

## “E-TEACHING CARDS”,

### ON-LINE CREATOR OF TEACHING CARDS

MAGDALENA TRECEVSKA

Evropski Univerzitet – Skopje, fakultet za informatika, trecevska.magdalena@live.eurm.edu.mk

ELENA RISTESKA

Evropski Univerzitet – Skopje, fakultet za informatika, risteska.elena@live.eurm.edu.mk

RISTO HRISTOV

Evropski Univerzitet – Skopje, fakultet za informatika, risto.hristov@eurm.edu.mk

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**Abstract:** Latest advances trend in information and communications technology is creating, using and distributing information through the use of digital mobile devices. The mobile devices incredibly quickly enter all spheres of human activities. There are several reasons for this and they still need to be emphasized: mobile devices become inseparable friends to an individual who carries them in a bag or pocket, establishes friendly relations with them and through them establish a confidential relationship with a communications network, thereby with anyone, anywhere. In other words between the users and mobile devices emotional intimacy is established. This is especially true for students who become somehow addicted to their mobile devices. Such devices are mobile phones, smart phones, tablets, notebooks, tablet PCs, laptop computers.

With the help of mobile devices we can access the necessary information regardless of where we are (at work, in a coffee shop, on the road, on the beach, ...), regardless of the accommodating medium, its geographical distance, regardless of its format (digital documents digital books, drawings, audio-recordings, videos, ...), to process, use and distribute according to our desires and needs. Mobile information and communication technologies do not bypass our educational processes. The current access to information, their easy transformation and multimedia display, their content regardless of the geographic location of the teacher and the student, are posed as a priority. In other words, the principles of distance learning become imperative in today's educational practice.

Within the frames of this paper, a model of on-line designer of control study papers is given (controlling technique for student knowledge that is used in educational practice in Republic of Macedonia) called "E-teaching cards". It is a software tool for On-line control instructional cards that help teachers to create cards for controlling students' knowledge, i.e. students self knowledge using mobile telecommunication devices.

**Keywords:** education, computer, mobile device, subject, teaching unit, learning, on-line, testing, electronic teaching card, teacher, student....

## 1. INTRODUCTION

We live in a time in which there has been an exponential growth of new products, development of new methods and discoveries, which are happening at lightning speed. With the advancement of science and technology and the daily development of new technology simplification and improvement of quality of life is happening. The base of all these innovative processes is informatics and information technologies. They are drivers, creating and maintaining almost every step of every process. Therefore, there is a need for more and more knowledge of computer science and information technology and its inclusion in all spheres. Basic and initial step should be taken, that implies greater involvement in education,

especially in curriculum among students of primary education.

The technology represents a part of all spheres of our life, and it changes from day to day while its use is implemented in almost every area. Technology is growing and evolving rapidly, as electronic devices become an inevitable part of our everyday lives. Due to the level of implementation of technology in all spheres of life, from science, industry, and entertainment in the last twenty years, a campaign has started with the main goal - to "computerize" the entire society. [1] Such is the influence to the education and the curriculum. At a time when extremely rapid progress of science and technology is seen, spontaneously a following trend of progress in the sphere of education and learning is expected too. As time passes and as the world is globally covered by

computerization, the level of development in certain areas requires a much faster pace which must change simultaneously and rapidly. Such is the case with the inclusion of technology in education. In this context, a new approach to learning new things is imposed. The learning process has changed its form, and the definition of learning and what needs to be learned is changing.

Nowadays, children are growing up with computer-information devices and technologies. Though initially it seems naive, even small children use computers and mobile devices for playing games, listening to music and "surfing" the Internet. [2] Due to the rapid development of technology, there is a need to include information technology in large amount even in primary education, especially in the basic curriculum of the students.

The application of information technology in education presents an innovative technique of placing educational content on the Internet, which leads to better quality education. Ability to follow part of the curriculum through a variety of mobile computing devices, is not only simpler, but also more interactive and interesting learning method. [3]

This paper will present a model of the structure of the application that will offer on-line instructional cards available for teachers / students at any time, from any device. Thus in this way the teacher can create an academic paper (teaching card) on-line , to test the knowledge of students using networked computer or to print ballots and conduct classical testing. Or the student will be free to check his knowledge when he wants and for whatever part of the curriculum he wants. Through this application, with the application of information technology, an improvement of teaching process and updates of the entire system of education is done. Thus, innovation in educational mechanisms causes change in the traditional method of education and application of information technology in the educational process. [4]

## 2. DESCRIPTION OF THE FUNCTIONAL SPECIFICATION

Application of "E-Teaching cards" is a software web application that allows students test / self-test given educational material in real time (on line) through any computer or mobile device. The time and place are not an important factor when it comes to using this application. The main goal is to provide quick and easy access to all students who want to check their knowledge of a given part of the curriculum. At the same time, teachers have the opportunity to monitor all student activities, i.e. what kind of electronic card they have solved and what result is achieved.

