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TECHNICAL FACULTY "MIHAJLO PUPIN"
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With this publication, the CD with all papers from the International Conference on Information Technology and Development of Education, ITRO 2014 is also published.

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INTRODUCTION

This Proceedings comprises papers from the **International conference on Information technology and development of education** that is held in the National House of Mihajlo Pupin, Idvor on June 27th 2014.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and in the region, as well as, to gather experts in natural and technical sciences' teaching fields.

The expected scientific-skilled analysis of the accomplishment in the field of the contemporary information and communication technologies, as well as analysis of state, needs and tendencies in education all around the world and in our country have been realized.

The authors and the participants of the Conference have dealt with the following thematic areas:

- Theoretical and methodological questions of contemporary pedagogy
- Personalization and learning styles
- Social networks and their influence on education
- Children security and safety on the Internet
- Curriculum of contemporary teaching
- Methodical questions of natural and technical sciences subject teaching
- Lifelong learning and teachers' professional training
- E-learning
- Education management
- Development and influence of IT on teaching
- Information communication infrastructure in teaching process

All submitted papers have been reviewed by at least two independent members of the Science Committee.

The papers presented on the Conference and published in this Proceedings can be useful for teacher while learning and teaching in the fields of informatics, techniques and other teaching subjects and activities. Contribution to science and teaching development in this region and wider has been achieved in this way.

The Organizing Committee of the Conference

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ELECTRONIC TESTS IN HIGH EDUCATION-OPPORTUNITIES AND CHALANGES

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Abstract – Checking and evaluation of knowledge of the students is an important segment in educational process. Paper presents application of electronic tests in student's exams, its creation, scoring and evaluation by using web based software for creation of electronic tests. Electronic tests are implemented in April exam term, year 2014. Comparison is made between archived student outcomes in April exam term when electronic tests are used and February exam term when they were not used. This was a pilot project implemented on only one subject in one exam term but it has opened the wide doors for further implementation of information technology in high education especially in achieved knowledge evaluation since it has proved to be very effective, objective and time-saving way for student grading.

I. INTRODUCTION

Checking and evaluation of student knowledge in educational process is an important segment. This enables to be determined: the degree, the completeness, the depth, the applicability and durability of adopted knowledge and skills from student's side. With knowledge evaluation we are increasing educational discipline and we are improving the activity of students and their work. There are many different ways for checking student knowledge: systematic monitoring, frontal verbal check and individual check which can be implemented with control works, learning sheets and different types of online tests. Prior to the realization of checking the professor needs to acquire necessary preconditions for successful checking of knowledge and those are: checks needs to be on-time and planned, to be psychologically sustainable and of course, objective. Information technology is shaping the world we live today and it has it has changed dramatically the educational system world-wide with introduction of e-platforms for learning, distance learning and electronic tests where software program is identifying correct and incorrect answers and the professor role is evolving from instructor to mentor [1]. Educational institutions recognize that they must move apace with the technology-driven

changes in the society. In today's information society, schools must ensure that learners possess the knowledge and competence to apply the new information and communication tools productively and they must equip learners with critical and analytical tools required of them to live and flourish in an information saturated environment [2]. Flexible access to learning time and locations are another features enabled by technology driven educational system where student can access remote classes from different locations [3].

In this paper we will put the accent on on-line tests, its creating, using scoring and evaluation by using software for web-based creation of electronic tests. Electronic tests are used for discovering "weak" points in student knowledge and in the same time they tend to be fair and objective. Paper presents the process of creation of e-tests and its implementation in April exam term, year 2014 for subject Electro-technical materials. Furthermore, comparison is made between achieved student outcomes in April exam term when electronic tests were used and February exam term when they were not used.

II. METODOLOGY FOR CREATION OF E-TESTS

There are numerous web-based applications which can be used for creation of e-tests. Most of them are free and in the same time they provide sufficient level of quality. In this paper is used web page <http://www.classmarker.com> (Fig.1) which as a free version has some limitations [4].



Figure 1. Starting page of web-based application ClassMarker

Registration to the class-marker web with valid e-mail address is a first step in creation electronic tests. All students who are tested must be registered in classes and system automatically creates user name. Only password is added by test administrator. Then by returning to starting page and pressing the icon Test a web page is opened where test can be created. By pressing the button for new tests (New Tests+) a procedure for test creation can be started (Fig.2). Name of the test is written in empty box and button for adding questions should be pressed (Fig.3). By clicking the button (Add Questions) a new pop-up menu is opened in which we can choose weather we want to create a new question, to import the question which is already created in some other document (Import New). The later option is not allowed if we are using the free version of web page. We can also add question created by ourselves which is already in data base of web page (Add from question Bank).

