The Possibilities of Implementation of M-Education in the Republic of Serbia

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Abstract—The use of mobile technologies as almost irreplaceable means of communication has been increasing constantly in most areas of economy. It is necessary that education, which is deemed to be the driver of progress within a society, show interest in the implementation of new, modern solutions, in order to make development and application of new means of communication completely meaningful. The way of progress of the Republic of Serbia implies educational consciousness raising, through the possibility of education, any time and anywhere. Providing necessary relations in the sphere of education oversteps the frame of obligation, which implies adjustment to new profiles interested in education. The possibilities of applying new means of education on the territory of the Republic of Serbia are great, concerning the necessary elements for implementation, and their utilization depends on the attitude towards the existing possibilities on all levels of the system.

Keyword—communication; m-education; mobile technology; education.

I. INTRODUCTION

When discussing the application of new technologies in education, their possibilities and advantages, it is necessary that the application find its right place, not only in the present moment, but also in the near future. It almost seems impossible to speak about the progress within a society without the appropriate development of education, on all levels, formal as well as informal education, that has been paid a lot of attention to recently.

The utility of applying new technologies is estimated according to the level of applicability, acceptability in terms of price-quality relationship and through comparison with the already accepted methods. The reasons against the implementation of new models can also be found very often, most commonly due to the inflexibility of the old methods. It is highly important to spot the new possibilities on time, start with their application and, thus, achieve both the advantage over competitors on the market and profit when trying to overcome generation gaps, that can be crucially important in the sphere of education.

The proposal for implementation and realization of the project of introducing mobile education, requires, in the first place, defining needs on the level of a community (society, country, etc.), utility, possibilities and, finally, ways of realization. The paper presents the intersection of the current situation in this area on the territory of the Republic of Serbia.

II. EDUCATION TODAY

A. New Means of Education

Modern European trends in the sphere of education more and more frequently promote lifelong learning and life-wide learning. In that sense, both young and elderly people should be encouraged to use the opportunity for learning and improving their skills, both in schooling process and outside of it. Every kind of learning that leads to increasing employment rate, personal development, proactive attitude within the society and understanding of modern European values, should be appreciated.

The first association that comes to mind when we hear the word ‘education’ is the schooling system of a country, i.e. the formal education that the country offers. Nevertheless, the term ‘life-wide learning’, that can be found in various EU documents, signifies three basic forms of education in modern society:

- Formal education – implies educational processes within the formal education system, hierarchically structured (from elementary school to university and postgraduate studies), that leads to obtaining appropriate professional/scientific titles and degrees.
- Informal education – implies various, mostly individual educational activities, initiated by the person who learns or spontaneously gains different experiences and knowledge throughout his/her life (from home learning via electronic media and Internet to gaining different sorts of knowledge through contact with other people in the process of socialization).
- Non-formal education – implies organized and planned educational activities that encourage both individual and social learning and gaining various skills and knowledge, developing values and attitudes out of the formal education system that are complementary with it. Participation in these activities is voluntary and they are designed and performed by trained and competent educators.
B. Modern Education

One of the basic conditions for improving the quality of education in modern society is that information always be available to the interested party, as well as the two-way communication any place and any time (with lecturer/medium). The main characteristic of the previous period related to providing education, especially formal education, was the fact that all relevant information were obtained only within the educational institutions (this principle is still valid within some institutions in Serbia). That kind of mental cooperation in the student-lecturer relationship often has a number of shortcomings. Namely, both lecturers and students are required, for the purpose of the quality of education, to be obligatorily present in educational institutions, which results in large amount of unproductive time, especially the time spent on overcoming physical distances.

This problem has been partially solved after the introduction of e-learning in educational institutions (primarily those of higher education), although there is still a large number of institutions that do not have that kind of education in their offer, or offer only some halfway solutions. The reasons for that is the lack of appropriate equipment in educational institutions and inability of all students to provide the appropriate computer configurations and quality connection in their homes/offices.

The space-time issue can be successfully overcome through the implementation of modern technologies based on mobile communications and the use of available mobile devices, that are already being used for the purpose of communications.

On the other hand, the economic development of a region, or a country, depends on the application of the latest findings in a relevant field. The experiences of developed countries lead to the conclusion that it is realistic to expect the occurrence of a large number of individual subjects (that participate in economy) interested in modernizing their business activities by following, adopting and applying just-in-time novelties from the fields of their interest.

