

Android applications supporting the teaching and learning process

Tamara LUARASI¹

Abstract

The traditional blackboard remains an important teaching tool through and in which the basic concepts of different teaching subjects can be explained. On the other hand, we live in a time when technology has become an inherent aspect of our life, and we cannot ignore its potential role in teaching and in the teaching and learning process. Smart phones and other mobile devices could help us in the further development of distance learning and in a more efficient and qualitative communication between the students and the instructor. As we will see in a practical application described in this article, the mobile devices could help us in the personalization of the portals that already exist in schools, thus making possible their adaptation and response towards specific requests of instructors and students. Such applications in a massive scale condition changes in the education process starting from the elementary and secondary school and continuing in High School and University. Programming should become an essential teaching and learning subject starting gradually from elementary levels during the early stages of education towards more advanced levels in higher education.

Introduction

Today, the teaching and new technologies are growing closer towards each other. They help each other and this fact makes the use of the new communication technologies an obligation for a teacher and the student. The smart-phones are the type of small devices that are very much used today by the students. Often we consider them as disturbing tools of our teaching process. Then let think to convert them in useful tools even for the teaching process.

The life of our students today is quite different referring to the previous years. Today, the student works, travels, stays in cafés, with other word, the student passes the time in different environments, but the cell-phones or smart-phones are common associative things that are used by him all the time. Then, we have to consider this relatively new fact, in the teaching process improvement.

1. Tamara LUARASI, European University of Tirana , Departament of Information Technology, Mathematics & Statistics.
e-mail: tamara_luarasi@hotmail.com

It will be very useful for the student, who does not have the computer or the book with himself in each moment of the day, to have the possibility, everywhere where he is, to work for solving exercises from his smart-phones and check the correctness of the solutions. An application would help this idea. An Android application is what the article presents, in relation with this matter.

An Teacher-Student Way Of Communication

The idea is, the creation of a data base regarding all the teacher information useful for the student, considering the lectures, exercises and their solutions, lab assignments, teacher research, student works, necessary software to be downloaded by the student, evaluations ect... This database will be updated continuously by both, teacher and student.

On the other side this database will be used by the student. There are different alternatives. A student can work in class, or kilometers far of his University. It is the time when the both variants are possible due to the new technologies and the cell-phone or smart-phones are part of it. As teacher we have to offer to the student at least, the possibility to solve the assignments and exercises and check the correctness of the solutions through the use of the smart-phone.

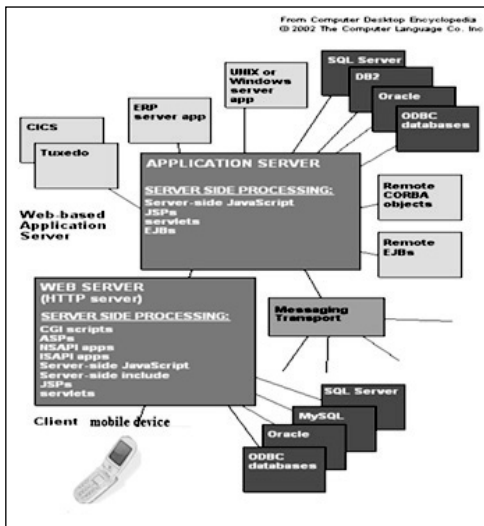


Figure 1 Different ways of the teacher-student communication [7]

The most of the cell-phones or smartphones today are supplied with the Android Operating. Android is a Linux-based operating system for mobile devices such as smartphones and tablet computers. It is developed by the Open Handset Alliance, led by Google, and other companies. The language used is Java. [1]

There are many mobile operating systems, but the most preferred today by the market evaluation are Android, Symbian, Apple iOS, RIM BlackBerry, MeeGo, Windows Phone, Bada etj.

With the help of these operating systems, it is possible the development of the various applications that can be added to the existing ones, which are present when we buy the small devices. The system Android is used in this article like the most evaluated system by today market. The Figure 2, represents the market preferences during the 4 first months of the 2012.[2]

Android	iOS	Symbian	RIM	Microsoft	Bada	Të tjerë
50.9%	23.9%	11.7%	8.8%	1.9%	2.1%	0.8%

Figure 2 A table of the mobile system purchases in market

In this paper, it is presented the example of an application developed in Android system, which makes concrete the idea presented above.