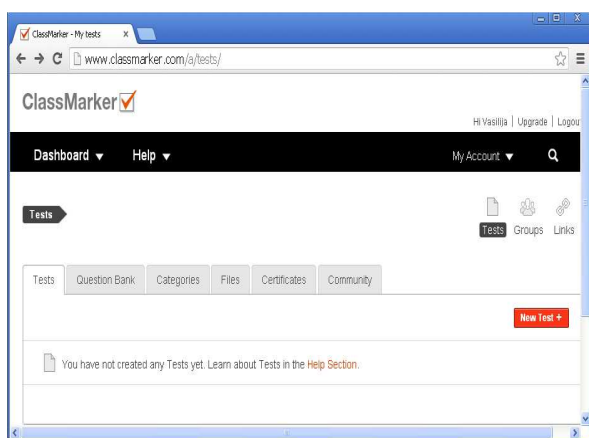


Figure 2. Web page for test creation

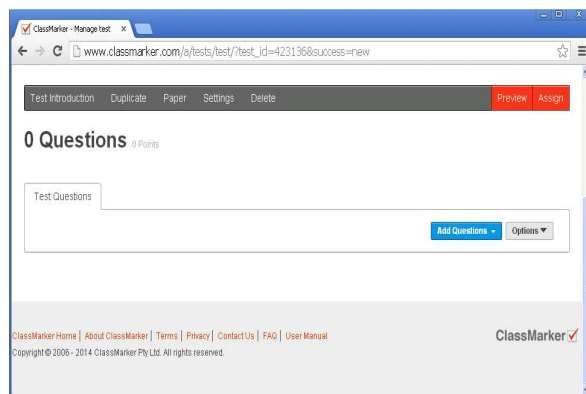


Figure 3. Web page for adding question in the tests

A question is created by choosing the option for adding new question. There are several types of questions which can be created: questions with multiple choices, true/false questions, questions by adding text (Free text), grammar text and essay. In our exam all questions were questions with one choice, i.e. to be chosen correct answer from several options.

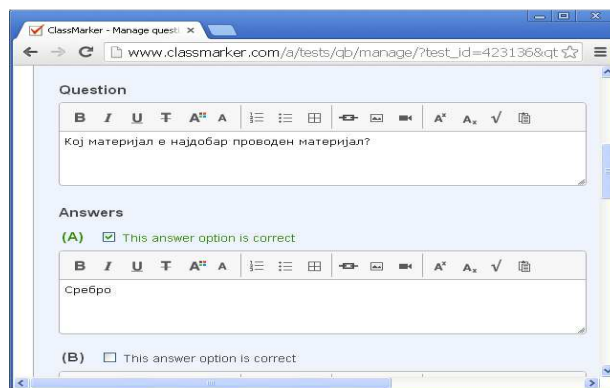


Figure 4. Creation of question and answers

In empty fields for questions, question is filled (Fig.4). Afterwards answers are input. Correct answer is marked with check mark. In other answers which are false this field is not checked. On the bottom of the page there is an information which notify us which answer is chosen to be correct. There is an option to randomize the answers and it should be turned on. In this case answers are appearing in different schedule, each time we open the test. Finally there is a possibility to preview the question, answer which is chosen to be correct and as a last step question is saved. Procedure is repeated until all questions are created. Next step is to assign the test to a certain group of students for which the test is aimed. Last menu in test creation is menu under name Settings in which several options regarding tests performance are defined (Fig.5).

