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Assessment with Information Technology Support

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Abstract

This article describes the part of the solution of effective assessment with the support of technology. It is a part of a complex solution containing model of teaching, which includes the assessment with the support of technology, verification of the model by implementing in selected mathematics courses, adaptation of teaching model based on the results of the experiments, and development of recommendations and application for other subjects of study at the Faculty of Material Science and Technology, Slovak University of Technology (MTF STU) in Trnava.

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1. Introduction

Student's assessment is an important part of effective learning process. (Andrade-Aréchiga, López, & López-Morteo, 2012) Recently it is possible to notice that the role of ICT in assessment rose in extent that we can speak about e-assessment. (Blanco & Ginovart, 2012)

Assessments with technologies support were defined as those that integrates authentic experiences, involving digital media, with incorporation of performance measurement, learning and knowledge, which creates a detailed record that can be analyzed and immediately used its results by teachers and students to improve education.(Webb, Gibson, & Forkosh-Baruch, 2013) In order to measure complex learning outcomes, it is necessary to develop

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alternative approaches to evaluation as well as evaluation tools that overcome the limitations of current evaluation systems and will be based on an understanding of the impact of ICT on education. (Erstad, 2008) Daly et al. (2010) indicate that the use of ICT in assessment blurs the boundaries between formative and summative evaluation. Adaptability is becoming an essential feature of e-assessment, because the resulting feedback is used by students to adapt their concepts and approaches to tasks and by teacher to adaptation of tasks to the needs of the students. This is in accordance with the concept of self-directed education. (Pokorny, 2012)

Extended use of technology caused frequent usage of tests for assessment, as well. (Ferrão, 2010) When the number of students is high, teacher can be overloaded with tests evaluation. (Webb et al., 2013) (Országhová, Gregáňová, & Matušek, 2013) Academic information system that has component for the tests generation and evaluation can help with this task. Disadvantage of this approach is that the number of students simultaneously undergoing test is limited to the number of working places in the lab. That was a reason why we decided to use scanners and recognition techniques in the form of assessment system designed to break this dependency. Specialized scan software and hardware has been integrated with Academic information system so that together they can generate, evaluate, and archive tests. To be sure that the assessment of students will reveal their real knowledge and skills a research project was carried out during 2012 – 2013 - 2014 academic years.

2. Purpose, research context and methodology

Following questions have form the essence of research:

1. Does different form of test tasks influence students score in tests?
2. Are the students' results influenced by time when they are tested (during semester tests or final test)?
3. Are there any differences between men and women in solving different test tasks?
4. Is the succeed rate of students in tests dependent on the kind of secondary school they graduated?

Teaching model contains teaching and assessment blocks and database of tasks that requires application of knowledge. Model stresses continual learning, activity, independence, and creativity.(Mišút & Mišútová, 2013) Educational process has been massively supported by technology. Students had the package of educational e - materials at their disposal. This package includes educational content, additional interactive teaching materials, e-lectures, e-presentations from lectures, application of knowledge (file of key solutions, activating exercises in the form of e-textbook), and self-evaluation tasks – interactive self-tests.

Proposed teaching model (Mišútová & Mišút, 2012) was applied in mathematics courses during 2012/2013 academic year in the first year of study. On the base of gained results, the model was adjusted and used during winter semester of 2013/2014 academic year.

Students undergo three so called mini-tests (four closed-ended tasks, 10-15 minutes in total) as well as checking tests (Test 1-2, Test PC) in the 5^{th} and 10^{th} week of semester, and test with mathematical software support (WinPlot and Maxima) where tasks were open-ended.

In order to succeed in math courses, the student has to be successful in both components that form assessment. Students can earn totally 40 points during course. The emphasis during the whole teaching process is put on activity, creativity and self-activity of students. The results achieved in the post-test (as a part of math course final examination) that is aimed to verify students´ ability to apply the acquired knowledge, are essential for assessment. Students can earn maximum 60 points in this final test. To successfully pass math course students must earn at least 56 points.

Three mini-tests containing multiple choice questions, two tests with open-ended tasks and one PC test where students solve an open-ended problem with the use of mathematical software WinPlot and Maxima have been used during the term to answer research questions. Test with multiple choice questions, evaluated by advanced scanning and recognition technology, students had taken in the exam period. This test is designed on the basis of tests quality criteria and satisfies requirements of content validity. It means that test evenly covers the learning content and measures its acquirement at the required level, according to the taxonomy of educational objectives. Skills and creative application of knowledge is tested. All versions of final test are equivalent.