In this way, students have the opportunity to use classical instructional papers that are used in traditional teaching education in more interesting and more fun way through technologic devices that are dependent and at a time when they want.

The purpose of this application is to digitalize all subjects and teaching units with content that will be adjusted to the

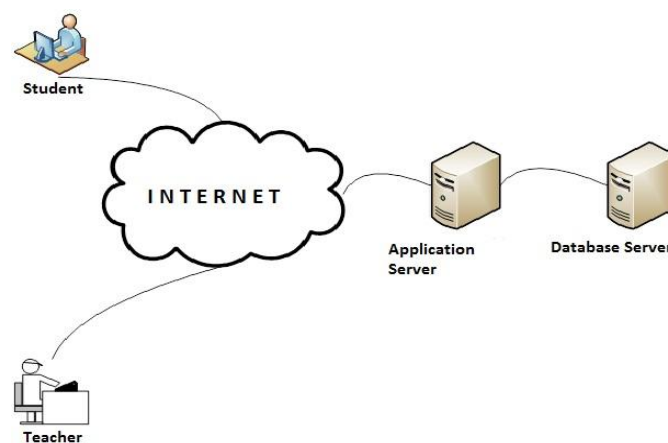
students' age and level of knowledge. Generally this application is intended to allow students:

- Quick and easy testing and deepening of the students' knowledge of all curricula and units that have been studied in a given period of the current curriculum.
- Ability of the student to self-test his knowledge through control tests, to have an overview of the results after each test, and review the answers he gave, and review the correct answers.
- Availability of the application at any time and from any computer or mobile device.

According to research, self-learning for students is much more acceptable than the classic way of monitoring teaching. Some studies show that students who use the on-line educational apps are more fulfilling than the students who practice the traditional way of monitoring teaching. [5]

## 3. TECHNICAL SPECIFICATIONS

The whole application is a web-based centralized system intended for users (students and teachers) who need only a mobile device or computer to use. The application has been developed and installed using three- level web architecture. The first level consists of HTTP servers that accept students' logging in. Middle level is consisted of application servers that serve the developed application and provide dynamically generating and processing content. The third level (constant) in this multi-layered architecture is a relational database that manages and provides access to the data. At this level the Oracle database is used.



**Figure 1:** View of the structural architecture of the application 'e-teaching cards'

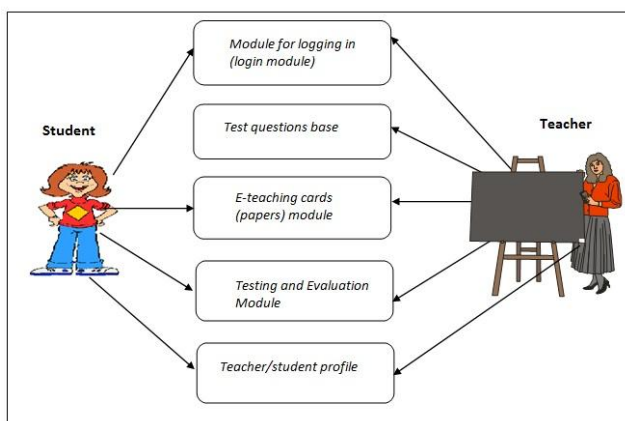
The Web application is implemented with the latest Java technologies like Seam, JSF and Hibernate. These technologies enable the design of the application to be multilevel consisted of presentation level, the business logic level and level for data access that provides a simplified further development and maintenance. The presentation level is realized using modern components like Rich Faces with AJAX support, and technologies like JSF and Facelets.

Application "E-teaching card" is actually a simple web application that is accessible to all students and teachers who have access to any browser (Mozilla, IE, Chrome ...) with access to the Internet / intranet from their mobile device or computer.

