet connection, with no restrictions for platform and PC performance.

When accessing the application, the system requires a username and a password. Users are divided into three categories: administrator, professor and student.

### 2.1. eManagement module

As a whole, eManagement module is taken care of by the administrator account. In a university it is recommended to have 1-2 administrators who will enter various data that is needed later for the eLearning and eTesting modules.

**Specializations** divide the university into different teaching fields, reflecting how most universities are organized. **Subjects** get a name and can be afterwards assigned to professors (see figure 1). **Administrators** will be added in this module as well, each of them receiving login privileges. **Professors** get a username and a password for logging in. Also, they get assigned the subjects that they are teaching. **Students** are required to be assigned a specialization, year of study, group and subgroup, like in most universities around the world. Because of the high number of students a university may have, the page has also a filtering capability to ease the administrator's work (see figure 2).

### 2.2. eLearning module

This is the newest module added into Testing Assistant, a module which manages online courses to be available for students through the system 24 hours a day, 7 days a week. As for its current development state, it consists of lessons which contain text items (see figure 3). Its structure can easily implement project-oriented group work, like Google Docs or Dropbox, which will be fully supported in later versions. In order to get to a lesson, the professor has to select one of his subjects, then a lesson title and finally the text items that compose the lesson. Font type, size and style are editable, so that basic content is easy to add. As a further development we will introduce media files as well, making lessons more intuitive and interactive.