III. MOBILE EDUCATION

Mobile education represents a relatively new area and, from different points of view, has different meanings, depending on where the focus lies. Thus, it can be defined as in [1]:

- learning through mobile technologies – where the focus is on technologies, so it can be realized within a classroom;
- learning through context – where the focus is on the student, through the interaction with a fixed or mobile technology;
- learning in a mobile society – where the focus is on the ability of the society and its institutions to adapt to the needs and support of mobile population;
- learning through a mobile device – that is primarily focused on the use of wireless Internet and access to all Internet contents related to their education, so students can use their mobile devices as ‘course books’ any time and anywhere, in classrooms and other educational centres. There are multiple effects of the application of this kind of education, first of all, the access to information is faster, the device can be used as a dictionary, encyclopaedia etc.

The use of mobile technologies in the sphere of education should be organized right from the start in a manner that would enable further extensions, with respect towards the basic principles:

- Providing media compatible with the already existing media within the observed education system (or a part of the system), for the purpose of minimizing the requirements for expanding the existing configurations, memory, processors etc.
- Providing the use of as many configurations as possible, whose quality and applicability could be constantly increasing, together with the adaptation of the existing and possible use of alternative versions, all with the aim of resource optimization.

A. The Realization of the M-Education Project

Basic elements necessary for realization of such way of education imply the following:

- physical distance between students and lecturer – the most important element;
- concept of organization of educational contents – unlike self-learning;
- curriculum – education must have its aim and, according to it, a priori defined structure;
- assessment (evaluation) – which is the characteristic of every a priori defined education.

The realization of the project implies two steps.

The first step in the development of the m-education project in a country is the map of national strategy with clearly comprehensible goals of the country, plans, educational context, as well as the analysis of dynamics changes within administration.

The second step is identification and analysis of the areas for application of information and communication technologies and, therefore, mobile technologies in the sphere of education.

When analysing the areas of information and communication technologies for the purpose of application in the domain of m-education, it is important to think of the ways of applying mobile education for approaching the goals in each of the following categories:

- expansion of educational opportunities/possibilities,
- increase of efficiency,
- improvement of learning quality,
- improvement of teaching quality,
• life-wide learning support,
• facilitating skills acquisition,
• improvement of development of micro and macro society,
• improvement of planning and management policy.

Successful realization of the project also requires taking into consideration the following key parameters:
• infrastructure (hardware, maintenance),
• contents (curriculum, software, assessment),
• staff (education and training are necessary),
• funds, sustainability,
• pilot project and evaluation.

For the achievement of the stated goals and expected effects, it is necessary that the educational institutions establish close cooperation with their social environment, so that the in-education and training could be combined into an issue of greater importance for an individual: integrated personal learning based on the existing reality, as in [2, 3].

IV. THE POSSIBILITIES OF IMPLEMENTATION OF M-EDUCATION IN THE REPUBLIC OF SERBIA

There is an existing trend of increasing the number of mobile telephony and Internet users worldwide. The same trend has been recorded in our surrounding too, including the Republic of Serbia. Table I shows a comparative review of the number of mobile telephony users in the Republic of Serbia and neighbouring countries and the number of Internet users for the same surrounding.

The information that the penetration of mobile telephony users on the territory of Serbia is greater than 100%, does not mean that each citizen has at least one mobile phone, but that there are users who possess more than one phone. Also, it does not necessarily mean that all of those phones are active in traffic.

Still, the number of mobile telephony users is far larger (more than 3 times) than the number of Internet users. According to the data, the suggestion is that mobile telephony be used as the medium for the realization of educational activities.

According to the report from the Statistical Office of the Republic of Serbia [4], more than 4 760 000 people use mobile phones, which is twice more than the use of computers. Fig. 1 shows the number of mobile phone users in the Republic of Serbia, compared with the entire number of population of the adequate gender and defined age groups, expressed in percentages.

It is obvious that the number of mobile telephony users is large, especially among the population aged 16 to 24 years, which gives a very good perspective for applying this technology in education, primarily at high school and university level.

Fig. 2 shows the increase of the number of mobile telephony users in Serbia for the past three years. Further increase of users is highly probable, considering the prognosis according to which there will be 5.9 billions of users worldwide until the end of 2013.