#### 4. DESCRIPTION OF THE STRUCTURE

The structure of the application is modular in terms of its flexible, that is an option for its functional expansion by adding new modules. Each module can operate independently, but by working together they make a functional whole. The application consists of the following main modules (Figure 2):

- Module for logging in (login module)
- teacher / student module
- test questions base
- e-teaching cards (papers) module
- Module for testing and evaluation.



**Figure 2:** Modular structure of the application "e-teaching cards"

##### 4.1 Module for logging in (login module)

This module is used for login, that is registration of the teacher / student. In this part, the teacher / student register with his own username and password through that log. Within this module, during the first login, the user enters his personal data (code, name, surname, teacher / student, school, grade). Based on the data entered, the application assigns his rights to use the application, or define his profile. Outside the assigned rights the user can not act. [6]

Each teacher / student, within his profile, has the opportunity to choose what kind of test he wants to do from which lesson and which level of difficulty. Fields that have the ability to be chosen are the following:

- Selecting Grade - in this field each user has the ability to choose the level of his ongoing education.
- Selecting a subject - in this field every user has the opportunity to choose the subject that he wants to check his knowledge of.
- Choosing teaching unit - in this field each user has the ability to choose a separate teaching unit (topic) for the already chosen subject.

- Selecting the difficulty of the test-in this field each user has the possibility to choose one of the three opportunities to test knowledge through basic, intermediate and advanced level.

- Selecting the type of test -in this field for each user there is the ability to choose what kind of test he wants to do. The user is offered the following opportunities: testing with test questions with circling the right answers, test with filling the gaps and testing with textual and multimedia presentation.

##### 4.2 Test questions base

The basis of this application is a base of the questions which are consisted of basic concepts. The basic concept is in fact test questions for creating a control card. [6]

The questions are grouped in two ways:

- According to the students' age and the prior knowledge, namely the younger the student is or less prior knowledge he has the more the questions are enriched with more text and multimedia elements, and vice versa.
- According to the grade, subject, teaching units and difficulty factor.

The term subject refers to all subjects that are taught in elementary school, while the term difficulty factor indicates the level of difficulty of test questions. To each basic concept an appropriate response is attached.

The content of these two concepts represents a combination of classical test questions with given possible answers, questions with fields to complete and questions with the possibility of providing full-text or multimedia responses.

For each concept an evaluation of the accurately answered question is made expressed in points according to the teaching unit and the difficulty factor.

A specifically determined administrator or the teacher fills in the database.

##### 4.3 E-teaching cards (papers) module

This module is used by the teacher or administrator. The basis of this module is the so-called Base of e-cards. Teacher / administrator can open the database to review the existing e-cards (papers) to regulate their contents or to create new cards.

The content of the educational card is created by random questions (taken from the database of test questions) according to the previously set criteria or teacher / administrator manually chooses the questions.

The appearance of the teaching card is simple and easy to understand. The content of e-card can be a combination of three types of questions: questions that are answered by circling the right answer (ticking, clicking), questions that are answered with completion of the empty fields with text and multimedia elements and issues that are fully answered with text and multimedia content.

Teaching card (Figure 3) is a type of card in which the answer is given by clicking, completing or filling empty fields with text content.

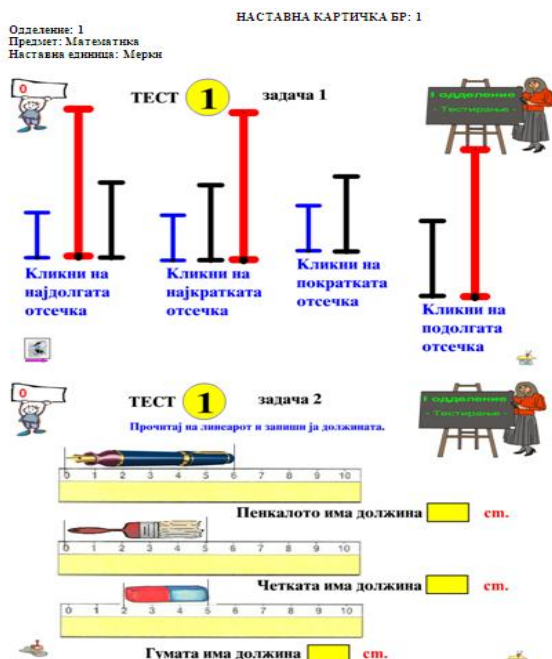


Figure 3: E-teaching card

#### 4.4 Testing and Evaluation Module

The testing module is used for testing, standardization and evaluation of students' knowledge conducted by the teacher or for self-testing.

