ABSTRACT

Over the last couple of years, a comprehensive education reform, prompted to a large extent by an intensive development of information and communication technologies, has been implemented in the Republic of Croatia. Within this framework, primary schools have begun to apply the Croatian National Education Standard, i.e., a set of standards regulating education with an aim to improve it and adjust it to the requirements and needs of the modern society. The National Curriculum (guidelines) for secondary schools that will follow the principles and methodology of the Croatian National Education Standard for primary schools are planned to be completed by the end of 2010. The school reform is closely connected to the implementation of the Program e-Education, as one of the basic projects initiated as a part of the introduction of information technology into Croatian society. Its implementation has created the conditions for creation of information systems in education based on digital communications technology. Efforts to improve school information system by notifying teachers, pupils, and parents by SMS messages or alternatively by e-mail, i.e., the web, became concrete at the beginning of 2006 when Croatian schools started using SMS school informing service system, called SMS Informativka. After reviewing the state of the Croatian education and the most important achievements of past reforms, this paper has analyzed the process of developing a modern school information system considering its advantages but also problems associated with its implementation.

Keywords: Program e-Education, school information system, exchange of information, digital communications technology, SMS Informativka

INTRODUCTION

Since the beginning of the 1990s, the Republic of Croatia has been going through the process of complex social transformation influenced strongly by globalization and growing exposure of domestic economy to foreign competition. At the same time, intensive development of science and technology presents the Croatian society with new challenges. In these circumstances, a decision to base the development on knowledge and its values represents the only logical choice justifiably anticipated to produce positive results over time.

The key role in the development of knowledge-based society has the education system. The need for its transformation to meet the requirements and needs of modern times has been recognized in Croatia and as a result on June 9, 2005 the Government of the Republic of Croatia adopted a strategic document entitled the Education Sector Development Plan 2005 – 2010 which is based on comprehensive analysis of the issue. The intention of the document is to focus efforts and the policy on the improvement of education system so that it could function as a creator of intellectual and human capital as key development resources.

Building from the fact that the functioning of modern society is inseparable from the development and implementation of information and communication technologies, special attention, while creating a knowledge-based society, should be devoted to various aspects of its use. With an aim to accelerate the process of becoming a part of information society, by the end of 2003, the Croatian government adopted a special document entitled Program e-Croatia 2007, which identified education as one of the main spheres of
activity. The SMS Informativka, that enables connection among all school system stakeholders via digital communications technology, is a concrete result in this area. After reviewing the state of the Croatian education and the most important achievements of past reforms, and the results of the Program e-Education, the basic features of SMS Informativka project and the way this application functions will be presented. Special emphasis was put on consideration of the advantages of the implementation of such information system, but also on disadvantages that need to be removed so the system could be widely used.

THE STATE OF THE CROATIAN EDUCATION AND THE MOST IMPORTANT ACHIEVEMENTS OF PAST REFORMS

The education structure of the population in the Republic of Croatia is by no means satisfactory. In support of this viewpoint, Table 1 shows the data on Croatian population aged 15 and over, by sex and education, based on the Census 2001.

<table>
<thead>
<tr>
<th>教育水平</th>
<th>性别</th>
<th>女性</th>
<th>男性</th>
<th>总计</th>
</tr>
</thead>
<tbody>
<tr>
<td>无受教育</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>初级学校</td>
<td></td>
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</tr>
<tr>
<td>中学</td>
<td></td>
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<tr>
<td>大学</td>
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<tr>
<td>未知</td>
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<tr>
<td>总计</td>
<td></td>
<td></td>
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</tbody>
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Source: "Population aged 15 and over, by sex and educational attainment, by towns/municipalities, Census 2001", http://www.dzs.hr/default_e.htm

Table 1. Croatian population aged 15 and over, by sex and education

According to the Census 2001, the majority of the population in the Republic of Croatia aged 15 and over had secondary education. The second largest group has primary education and the third largest group did not have any education nor had incomplete primary school education. According to the same census, a little more than 7% of the population was university-educated, while only 0.5% of the population held Master’s and Doctoral degrees. In comparison to the number of male population in the same category, there is a larger portion of female population without any education; or with incomplete/complete primary school education. The portion of male population with secondary education and first level of faculty was larger. There was an equal number of university-educated male and female population while the number of Master’s degrees and Doctoral degrees was higher among male population.