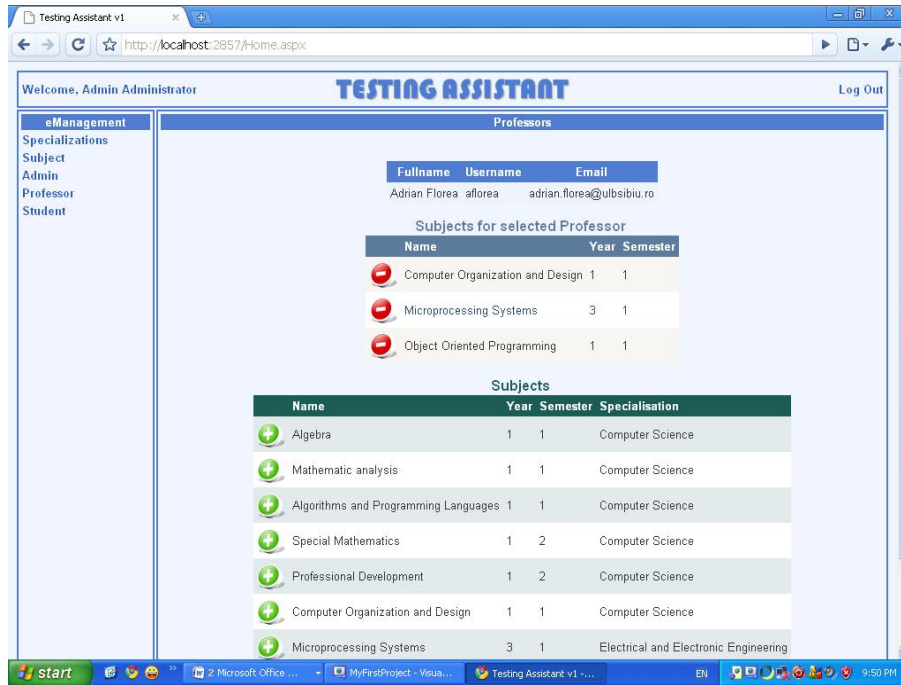


Figure 1. Managing subjects for a certain professor

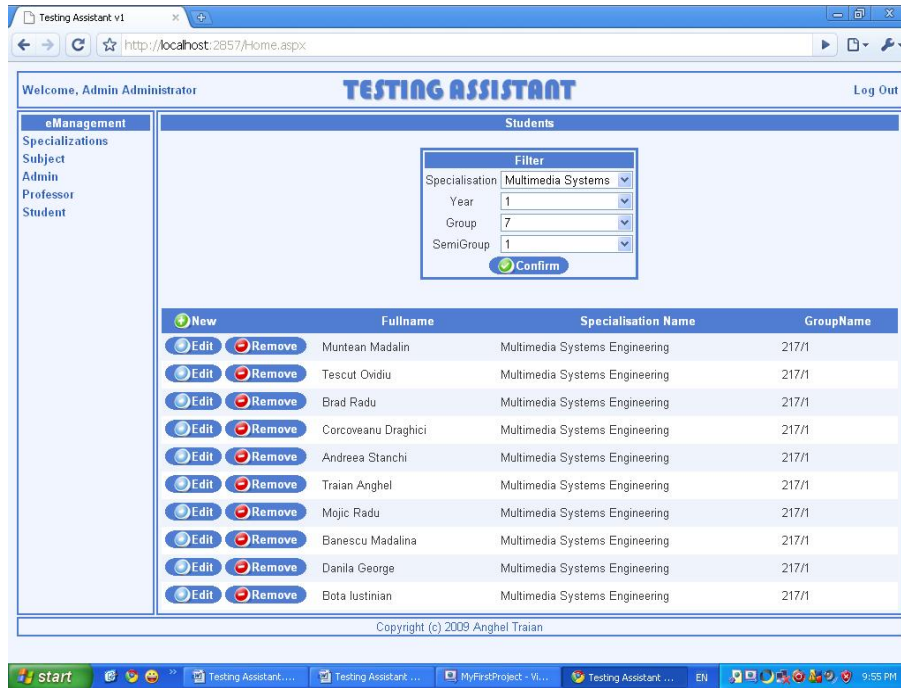


Figure 2. Students overview, filtered



Figure 3. Editing a lesson

### 2.3. eTesting module

This is the most complex part of the system. It consists of exam configuring and planning, testing, automated feedback, overview as well as its adaptable quiz.

**Exam configuring** begins with quizzes which contain a series of questions and answers divided into chapters (see figure 4). Testing Assistant manages 4 distinct types of questions:

- **Textbox**: the student must type an answer which must be identical to the control answer. Case-insensitive.
- **Checkbox**: permits students to choose one or more answers. No intermediate points.
- **Ordered**: the student is asked to place the answers into a specific order.
- **Essay**: designed for questions that don't fit into the other question types listed above. The professor will manually correct the students' answers after exam finishing.

**Planning** continues the configuring part in the exam module, where exam dates are set up individually, provided by a date and time for each separate session. Students are assigned to each exam date, having on their page an overview of the exams assigned to them.

**Testing** starts when the professor activates an exam date. When entering the exam, the student first sees some basic information about it. Then, by clicking on the "Questions" button, the exam questions will show up. The system generates questions in two ways, depending on the parameter "Question Generation": either random, by randomly selecting a specified number of questions – parameter "Question Amount" in exam configuring, or manual, when the professor picks a subset of questions in the QuestionSet module – parameter "QuestionSet". He has to answer the questions in the specified time for the exam, otherwise the system will automatically end his exam session and display the final result (see figure 5). If the student somehow leaves his exam page, he can

resume his session at any time. No answers will be lost because the system periodically backs up his answers. The exam session can be closed only by pressing the button “Finish” or, automatically, when the allowed exam time is up.

When a session is manually or automatically closed, the **automated feedback** system analyses the student’s answers for all question types, except “Essay”. A number of points are calculated and a mark from 1 to 10 is shown.