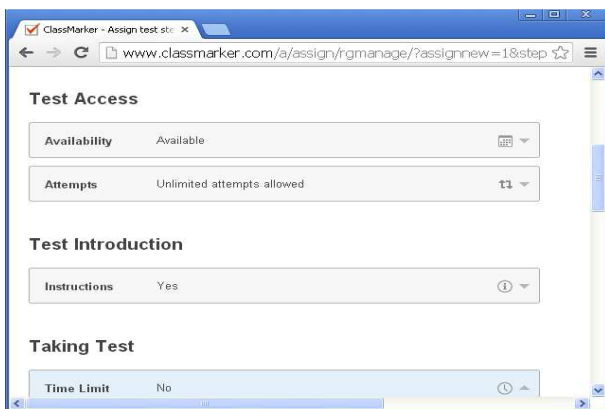


Figure 5. Web page for adding question in the tests

One of these settings is tests Access in which we define when this test can be accessible and how many times the same tests can be used. In our test we have chosen the option each student to access the test only once. After student exits the test it can not return again and continue solving the same tests. Second setting is Test Introduction where at the beginning of the tests basic instructions are displayed necessary for proper test solving. In the option Taking test, time for test performance is set and we have chosen for fifteen questions, thirty minutes available time for solving them. In the menu Tests question we have chosen to have only one question per page and we have chosen questions to be displayed in a randomized way at each starting of the tests. In that way we had minimized the chances students not to work individually on test solving. The final menu Tests Completion is giving information about the number of scored points, and here we determine the level of correct answers in percentage in order for the test to be considered as passed. All these settings are saved and the test is ready to be used on an assigned group of students.

III. IMPLEMENTATION OF E-TESTS

First recognition for use of created electronic test is to have available computer with internet access. Students register themselves to the web page with user name and password and the web page displays where they can read the instructions for the test, obtain necessary information from the professor and by pressing the menu start, starts elapsing of time for test solving (Fig.6).

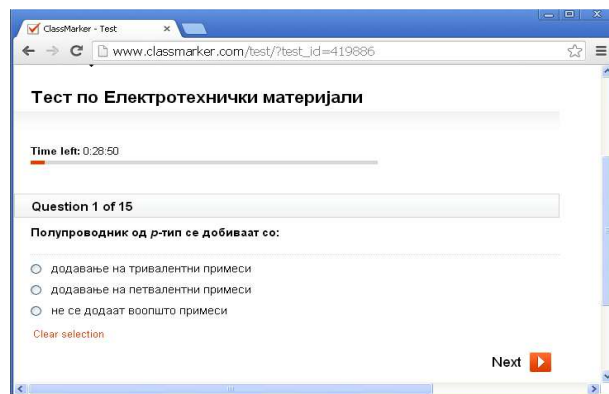


Figure 6. Display of questions in electronic test

Students should finish the test within the assigned time limit of thirty minutes, if not the test is automatically closed. After the test closes, students have the possibility to see results in percentage and number of achieved points (Fig. 7).

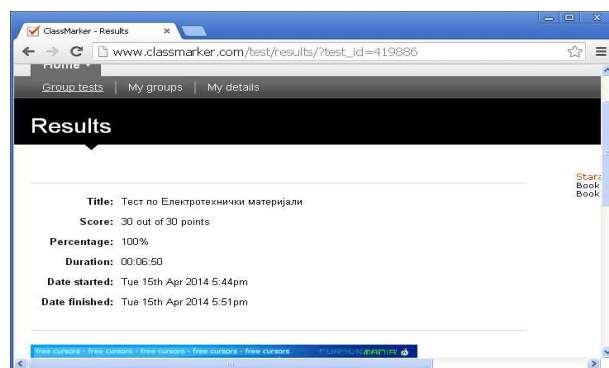


Figure 7. Results from testing available to students

Professor as administrator of test has the possibility to view the overall results of the tests for each student but as well as group results (Fig. 8). From the tests report average result from tests success can be viewed but as well success of each student separately as percentage of correct answers and as number of obtained points out of total number. For each student there is a separate report where all questions are displayed and correct and incorrect answers (Fig. 9).