In order to gain a clear picture of the Croatian education system, Table 2 shows data on the number of institutions, attendees and employees in 2007.

<table>
<thead>
<tr>
<th>机构类型</th>
<th>总数</th>
<th>学生数</th>
<th>员工数</th>
</tr>
</thead>
<tbody>
<tr>
<td>小学</td>
<td>871</td>
<td>384261</td>
<td>34093</td>
</tr>
<tr>
<td>中学</td>
<td>416</td>
<td>187695</td>
<td>16112</td>
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<tr>
<td>大学</td>
<td>111</td>
<td>158014</td>
<td>7345</td>
</tr>
<tr>
<td>总计</td>
<td>1398</td>
<td>729970</td>
<td>57550</td>
</tr>
</tbody>
</table>


Table 2. Number of institutions, attendees and employees in 2007.

Globalization, transition process that Croatia is undergoing in an effort to become a member of the European Union and NATO, as well as the necessity to build a knowledge-based society and economy, impose the need to rethink radically the traditional principles and methods of education. The increasingly rapid technical
and technological development requires not only encyclopedic acquisition of facts but also efficient resourcefulness in more and more complex situations. Therefore, the new Croatian education policy has to take the best achievements from the previous practices and align them with the highest world and European standards.

One of the basic preconditions for integration into the global social and economic system is information and communication technologies literacy. With an aim to ensure a good position on the knowledge scale, it is necessary to adapt the education system to the needs of information society. In such a society, modern technologies facilitate the access to information needed for understanding of course material during formal education, but at the same time they also open up a wide range of possibilities for lifelong learning and training. Based on the above and the fact that information and communication technologies have had a significant impact on everyday life, it is necessary to encourage their use through the education system, thus contributing to the achievement of the principle of individual-oriented and flexible learning for all community members.

The world’s most developed countries have adapted their education systems to the challenges of the information age in due time. Over the last couple of years, the Republic of Croatia has tried to follow their example. The Croatian model is based on the idea of lifelong education. Within the process of reforms, as of September 2006, all primary schools began with the application of the Croatian National Education Standard which represents an integral approach to the education process. It includes education goals, educational content, proposals for teaching methods, expected learning outcomes and learning environment. Relieving pupils from excessive study loads, basing education system on a teaching process rather than on lecturing only, introducing pupils to research-oriented teaching, acquisition of lasting and usable knowledge, competencies and skills, developing of entrepreneurial skills, training for lifelong learning and strengthening of educational role of schools are just a few of its stated goals. One of the areas it covers is communications and information. This is why the Ministry of Science, Education and Sports included the subject of information science into the Croatian National Education Standard. This subject should enable pupils to acquire skills needed to use computers and programs; familiarize them with basic principles and concepts on which computers, i.e., information and communication technologies are based, and develop their competences to use them in various areas of human activities.

Significant changes were introduced in the secondary education as well. For instance, the students that enrolled in Grammar Schools in 2005/2006 (in case of four-year vocational schools and art schools the relevant year of enrollment is 2006/2007) will be obliged to take a national graduation examination, called Matura, at the end of their secondary school education. It is expected that introduction of this examination will contribute to harmonization of pupils’ competences and facilitate the access of candidate students to tertiary education as they will replace entrance examinations at many higher education institutions. In addition, in May 2006, the preliminary national examination took place. The goal of their introduction was to create a continuous system of evaluation of work and results as well as to improve education. In order to provide an insight into the quality of education on internationally comparable basis, in 2005 competencies were tested for the first time on a sample of 1600 students within the project of the Organization for Economic Co-operation and Development (OECD) called PISA (Programme for International Student Assessment). However, one of the most significant initiatives undertaken in this segment of education is the expected introduction of mandatory secondary education. Collective efforts to improve secondary education should result in the National Curriculum (guidelines) for secondary schools by the end of 2010.

**RESULTS OF THE e-EDUCATION IMPLEMENTATION**

The above-mentioned activities are closely connected to the implementation of the Program e-Education, which is one of primary projects initiated as part of the introduction of information technology into Croatian society. The implementation of the latter has provided free Internet access via CARNet network to all central public primary and secondary schools, and equipment for at least one computer classroom in each school. CARNet network, which also connects all higher education institutions, is linked to the Internet via a 1.2 Gbit/s connection. All education system stakeholders have possibility for accessing both fixed and wireless networks. As a result of introduction of information technologies into electronic identity management process in the education system, an authentication and authorization infrastructure has been established which, according to the available data, covers 223 domains (institutions) and 370994 users. By using a unique electronic identity it is possible to access the network as well as network services regardless of a person’s location.

