Testing System for Graphic Disciplines

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To improve the quality of education in graphic disciplines, computer technologies are used:

• for presenting educational material at lectures and practical classes;
• for conducting current, intermediate and final control of students’ knowledge.

**The problem** is to use the proper tools for both purposes.

In this report we’ll take under consideration the problem of controlling knowledge on graphic disciplines.
Characteristic Properties of Knowledge Control on Graphic Disciplines at MPEI

There is a point-rating system (PRS) for monitoring the educational process at MPEI.

• the work programs content on graphic disciplines diversify for different specialties;
• a large number of students are tested every term on graphic disciplines (from 1000 to 1500 people);
• there are from 4 to 10 point-rating events during the educational process on graphic disciplines.

This led to the need for creating a testing system that can identify typical “gaps” in students' knowledge and allows teachers to create a large number of test items at the lowest labor expenses.
Merits of the Testing System for Graphic Disciplines (TSGD)

• the developed system needs no technical knowledge in the field of network software administration;
• there is no need to pre-configure and configure the web server;
• there is no dependence on a central web server;
• the test system server can be launched both in the local network and provide access to the developed testing system via the global Internet regardless of the main server;
• it is possible to remote access to the testing system from any platform that provides a runtime environment with support for a browser that works with the HTML5 standard.
## Comparison of the Capabilities of Computer Knowledge Testing Programs

<table>
<thead>
<tr>
<th>Capabilities of Systems</th>
<th>Testing Systems</th>
<th>MyTestXPro</th>
<th>x-TLS</th>
<th>INDIGO</th>
<th>Moodle</th>
<th>OpenTest</th>
<th>Let’s test</th>
<th>EG MPEI Testing System (TSGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional types of test questions</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Ability to customize grading scale</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ability to import questions</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Ability to export tables with results</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Protecting test keys and user data</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>The ability to refine program modules, integrating custom blocks</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Setting up a test schedule</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
Basic Characteristics of the TSGD

The developed testing system consists of three modules:

• **testing module** provides the test user with the ability to perform a test task presented in the form of text or graphic image;

• **administration module** provides both the management interface of the developed test system and the capabilities necessary for the teacher to verify and control the ongoing testing;

• **test development module** allows the developer to add the task to the test task database available in the testing system.
The Content of the Test Task Directory

- Test name
  - name.txt
  - test.txt
  - auxiliary files with graphic files
### TEST MARKUP

<table>
<thead>
<tr>
<th>Tag</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>[t]</td>
<td>Test task. An empty tag [t] is placed at the end of the test task and means the end of the file</td>
</tr>
<tr>
<td>[q]</td>
<td>Possible answer</td>
</tr>
<tr>
<td>[x]</td>
<td>The correct answer label is placed after the [q]</td>
</tr>
<tr>
<td>[i]</td>
<td>A link to the image file is placed after the [t] tag and before the [q] tag</td>
</tr>
</tbody>
</table>
Testing System for Graphic Disciplines

An Example of the File «Test.txt»

[t] Question  text ?
[q] Question  answer text
[q] The right question answer text [x]
[q] Question  answer text
[q] Question  answer text
[t] One more question text?
[i] picture link.png
[q] The right question answer text [x]
[q] Question  answer text
[q] Question  answer text
[q] Question  answer text
[t]
Testing Preparation Program

This training program is a subsystem for the developed complex of automated teaching aids on the discipline "Engineering Graphics".

The program is intended for self-training students.

The program is written in C++. The SFML is used as a graphical display model, adapted to output the necessary geometric shapes with the least cost in hardware performance.

Work algorithm: a point is randomly generated in one of the views with a further transferring the projection of the point to other views.
Testing System for Graphic Disciplines

Testing Preparation Program

Rotation surfaces studied in the subsystem

In this case a mathematical model calculated on the basis of analytical geometry methods is used.

To random three points random parameters are changed according to the method of fuzzy logic and random distribution.
Testing System for Graphic Disciplines

Administrator

• renovate data base of students
• output the test
• look at the test
• look at the test results

output test for the student

the name of students group

student’s name

output test for group

Student’s results
This is one of the test questions on the subject of “Surfaces”.

The tests are developed for all subjects of engineering graphic disciplines.
CONCLUSIONS

The developed system for testing knowledge on graphic disciplines
• brings modern opportunities to the teaching process and has a number of advantages compared to existing testing systems;
• allows you to change flexibly the number of questions issued to the student on various topics of graphic disciplines and ensures the confidentiality of the testing results.

The test markup language and software interface used in the development expand significantly the system’s functionality at the request of teachers.
REFERENCES


Thank you for attention!

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