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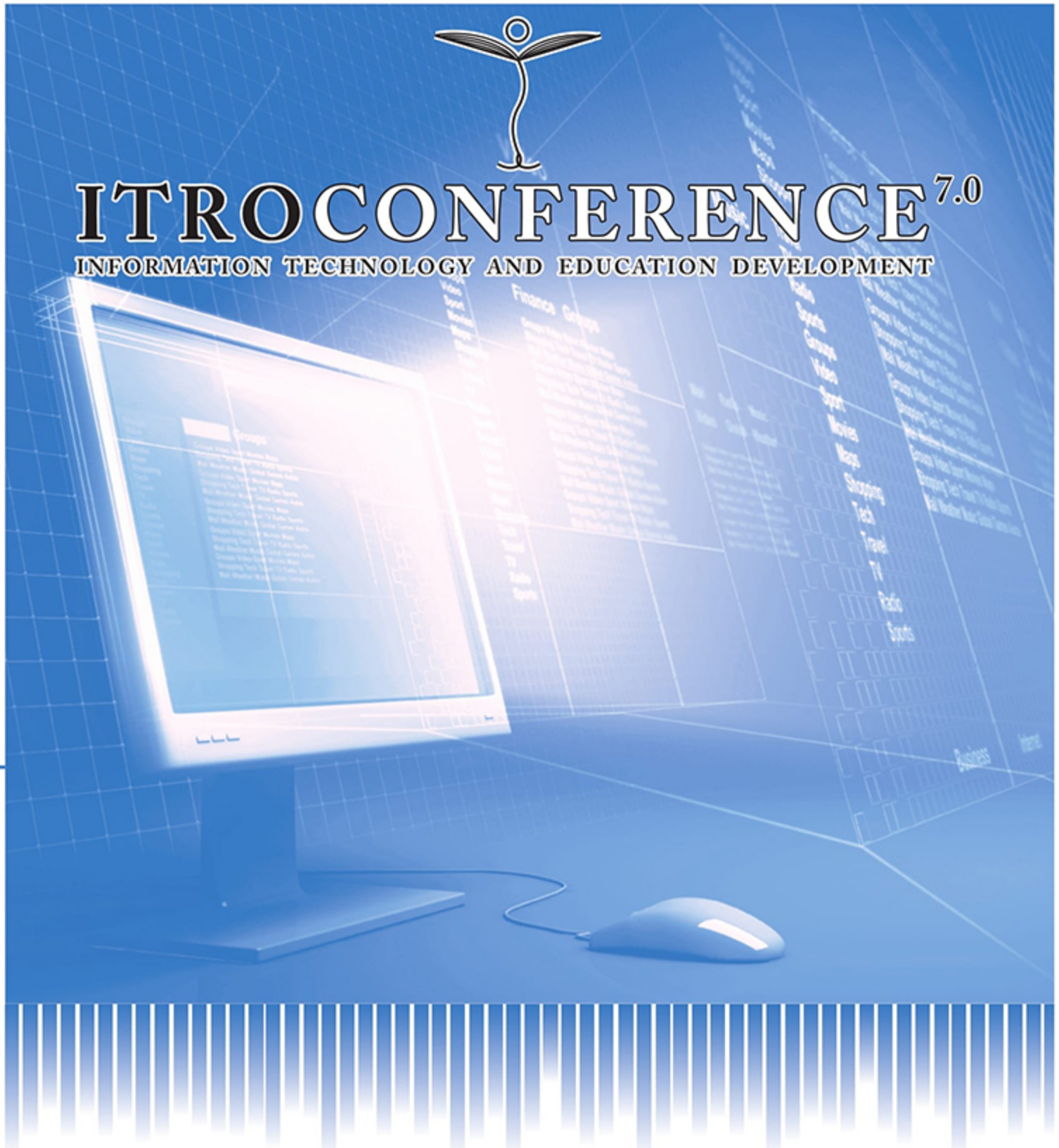
INFORMATION TECHNOLOGY AND EDUCATION DEVELOPMENT

PROCEEDINGS



ZRENJANIN, June 2016

UNIVERSITY OF NOVI SAD
TECHNICAL FACULTY "MIHAJLO PUPIN"
ZRENJANIN
REPUBLIC OF SERBIA

VII INTERNATIONAL CONFERENCE ON

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PROCEEDINGS OF PAPERS

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With this publication, the CD with all papers from the International Conference on Information Technology and Development of Education, ITRO 2016 is also published.

INTRODUCTION

This Proceedings of papers consists from full papers from the International conference "Information technology and development of education" - ITRO 2016, that was held at the Technical Faculty "Mihajlo Pupin" in Zrenjanin on June 10th 2016.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and the Region, as well as, to gather experts from 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 has 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.