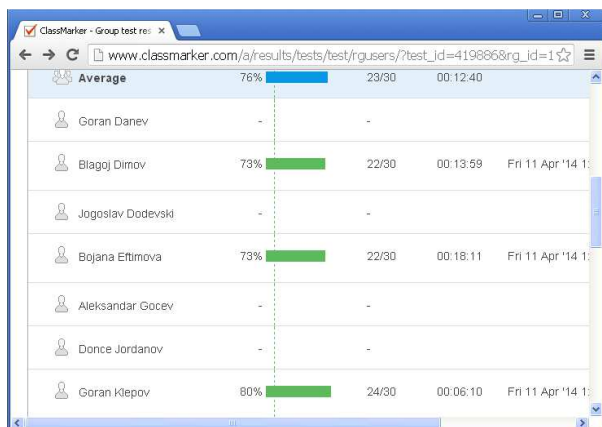


Figure 8. Display of results from test overall success

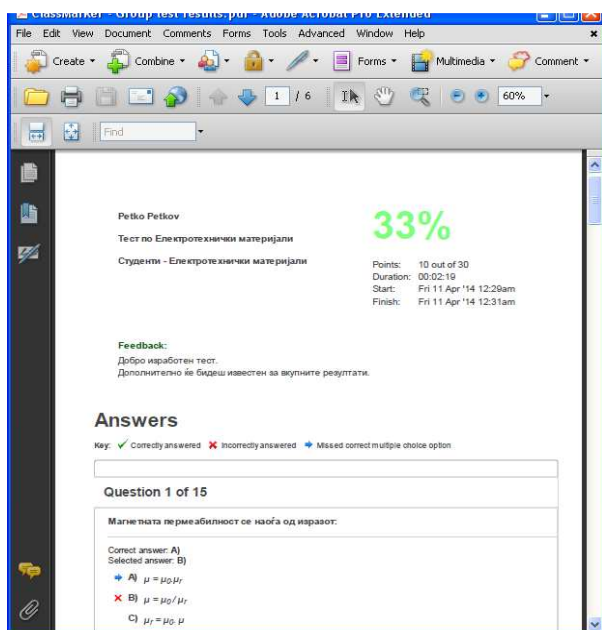


Figure 9. Display of results from testing individual results

On that way a complete overview of tests success is achieved, students get the results immediately, computer is calculating student achievements and it is displaying the results, thus avoiding subjectivity or possible errors in student grading. Electronic tests become a useful tool enabling complete, quick, easy and objective grading of all students with complete statistical analysis of the tests within the exam itself, and all complete documentation from testing is available for following student progress. Testing is done within certain time limit in average two minutes are allowed per question in order to be seen whether student can find correct answer for relatively short time among several similar answers. On that way is avoided answering of questions just by try and error system. Tests can be set not to allow returning to the same question, once the question is exit or input answer from student side is considered final.

IV. RESULT DISCUSSION

In April exam term, year 2014, six students took the electronic testing. All of them have passed the testing and average grade was 8. In February exam term, same year fifteen students had taken the exam without electronic testing. Number of passed students was six or 40 % of the students passed the exam. Average grade was 7.83. In Table 1 is presented comparison of obtained results in both exam terms.

TABLE 1. COMPARISON OF RESULTS FROM DIFFERENT EXAM TERMS

	Exam term year 2014	
	February	April
Nr. of students	15	6
Percentage of passed students [%]	40	100
Average grade	7.83	8

From results in Table 1 it is noticeable that all students have passed the exam and the average grade was improved for 2.17%. Although percentage of passed students is improved as well as average grade still student achievements should be monitored for longer period and when possible should be tested on larger series i.e. larger number of students. During exam performing it was noticed that sufficient time was available for going through the complete tests, all students have finished the test on time, results from testing were available instantaneously, any subjective professors' opinion was excluded enabling fair and objective grading.

V. CONCLUSION

In April exam term, year 2014 electronic tests were implemented for student testing for subject Electro-technical materials. Electronic tests were prepared in web-based software <http://www.classmarker.com> which enables creation of different types of electronic tests with different types of questions and answers: multiple choice, true/false answer, writing an essay etc.. Numerous possibilities of this software enable utilisation of different features in test preparation: time limitation for test answering, randomization of questions, randomization of answers, number of attempts for test entering, possibility to return to already answered question or not to return etc... Results from testing are instantaneously available for students as well as for professors, after test is finished. Further more complete

statistic from testing is available for the complete exam as well as for each student individually. All these features make the electronic tests very useful tool for fair, objective, complete and quick knowledge examination. Comparison is made between achieved results from two different exam terms when electronic tests were used and when they were not. Improvement in percentage of passed students as well as in average grade is noticed although these figures should be monitored through several exam terms. This was a pilot project which opened the door for further implementation of electronic testing in student examinations since it was adopted by student's side with no objections. One of the limitations of proposed methodology for creation of electronic

tests is that internet access should be available on all computers where testing is done. Further research should be in direction of exploring the opportunities of other software platforms for creation of electronic tests their possibilities, advantages and disadvantages.

REFERENCES

- [1] The Economist Intelligence Unit: 'the future of the high education-how the technology will shape learning', 2008.
- [2] J.M. Dela Torre, "Status of information technology in relation to selected variables: high education teachers' perspective". Asian Journal of Management Sciences & Education, Vol.2, No4, October 2013, ISSN 2186-845X p.p. 145-155.
- [3] J. Barraket, A.m. Payne, G. Scott, L.Cameron "Equity and the Use of Communications and Information Technology in Higher Education , a UTS case study", ISBN 0 642 44500 1, 2000
- [4] www.classmarker.com