A Web application makes possible the connection with the teacher database which is stored in one server. Another Android Application calls and activates the web Application through its server address. This Android Application displays in small device an interface that makes possible the interactive communication with the database. The student inputs some identification data and as result of a button push, an exercise is displayed in the screen interface of the small device. The student writes down the solution and by another button checks its correctness. The application is written in Java language, which is the language accepted by Android.[3][4][5]

Figure 1. gives us an idea how works this process: on client side, an interface is used which activates an web application by use of a button. This web application is processed by a web server and an application server. These two servers can be everywhere in the world. [2].

The execution of this application displays a screen like in figure 3. Through this interface, the user communicates with the database reading the data from it and storing the result of the work on it. In the following example is checked how the student understands the operators in C++ programming language and their priority considering an expression. For example let-s have the exercise:

Find the result of the following expression without using the calculator:
 $7 + 5 * 4 \% 3$



Figure 3 Android Interface

As we see there are many practical ways, besides the traditional ones, that can be included in the teaching process. On the other side these ways help on the generation of the exercises with random coefficients not necessarily stored on memory. In the above exercise, each time the student asks a type of exercise, a new one can be generated regarding the coefficients or operators. This would

save the registration time and will produce many alternatives for the same exercise type.

Beside the practical aspect of what we discussed, these new ways of the communication have their attractive aspect, so liked in today days, when the new generation has so many information regarding the new technologies and knowledge about their use.

So called portals are today something usual on high schools and Universities. They are web applications that are very useful communication between teacher and students. Although they are present now and they are used by all the teacher and students, the request for a personalized portal for each teacher can be a reality today. The specific subject would ask a personalized portal, and this Android application makes this possible. What we said brings the necessity of the programming learning from both sides: teacher

and student. The teacher needs to organize the information into a database and a portal personalization. The student needs to answer to this level of the work.

The new technologies and their use are closely linked with new programming skills for the students and teacher too. So, the conclusion is the programming concepts are an emergency today.

Programming learning

Every new job needs some knowledge about computer, and besides this you are obliged to use some software to perform your work. These softwares have the automatic aspect of their use, but often they have the programming aspect too. Therefore in order to use a software with efficiency and with all its features, you need some programming knowledge. This is true for an accounting person, who is using a spreadsheet as a tool for his work; this is true for an engineer or a mathematician that are using MATLAB, or for an architect that is using Rhinoceros for his designs. Each of these softwares has his own programming aspect to be personalized for an individual work. It is the use of this part of the software that will make a difference in the work of everybody.

We find the following paragraph inside In the book “How to Design Programs” of authors Matthias Felleisen, Robert Bruce Findler, Matthew Flat, Shriram Krishnamurthi “How to Design Programs”[6]

“To get a better understanding of modern understanding today for the programming, take a closer look at spreadsheet, one of today’s popular application packages. A user enters formulas into a spreadsheet. The formula describes how a cell A depends on another cell B, than, as the user enters a number into B, the spreadsheet calculates the contents of a cell A. For complicated spreadsheet, a cell may depend on many other cells, not just one. The essence of these activities boils down to two concepts:

1. *Relating one quantity to another quantity, and*
2. *Evaluating a relationship by substituting values on names (!!!!!!)*

Indeed, the two concepts characterize programming at the lowest level, the computer’s native language, and in a modern fashionable language such as Java. A program relates its input to output; and when a program is used for specific inputs, the evaluation substitutes concrete values for names.”

The programming consists of the logic of how we think in order to solve a problem and the implementation of this logic using a programming language. Because of this logic, which is too close to math logic or more precisely part of it, programming needs to be now a subject present in middle and high school, and has to be continued in University in the same way that happens with math. The programming skills will help everyone to understand the new technologies more easily, to use them in more efficient ways, and to help for further progress of them.

Of course there are different levels of programming and the highest one has to be part of higher education.

Conclusions:

- The use of the new Information Technologies in teaching process is a necessity today. This use gives to the student more alternatives to use the teacher information even in distance. Small devices help in the aspect of the communication. An Android application makes possible connection of a student with a teacher database and

interactivity with it.

- The need to understand, use and advance the existing communication technologies dictates the necessity to make the programming learning a foundational subject like math is. There are different levels of learning and teaching of the programming subject. The concepts need to be repeated in the next level but the in a progressive way.
- The communication technologies are very important to be used and implemented by people in different ways. The task of the education is to teach the essence of these technologies in different aspects and particularly in programming.

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