There were total of 163 authors that took part at the Conference from 15 countries, 4 continents: 96 from the Republic of Serbia and 67 from foreign countries such as: Macedonia, Bulgaria, Slovakia, Russia, Montenegro, Albania, Hungary, Italy, India, Rumania, Bosnia and Herzegovina, USA, Egypt and Nigeria. They were presented 82 scientific papers; 42 from Serbia and 40 from the above mentioned countries.

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

The Organizing Committee of the Conference

CONTENTS

INVITED LECTURES

SCIENTIFIC PAPERS

E-LEARNING

E-Learning Application for the Primary School Students

B. Delipetrev*, M. Pupinoska-Gogova**, M. Kocaleva*, A. Stojanova*
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Abstract - In the past decade a growing number of institutions started applying the e-learning concept through web-based learning systems in order to change the traditional learning environment and monitor the students' educational needs. The lack of electronic materials both hardware and software in Macedonia primary education force the teachers to actively engage in the process of creating and developing their own educational applications. This paper demonstrates a successful e-learning application developed with Adobe Captivate, which is a powerful tool for creating interactive applications. The e-learning application is based on SCORM and it was evaluated by the students of VII grade primary school as well as with their teachers and parents. The evaluation showed that the e-learning application has accomplished its goal and it can be a foundation for developing similar application in all schools in the Republic of Macedonia.

I. INTRODUCTION

In recent years, Macedonian government made a significant investment of ICT equipment and applications in schools educational system increasing the usage of ICT in all subjects. Therefore teachers have to create electronic learning materials in order to improve the teaching materials, and students have the opportunity to learn in a different way that would result in higher achievement. Teachers made a transition from traditional classes [1] to online teaching and learning [2].

Special accent in the process of creating applications is placed on learning open source programs [3], which are available in all schools in Macedonia, and used in all classes. Since in curriculum open source programs Writer, Impress and Calc from Open Office are learned, from the book for Computer science aimed for students in VII grade, we decide to digitize part of the curricula in the form of educational interactive content in Macedonian language. This educational interactive material was available over the internet to the students both at school and home. As an example in this paper is presented the application for learning advanced techniques in Writer that is represented by twelve hours teaching material for the students of VII grade.

As a tool for creating educational application we have chosen to use Adobe Captivate that offer a variety of possibilities, from creating projects for collaborative learning, interactive content for training, simulation, and quizzes, quizzes implementation and summarizing the students outcomes [4] [5] .

II. E-LEARNING APPLICATION DEVELOPED IN ADOBE CAPTIVATE

Adobe Captivate is the leading tool to create and maintain a wide range of interactive Flash and HTML5-based eLearning and e-Learning contents. It allows creation of software simulations and scenarios, software solutions designed to demonstrate multimedia content, interactive content, quizzes and similar content to improve the e-learning process.

Adobe Captivate supports recording, inserting and editing video projects as demo versions and their complementarity with audio, fields for writing texts, buttons, animations, other videos, a possibility to define actions for navigating the project through interactive facilities, to perform specific Java scripts and to execute other projects or scripts with variables [4] [12] created in Captivate.

Created projects have the opportunity to be published in various ways: as a Windows executive file (EXE) or MAC executive file (APP), as SWF and HTML5 formats, and as MP4 files if they are intended to display YouTube or are aimed for other devices such as Apple iPad and iPhone.

Adobe Captivate provides downloadable content created in other applications, such as Word and Power Point, for their further processing [6] [7].

A. *Adobe Captivate Reviewer*

Once Captivate project will be completed, the author can publish the project for review by competent persons - reviewers, on the internal server or on Acrobat.com. The project will be published as CREV file, and reviewers can see the project with Adobe Captivate Reviewer - AIR application [13].

Reviewers have the opportunity to add comments to a position on the time bar and can see the comments from others. Reviewers have the opportunity to export the comment as an XML file to the author. In this way the author gets specific guidelines for improving the project and its efficient software solution.

B. *Learning management system (LMS)*

We are using some of the leading systems for managing learning such as Learning management system (LMS) [8] [9] to distribute web-based tutorials created with Captivate to the Internet. The project placed on a LMS must be compatible with the Shareable Content Object Reference Model (SCORM) standards. SCORM is a set of specifications used for communication with between e-learning objects [10], and it is defined as communication between the client (in this case Adobe Captivate) and the host (some LMS, such as Moodle) Fig. 1.