The process of testing the knowledge takes place as follows:

- Teacher and students are logged in, each from his computer.
- The teacher, using the base of the e-cards, assigns to each student an educational card. During this he chooses whether to accept the offer for evaluation of the correct answer or he can make changes.
- The teacher defines the duration of the test, if he finds that the test time should be limited.
- The student implements testing.
- At the end of the test, the test results are automatically calculated, automatically recorded in the student's file data stem and displayed on the screen (Figure 4).

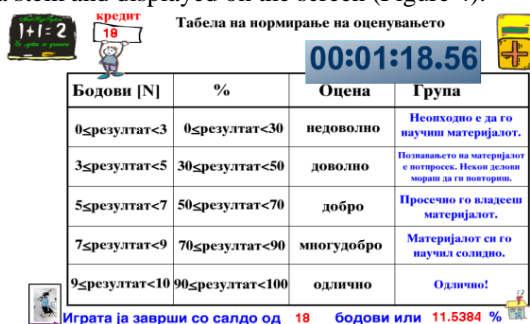


Figure 4: Information on the evaluation of the knowledge testing

In addition to testing this way it is possible to self-test. In this case, the student has the opportunity to test his knowledge at any time, from any place and device. During the process of self-test he can use a mobile communications device or desktop computer. The process of self-test consists of the following activities:

- The student logs.
- He enters the test module.
- He chooses an educational card
- He answers the test questions.

If the student is not confident in his answers he can move to the next question, while the unanswered question may be completed at any time during taking the test. Navigating through the questions is done through the buttons to view the next question or the previous one.

At the end of the test the student needs to press the button "end of testing". At the same moment it shows the correct answers, test questions, answers that the student gave and the result achieved. This section is important for self-testing of the knowledge of the student because the student has an overview of the issues that he gave an incorrect answer to.

The main function of this module is that it gives to the teacher a complete overview of each student login, and the outcome that is achieved by a subject and teaching unit. In this way, the teacher has an insight on the progress of each student individually.

#### 5. POSITIVE IMPACTS

The application "e-teaching card" gives a positive effect not only in the educational curriculum, but also individually for each student at the time and place when he wants. This application is intended for testing in the frames of the regular process of education, but it can be used for testing / self learning by students at any time. Flexibility and simplicity make it easy and fun to use, and thus very efficient.

Improving teaching through this way of learning focuses on the following aspects of teaching: teachers can see better how this enhances teaching and improves learning results of students, increases their motivation for learning allowing different learning styles and a wide range of Information.

The following advantages that characterize this application can be distinguished:

- Deepening the knowledge of students in an interesting and fun way.
- Self-testing of students from any place at any time.
- Simple and effective overview of the achieved knowledge of students by teachers.
- Greater flexibility.
- The curriculum material is much easier to update and upgrade.
- Students are interested in deepening their knowledge
- All students' needs are met to achieve higher success (interest, motivation, speed, previous knowledge and self-discipline).
- The student can quickly go through the contents which are already familiar and can concentrate more on areas that contain new information for him

- Learning curricula are distinctly different in pace and intensity for each student individually, regardless of the pace of other students.

## 6. CONCLUSION

The use of information technology in education not only helps in the learning process, but also improves students' creativity and helps to resolve problems.

Learning by using a computer or mobile device is the future of the modern education system. Information and communication technology is growing and evolving rapidly, making it an integral part of our everyday lives. Computers and mobile devices are implemented in all areas of development, from technology and manufacturing processes, to modern medicine. Therefore, it is necessary to enter these in prime areas such as education.

Using this kind of learning and teaching is of great benefit and assistance to teachers and students in the teaching process, contributing to the reformation of education, using new methods of learning, even changing the role of the teacher.

Methods that today are offered in education, despite the large number of reforms are still only at the beginning of the introduction of the concept of e-learning. This is especially true for the reforms in the primary education, at the age at which students are best suited to create and develop an information culture. Therefore, the curriculum should be developed with the help of information technology as a core educational branch and with the help of technical devices. In this way, the student will be associated with the program interactively and more consciously and will independently test the knowledge he has and will be able to check all the information about any subject in a very easy and simple way. Application "e-teaching cards" is an application that offers independence, interactivity and entertainment before everything to all students. It offers a quick and easy way to check your own knowledge. It gives a different view of the processes in the educational practice. It is our hope that this paper will give a modest contribution to a

different understanding of the educational processes in the Republic of Macedonia and beyond.

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