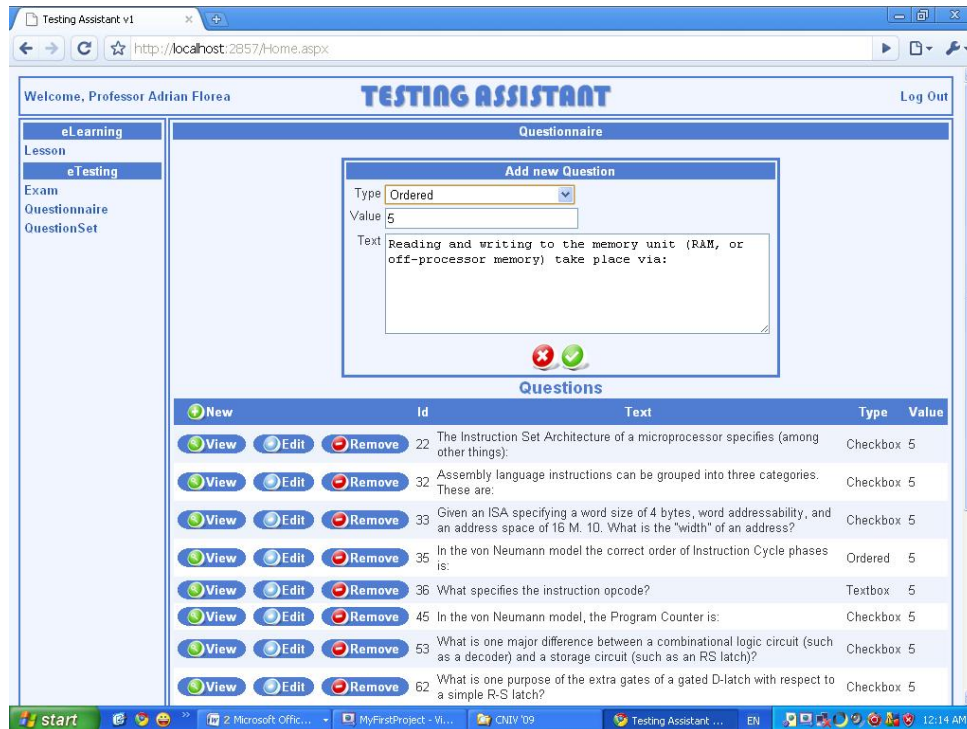


Figure 4. Adding new questions

For the essay type of question, the **manual feedback** system comes in charge. In the evaluation section of the exam, the professor may correct answers by entering a number of points between 0 and the maximum amount of points for that question (see figure 6). When the professor quantifies an answer, the correction status changes from “Not Corrected” to “Corrected”. The exam has a correction status as well. If no answers were corrected, the status is “Not Corrected”. When quantifying the first answer, the status changes to “Partially Corrected”, and when no more answers are to correct, the exam gets status “Corrected”. Exam dates and exam students have similar correction statuses as well.

An overview of the exam results can be seen, from a professor’s point of view, in the results section of an exam (see Figure 7). Alongside with the mark, the exam status is also shown for every student. Exam statuses have three states: “Assigned”, “In Progress” and “Finalized”. For the students with exam status “Finalized”, the professor can see further information. Also, the professor may see all of his students’ answers.