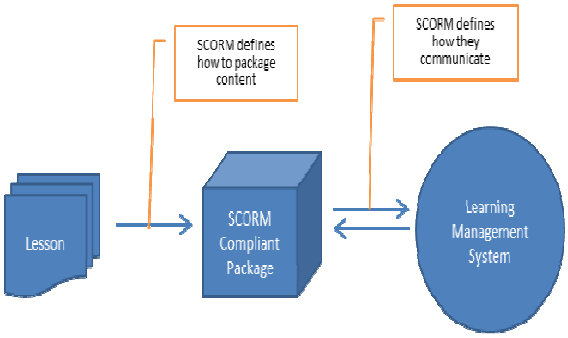

Figure 1 SCORM communication between the client and the LMS

Adobe Captivate provides options to make the project SCORM - compliant with these standards: Manifest File, HTML file, JavaScript File and other files which contain information required for LMS [11]. Then the announced package of LMS can be directly sent.

C. *Adobe Captivate Quiz Results Analyzer*

If the points from quizzes are not being monitored on LMS, Adobe Captivate provides reporting capabilities, such as Acrobat.com or an internal web server [14]. Once the user has confirmed the quiz results, Quiz Results Analyzer as AIR - based application starts the analysis of the results in online and offline mode. It is enough to set reporting preferences and then the application runs in the background without any user intervention. The application provides an opportunity to review a detailed report with the results of all users who have completed the quiz, to create and edit the report, to save the results in a local folder in order to be viewed offline, as well as creating of partial reports for comparison of results and printing reports.

III. INTERACTIVE APPLICATION FOR LEARNING AND GAINING SKILLS

The application for learning and gaining skills in Open Office Writer was organized in several modules: learning, practicing, testing and additional learning resources. For better navigation across processed material, on the application workspace are displays the contents with all units that are processed by modules. Each module is a project in Captivate with .swf format. The various projects are set in aggregator which is an interactive application for e-teaching and e-learning with possibility of upgrade.

A. *Adobe Captivate Reviewer*

During the application execution, the user is introduced with the application contents and its features. Using the navigation key, student can access additional resources for learning, leading to relevant sites related to content being processed (Fig. 2). In this way we can satisfy the needs of students who want additional knowledge, simultaneously reinforcing the safe use of Internet, giving students concrete directions for searching. For all users who need to ask questions or give suggestions related to the application, there is a link to contact the author. The application can be upgraded and developed towards students' needs for acquiring permanent knowledge.

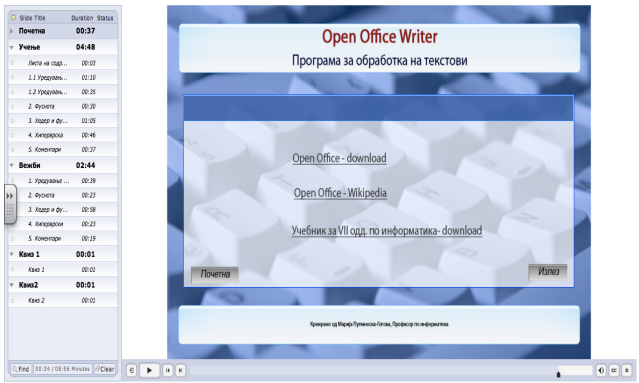

Figure 2 Additional learning materials

B. Visualization of teaching contents

The application contains a learning module that presents Writer from Science book for seventh grade. For navigation the curriculum titles can be used for navigation, that when selected a brief description is displayed. Each teaching unit begins with terms that student should learn and the explanation of the activities.

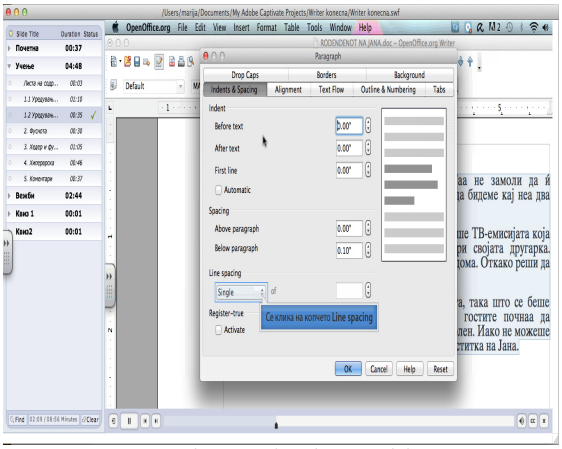

Figure 3 E-learning material

Following the contents, all the steps are clearly being described for which the student have to learn and perform the tasks (Fig. 3). For example, when editing Writer document, how to set the header, footer, footnote, comment, add hyperlink and so on. Following steps shown on the screen, the student with mouse click on the marked can see the additional application features.

