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The use of information and communication technologies in education offers new means of evaluation and examination. e-Testing is a valuable evaluation tool that teachers can use during final exams and students can exploit for self-assessment, in order to gain insight of their level of understanding the course content.

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1. Introduction

The information and communication technologies development in recent years facilitates the integration of technology with every field, education being no exception. Within the last years, e-Learning, applying the concept of delivering education through technology, explosively developed all over the world. e-Learning is seen as changing the future of education and training, promoting life long learning by enabling learners to learn anytime, anywhere and at any pace.

Assessment plays an important role in the educational process, providing means of recording students' progress and supplying valuable feedback to them. Technology, viewed as an integrated part of education delivering, has increased the availability of effective assessment tools to be used by students, encouraging self-assessment at all stages of the learning process. Therefore, the use of computer based assessment and online evaluation tools has rapidly increased within higher education, often incorporated into learning management systems.

Online assessment is not a simple combination of assessment and technology. The development of technology enhanced evaluation tools brings both opportunities and challenges for the educational process. It has many advantages such as cost effectiveness, time efficiency, unlimited geographic distance, immediate feedback etc. But there are also limitations, one concern being the impact that an inappropriate user interface could have on student performance [1]. On the other hand, although no one is contesting that some aspects of the assessment can be performed much more efficiently and accurately by a computer, there are many other aspects that still require human involvement. However, the general opinion is that both students and teachers benefit when online evaluation is implemented appropriately.

2. e-Testing – an Online Assessment Tool

e-Testing is an evaluation tool, developed as an alternative to traditional methods of examination. Using such software brings a plus to the educational process, improving both learning and examination. The perceived benefits for the teacher or course manager include automated grading and student progress recording, facilitating robust data analysis, reporting, and flexibility. The benefits for the students usually focus on the opportunity for instant feedback, allowing the long-term improvement of their performance [2].

The software product aims to achieve the following functionalities required for an efficient teaching-learning process, namely:

- assessment and self-assessment – based on previously stored questions, assessment tests can be generated, so that students can solve them online;
- recording the students' performance – the results of the evaluations are stored in a database and can provide the history of each student.

As an online evaluation tool, e-Testing can provide important information for both teachers and students regarding the students' progress, being a valuable tool in the learning process. The idea is to use the web to deliver assessment opportunities that allow the students to gain a measure on their understanding of course content. Immediate feedback on test results also helps teachers to identify both students' level of understanding and those areas that they might need to concentrate on.

The product is a Web Application project developed in C# .NET and is able to support two operating regimes:

- administrator* – intended for teachers use, allowing for questions and tests administration, users management, and establishing users rights over the application functionality. In addition, the teacher has the possibility to track each individual student's evolution and can obtain various reports and graphical representations of the stored results;

–user – intended for students use, allowing for their online assessment and self-assessment, using a tests generator. The online tests, in the form of multiple choice questions, provide feedback through automatic grading and results recording, also providing the correct answers to the students.

3. Teacher Role

The administrator regime allows the teacher to manage the application users (personal data, test results, users rights), and to administrate questions and tests (updating multiple choice questions, number of questions per test, examination time). For the classical paper assessment method, there is a possibility to generate tests that can be saved in Word format for later printing.

In addition to users management, the teacher can obtain a series of reports that offer the following information:

- displaying students having grades that meet certain restrictions;
- counting and displaying students from one class / year;
- displaying students from one class that passed / failed ;
- displaying students from one year that passed / failed;
- searching a student by name.

| Situatie | ID | NUME | PRENUME | GRUPA | MEDIA |
|-----------|----|----------|-------------------|-------|-------|
| Vizitarea | 48 | GERGORE | VERONICA IOHANA | 133 | 5.75 |
| Vizitarea | 49 | SOHAGHOS | VALENTIN | 133 | 7.25 |
| Vizitarea | 71 | POPOVICI | RADI DANIEL | 233 | 6.9 |
| Vizitarea | 73 | SOHAGHOS | VALEH ABEREI | 433 | 7.25 |
| Vizitarea | 75 | POPOVICI | RADI ABEREI | 411 | 5.75 |
| Vizitarea | 77 | POPOVICI | CONSTANTIN | 233 | 3.25 |
| Vizitarea | 5 | HALDE | CATALINA CRISTINA | 133 | 6 |
| Vizitarea | 3 | LOCHES | BOGANA | 433 | 7.75 |

Fig. 1. Student reports

The teacher can choose to visualize the complete data of a student, including the results from previous examinations.

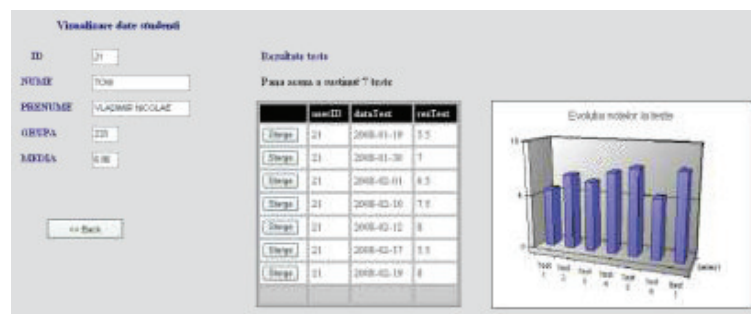


Fig. 2. Student history

Graphical representations in different forms provide more relevant and useful information about various statistical situations:

- students graduation rate;
- students graduation rate by years of study;
- students graduation rate in one class;
- students distribution by years of study;
- students average results by years of study.