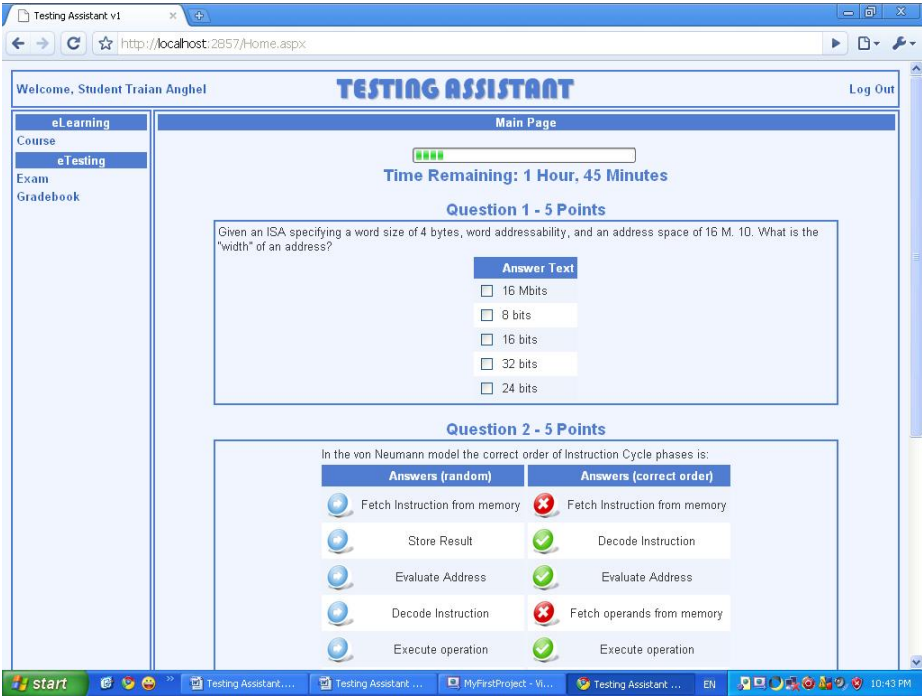


Figure 5. Exam page for student



Figure 6. Quantification of an answer

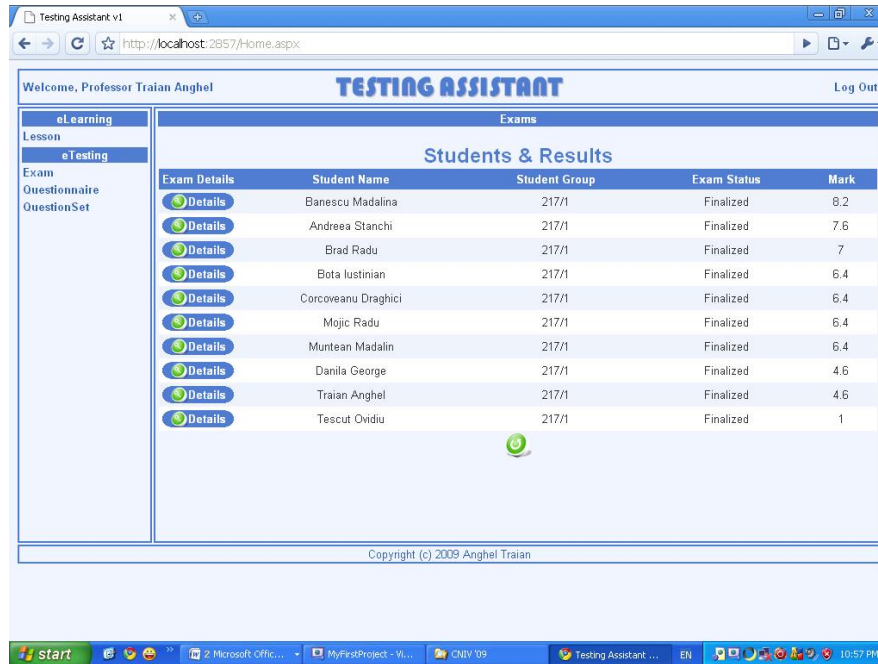


Figure 8. Exam results

Another feature of exam overview presents the possibility of mark editing. Regardless of what mark the system calculated, it can be changed by the professor who generated the exam, allowing increasing or decreasing mark for various reasons. This is sometimes helpful, especially when a student is caught cheating.

The student has his own type of overview; all marks received by him through exams are visible, together with other details, like professor, subject and timestamp. Also, he has the possibility to view his answers in former exams, too, as long as the professor doesn't delete the exam. Remark: although the professor deletes the exam, the marks don't get deleted. It is recommended to delete exams periodically, because they contain substantial information in the database, slowing database access with time (e.g. a university manages 5 specializations x 4 years x 12 groups x 30 students x 7 subjects x 2 exams/subject x 20 questions x 3 answer possibilities = 6,048,000 entries in database table ExamAnswer). Further development will support moving data into tables designed to hold historical data.

### 3. Conclusions and further work

We consider that Testing Assistant – an educational software tool which integrates student and course management as well as a complete testing system with automated feedback – could be a useful instrument for encouraging the student's learning potential. In further stages of development, we will integrate media files management in lessons as well as exams, a notification system to inform about important news and events as well as an e-mail-style communication interface.

The system was developed over a period of 9 months, summarizing over 300 kb of code. Its database consists of 22 tables closely linked to each other, containing all relevant information regarding users, specializations, subjects, lessons and exams.

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