C. Interactive exercises

Interactivity is one of the more powerful features to create educational materials designed for e-learning and therefore they are created in our application. The objective is to make student skilled in performing previously learned steps and to motivate him for self-solving problem situations. Each exercise begins with the manual for work and specific tasks that the student needs to do to successfully complete the exercise. Students perform the actions with mouse and keyboard. Each correct step enables the student to proceed with the task, and a wrong step produce an error message that is displayed in red color (Fig. 4). Furthermore, in case if student need help, the correct step is displayed or a displays messages that resemble the following task. At the end of the exercise there is a message in green color for successfully complete the task.

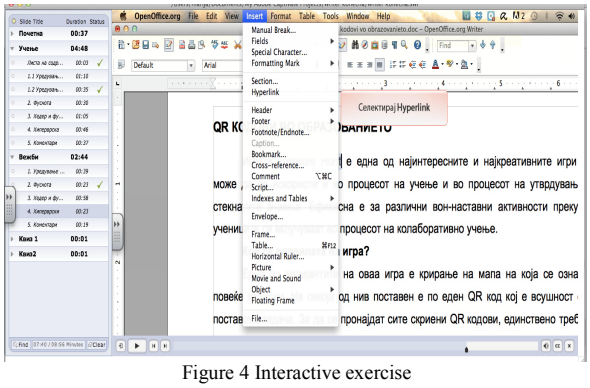

Figure 4 Interactive exercise

D. Quizzes for student self-assessment

Self-assessment of knowledge is an imperative of modern time that includes students in the evaluation process. In our application, students can self-assess themselves through quizzes with different kind of questions: a multiple-choice, with addition, matching, sorting, selecting from a list with more features (Figure 5). Quiz questions appear in random order each time while the quiz is active. At the end of each quiz the student receives a detailed overview of the number of answered questions, scored points and number of attempts. For students who correctly answered all the questions a motivation message are displayed as: Bravo! All answers are correct. The students, who have made mistakes, have the opportunity to review all the questions and try to give the correct answer.

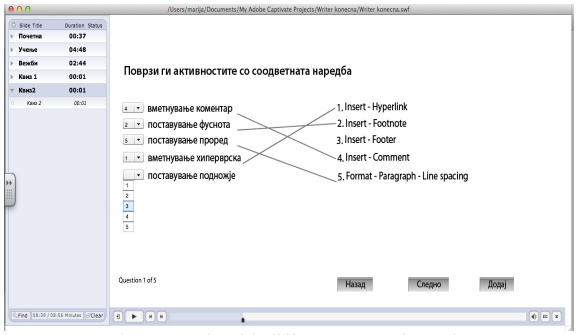

Figure 5 Quiz with different types of questions

IV. EVALUATION

We have published the application for learning advanced features in Writer on www.acrobat.com and on educational platform www.edmodo.com, and users were able to access them online or download on their computer. The application was evaluated by 84 students of VII grade from the primary school "Bratstvo Edinstvo" - Ohrid, their parents and 15 teachers who teach science, mathematics, biology and geography. Based on the conducted evaluation we were able to confirm the positive impact of

electronic educational materials on the overall process of e-teaching and e-learning.

All students have shown significant interest and motivation to work that the traditional way. In terms of overcoming the lessons, students perceived new concepts and ways of implementation of a given activity. Those students who needed more times to follow the same content could do it from their home. Some students who have difficulties with information terminology and didn't show interest in using a book, through application were motivated to learn new concepts and follow the e-learning material, performing much better than before.

Through interactive exercises students practically performed the given tasks and followed comments on each step. Part of the activities they learned through their mistakes and successfully completed task motivated them to gain new knowledge and skills.

The various quizzes provided the opportunity for self-assessment. Correct tests raised the confidence among students, and their interest in solving new additional quizzes throughout the year. Students believe that the collection of quizzes will be an excellent base in preparation for external assessment.

Students used the application contents at home and at school. Some parents expressed their satisfaction with the way their children learn, gain knowledge and overcome the barriers of computer technology.

Teachers involved in evaluation expressed their satisfaction of the interactive applications as excellent solution for simplify learning process and gaining skills. Science teachers expressed their motivation and willingness to create their own original applications that would enrich aggregator of educational materials in informatics.

V. CONCLUSION

The research demonstrated that the students are motivated to independently engage in the e-learning process that is adapted to their abilities and interests. The interactive content has helped the students to solve problem tasks, learn more interactively and gain everlasting knowledge. Creating quizzes with different types of questions encourage students to learn and use computer terminology, and also to control their progress and achievements in the field of computer science.

The produced application was tested on 84 students of seventh grade, including their parents and teachers. All of them were satisfied by the results that have demonstrated that it is valuable as for the students, and for the overall education process to implement e-learning into future classes.

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