The second feature of the administrator mode is managing tests; this involves administrating the multiple choice questions stored in the database and setting different characteristics of the generated tests, such as the number of questions or the examination time.

Exiting the administration mode and returning to the login page allows switching between the two operating regimes.

4. Student Role

The student mode allows access to testing the application for both authenticated and non-authenticated users.

Authenticated user is directed to his personal page containing information about his previous tests and his evolution, the student having the possibility of generating a new test. If the student does not have a user account he can still use the software, but the application only allows generating self-assessment tests without saving the results. The test contains a number of multiple choice questions determined by the teacher; the questions will be randomly chosen from the database without recurrence. For each question five alternative answers are provided, also in random order.

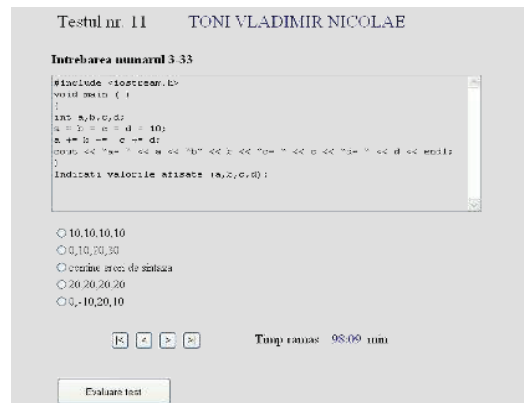


Fig. 3. Test generator

User is allowed to scroll between questions and can rethink an answer. For a more effective evaluation, the time interval in which the test should be done is determined by the teacher. In order to manage the remaining time, two JavaScript functions running on client were defined, combined with a C# sequence running on server.

```

JavaScript:
<script language="JavaScript"
  type="text/JavaScript">

function startTime() {
  var x
  x=document.getElementById("LbTMin")
    .innerText
  document.getElementById("LbTSec")
    .innerText=x
  checkTime()
}

function checkTime() {
  x=document.getElementById("LbTSec")
    .innerText
  if (x>0) {x--}
  var s=x%60
  var m=(x-s)/60
  if (s<10) s="0"+s
  document.getElementById("LbTSec")
    .innerText=x
  document.getElementById("LbTimp")
    .innerText=m+": "+s
  t=setTimeout('checkTime()',1000)
}
</script>

```

```

C#:
private void Page_Load(object
  sender, System.EventArgs e){
  .....
  if(!IsPostBack) {
    GenTest();
    int i=Global.NrIntrTest*
      Global.TimpIntreb;
    LbTMin.Text=i.ToString();
    DateTime d=new DateTime();
    d=DateTime.Now;
    d=d.AddMinutes(i);
    LbTimpMax.Text=
      d.ToLongTimeString();
  }
  DateTime d1=new DateTime();
  d1=Convert.ToDateTime
    (LbTimpMax.Text);
  TimeSpan dif=d1.Subtract
    (DateTime.Now);
  int jt=Convert.ToInt32
    (dif.TotalSeconds);
  LbTMin.Text=jt.ToString();
  if (jt<0)
    Response.Redirect
      ("WebEval.aspx");
}

```

When time expires the user is automatically redirected to the evaluation page. The test result is saved in the database and feedback is provided immediately by allowing the student to see the correct and wrong answers he has chosen during the test, and by automatically calculating the grade he obtained. The student can also see a graphical representation showing the quantum of correct and wrong answers. The test, the selected answers and the correct ones, can be saved in a Word file on the client computer, in order to be consulted later. The user also has the possibility to generate a new test, to return to his personal page or to logout.

5. Conclusion

The transition from the classical methods of evaluation to the new assessment practices enhanced by information and communication technologies, has been shown to be not only effective but also have benefits for students, teachers, and course administrators. Some of these benefits can be synthesized as follows [5]: improve student learning by identifying their strengths and weaknesses; review and improve the effectiveness of different teaching strategies or curricular programs; improve teaching effectiveness; and provide useful data that will help decision making.

e-Testing is a software program intended for educational use, being designed to be utilized as auxiliary teaching and learning material for any subject in the curricula. Its functionalities allow generating and managing of students' self-assessment and examination tests, and tracking each student's performance.

The software improves, but does not intend to replace the traditional evaluation system. The auxiliary is a useful and practical tool, for preparing self-assessment and examinations tests, coming to support both students and teachers. But, like any other auxiliary, it cannot replace some aspects of the evaluation process, such as the efficiency of the dialogue between teachers and students during the exam and the individual work students need to perform in order to acquire deeper knowledge.

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