# Testing Students' Knowledge Using Electronic Web Tests

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Introduction

An electronic test
presents a fast and effective form of feedback from student to teacher. It can
be fully automated and very precise. The electronic test as a highly formalized
instrument of evaluation of student&rsquo;s knowledge has a specific position in
the education process.

There have
always been some problems with examinations, assessment, classification and
evaluation. The two sides&mdash;teacher-student, student-student,
teacher-parent&mdash;often have different points of view. A demand for a fast,
powerful, objective and precise tool to obtain necessary information has arisen
together with increasing number of students, modern forms of learning and
distance learning.

In our school we supported e-learning by creating a students&rsquo; knowledge
testing system. It is based on a MySQL database and PHP scripts. Tests can be
accessed in a computer network, the Internet or an intranet and are realized as
dynamic web pages.

Features
of Electronic Test Application

The application is implemented as a form in which
questions and answers are presented in a successive order. The student can
select appropriate answers with a mouse click. The number of options in the
answer can range from two to. The number of valid answers is one or more.

The teacher prepares the
tests for students and does some necessary administration. Everything is done
using a web browser and an appropriate web page.

The test form generated and processed by the
application is a rather complex unit with several customizable attributes. It
is generated on the basis of its attribute values, of which the most important
ones are as follows:

-
Time limit value for taking the test

-
Total number of questions

-

Number of selected questions in an actual
test

-

Type of questions

-

Flag for scrambling the order of questions

The application is able to generate two kinds of
questions: select forms (single choice, with radio buttons) or multiple choice
forms (with check boxes). At first the script evaluates which kind of test is
taking place and according to that it generates an appropriate form. The time
limit value sets the owner of the test (test creator).

Electronic
Tests Administration

The application
of electronic testing has three types of users: an administrator, a teacher and
a student. These users have different permissions. The student has the lowest
rights and the administrator has the highest.

Student&rsquo;s rights:

-

Belong to a class.

-

Login and logout.

-

Fill in the tests.

-

View the result of his/her tests and the
results of his/her class.

-

Change the password and anything in his/her
profile.

-

View the list of emails of all students in
his/her class.

Teacher&rsquo;s rights:

-

Login and logout

-

Change his/her password and edit his/her profile.

-

Create and delete the subjects he teaches. He/she is an owner.

-

Create tests. S/he can edit or delete these tests. S/he is the owner.

-

(S/he cannot edit or delete the tests of another teacher)

-

Assign tests to subjects s/he teaches.

-

View the results of his/her tests.

Administrator&rsquo;s rights:

-

Create user accounts.

-

Create classes and enroll students into classes.

-

Change or delete accounts.

-

Assign subjects to classes where they ought to be studied.

-

Assign every student to a class.

-

View all subjects, tests and tests results.

-

Act as a teacher having all his/her rights.

Class
Diagram

Every record in the tables of database has its own
identification number ID. The system can be viewed as a registration of objects:
teachers, students, classes, subjects, tests, tests questions and tests
results.

The
relations of objects in the tables of database are as follows:

-
Every class studies several subjects.

Every subject can be studied in several classes.

-
Every class contains various students.

But every student belongs to only one class.

-
Every teacher teaches several subjects.

But every subject has only one teacher.

-
Every subject can contain some tests.

But every test belongs to only one subject.

-
Every test consists of a number of
questions.

But every question belongs to only one test.

-
Every student can obtain some result from
many tests.

But every result belongs to only one student.

-
Every test can produce many results.

But every result belongs to only one test.

## Types
of Test Questions

Test questions are implemented in various
forms.

### True-False
questions are the simplest form of the
multiple-choice format in which there are only two possible alternatives,
True-option and False-option.

These tests are very easy to create, but the students
can also guess the right answers.

### Multiple Choice
questions (Select one option). The student chooses one answer from a
number of choices supplied. While it&rsquo;s harder for a student to guess the
correct answers, creation of this test is more difficult than True/False
questions.

### Multiple Response
questions form (Select a number of options). This can be viewed as a
combination of the previous two types. The creation of the test depends on the
number of options. If it is not fixed, the creation is more flexible. If it is
fixed, evaluation is simpler.

### Supplement. In some
test questions, there is a need to attach a picture, graph, diagram or other
visual form of supplement.

This can be done by means of an appropriate script and the column
AttSupp in the table Questions.

## Test Result
Valuations

There are various ways of test evaluation. This application assigns a
value to every option (Weight1 to Weight7). It is a real number with two
decimal places assigned during test creation.

Some of the techniques used for evaluation are as follows:

-
Evaluate right only. The right answers (options) give a positive score and the wrong
ones give the zero score. A question without an answer also means zero.

-

Penalty for wrong answers
(options). The same as previous except that incorrect answers give a negative
score, discouraging students from guessing (a negative approach).

-

Evaluation apart. Evaluate questions
and options apart. There are two results of the test: one can see not only the
number of right answers but also the number of right options.

-

Evaluation with calculated weights.
Calculates weights&rsquo; values for the type of the question assuming a number of
options and a number of right options. In this way the student can be forced to
answer right as much as possible (a positive approach).

The
duration of test-taking can be considered and some points for premature
finishing of the test can be added. The end of the test in a specified time
automatically guarantees the script.

Conclusion

Testing
students&rsquo; knowledge using electronic tests is a unique method of evaluation of
results in the education process employing modern technologies of the Internet.
Implementation of electronic didactic tests helps the teacher to effectively
evaluate students&rsquo; work and preparation and to present results in a transparent
and objective form.

References

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