![Figure 1. The percentage of mobile telephony users both genders in defined age groups in the Republic of Serbia](image1)

![Figure 2. The percentage of mobile telephony users for the last three years in the Republic of Serbia](image2)

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of mobile telephony users</th>
<th>Penetration of mobile telephony users</th>
<th>Number of Internet users</th>
<th>Penetration of Internet users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>2,240,000</td>
<td>62.0%</td>
<td>750,000</td>
<td>20.6 %</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>2,596,000</td>
<td>56.7%</td>
<td>1,441,000</td>
<td>31.2 %</td>
</tr>
<tr>
<td>Croatia</td>
<td>5,200,000</td>
<td>115.0%</td>
<td>2,244,400</td>
<td>50.0 %</td>
</tr>
<tr>
<td>Cyprus</td>
<td>1,358,000</td>
<td>157.7%</td>
<td>335,000</td>
<td>30.9 %</td>
</tr>
<tr>
<td>Macedonia</td>
<td>2,005,000</td>
<td>97.4%</td>
<td>906,979</td>
<td>43.9 %</td>
</tr>
<tr>
<td>Montenegro</td>
<td>1,104,000</td>
<td>169.8%</td>
<td>294,000</td>
<td>43.7 %</td>
</tr>
<tr>
<td>Serbia</td>
<td>10,400,000</td>
<td>101.9%</td>
<td>3,300,000</td>
<td>44.7 %</td>
</tr>
</tbody>
</table>
The displayed data on the relation between the number of mobile telephony and the number of Internet users within the entire population of the Republic of Serbia, represent an exceptionally significant potential for implementation and development of the technologies that will serve the purpose of mobile education. The development of mobile devices also supports this statistical fact. Namely, the development of devices primarily intended for communication, has taken the course of multifunctionality, therefore, the devices currently present in the market are an equal competition for computers, they can even compensate the shortcoming related to their dimensions with quality response to various demands.

V. THE REASONS FOR IMPLEMENTATION OF M-EDUCATION IN THE REPUBLIC OF SERBIA

There are several important reasons for the application of m-education on the territory of the Republic of Serbia. Namely, regardless of the advantages of m-education, every area has its own specificities that can be aggravating or facilitating.

In comparison with the traditional education, this way of education offers:

- the continuity of learning and improvement – highly important for the development of economy, which is one of prerequisites for establishing new order within the Republic of Serbia;
- students learn independently, according to their individual pace, any place and any time they choose, lots of subjects offered by various institutions or lecturers are available to them – which implies quicker application of new forms of education, such is, for example, the Bologna declaration, etc;
- the availability of the topics that are not included in the local area programmes – students discover and attend the programmes they are interested in, even when the educational or business institutions from the places they live or work in do not have them in their offer. This characteristic is very important because of the modest financial abilities of a great part of population on the territory of the Republic of Serbia, which, at the same time, limits the possibilities for education;
- practical work with various technologies – not only the information about the learning subject are offered, but also some additional skills and knowledge on the use of a certain technology;
- the choice of school regardless to the physical boundaries of the home country. Of course, if this way of learning finds greater application in education, it will imply the possibility of self-improvement with significantly lesser initial cost;
- overcoming the inability of interested students to attend traditional lectures due to some of their permanent or temporary physical problems, illness etc., which should become an imperative in every society;
- independent learning and interaction between students and lecturers, where the exchange of information and knowledge can be bidirectional. Namely, contemporary learning methods imply that lecturers also learn from their students who independently seek sources of information. This characteristic has a significant role in the developing countries, where a large number of lecturers needs additional education.

VI. CONCLUSION

The need for everyday, comprehensive and diverse education has become an imperative at the beginning of the 21st century, which requires the necessity of quick, adequate and quality choice of the offered educational contents. The improvement of performances of mobile devices and broadband networks created the basic possibility of applying m-technology for the purpose of fast and quality download of the above mentioned contents.

The development of information and communication technology in the world, inevitably affects all economic and non-economic activities, as the basis of the exchange of information, knowledge, experience and ideas. The application of new solutions with this kind of technology requires constant observing, adjustments and reaction, as the answer to challenges. Thereby, it is evident that those who seriously take the offered possibilities, and react in due time, have competitive advantage in the area of their business activity. Regardless whether the information and communication technologies, whose development is in full blast, are to be applied now or in the near future, it is beyond dispute that there is a need and that the only wrong choice is – not to choose.

In the Republic of Serbia, and in other developing countries, it is necessary to take the possibilities of application into consideration very seriously, in order to make the process itself last as short a time as possible and the results of the applied activities visible in the final balance as soon as possible. Since the potential for the application of this way of education exists, the suggestion is that the implementation strategy be defined as soon as possible on the national level, for the purpose of quicker, more efficient and compatible acting in this field. With the achievement of this goal, the accelerated development of the entire economy and society of our country could also be expected.

REFERENCES