In 2005, a broadband Internet access was provided in secondary schools. Over the last couple of years, 700 branch schools, 600 school libraries, all secondary school teachers’ staff rooms and pupils’ hostels have been equipped with computers. The provision of computer equipment and necessary software to primary and secondary schools as well as higher education institutions
is a continuous activity within the Program e-Education. Croatian pupils and students have at their disposal state-of-the-art technological solutions that enable access to various databases. At the end of October 2007, the Ministry of Science, Education and Sports presented electronic content through which primary and secondary school pupils have the possibility to access online various interactive teaching materials free of charge. A networking project is currently under way to connect some 20 island schools with a video conferencing system for distance education.

Within the Program e-Education special attention was given to information literacy of the teaching staff. It is planned, inter alia, that by the end of 2008 all primary and secondary school teachers will have acquired basic information technologies literacy.

**FUNCTIONING OF SCHOOL INFORMATION SYSTEM BASED ON DIGITAL COMMUNICATIONS TECHNOLOGY**

The development of information and communication technologies has created the conditions for establishing new ways of connecting school system stakeholders. Surveys have shown that as much as 97% of families with school age children have at least one mobile phone. This suggests that a great majority of parents i.e., guardians have the possibility to receive school-related information via SMS messages. This justifies the introduction of an information system which could enable this communication. The following figure is a simplified illustration of connections created among school system stakeholders.

**Figure 1. School system**

After a one-year-long trial period in the school participating in the pilot project, at the beginning of 2006 SMS Informativka came into wider use and has enabled simple, timely and permanent connection of primary and secondary school teachers with parents and pupils using modern communication technologies. SMS Informativka project that was partially co-funded by the Ministry of Science, Education and Sports, has thus improved the communication in the school system. The application is currently used by 33 schools across 3 Croatian counties; however, other primary and secondary schools have also shown great interest in the introduction of the system. Figure 2 shows a schema of principles that govern the functioning of such a system.

**Figure 2. Schematic illustration of the information system in Croatian education based on digital communications technology**

SMS Informativka enables teachers, parents and pupils to exchange various types of school-related information such as notification on missed classes, assignments, parent-teacher conference time, changes in school timetable, information on departure and arrival time from school field trips or excursions, as well as various sports and cultural events. The system can be used for sending SMS messages about grades, but that possibility is usually not taken up. Sending messages containing information on matters involving child privacy, such as drug testing results for instance, is not allowed. It is necessary to mention that in addition to SMS messages the system also allows receiving and sending of information via e-mail, i.e., the web.

The biggest advantage of using SMS Informativka application is the simplicity of establishing the desired communication. Until now, whenever parents wanted to phone the teacher to inform him/her of their child’s illness, they had to call the school during recess time and hope that the line would not be busy. SMS Informativka system enables parents to just send a message informing the teacher on his child’s inability to attend school. On the other hand, it is also much easier for the teacher to establish contact with the parent whenever he/she has to pass on a piece of information, such as truancy for instance. If necessary, the pupil can also receive the required information in a timely and simple manner.

The mediators in the exchange of information via SMS Informativka system are the service provider, Internet...
access provider, and mobile network operator. Provisions are made that schools do not pay for the introduction of the service but that the relevant Ministry covers these expenses. The Ministry has also taken the responsibility to cover the costs of adjustment to the new work methods. Parents that subscribe to SMS Informativka service pay around $6 per month (according to the latest information, the average pay in Croatia is $950). In addition to this, there is also a possibility to receive information on request. In this case, the parent pays around $2 per each message.

The content of application is created by primary and secondary school teachers by putting information on the web interface. The schools may decide whether to allow all primary and secondary school teachers to put and modify the content or to allow this only to the system maintenance staff. Although it may seem that there is plenty of information, thorough surveys have shown that this is not the case.

Over 70% of parents that have the opportunity to use the described system expressed their satisfaction with the service. As could be expected, at the very beginning of its introduction, the reactions of pupils were rather negative. However, the majority of pupils have changed their attitude as time went by and accepted the numerous possibilities of SMS Informativka system.

All the above suggests that the SMS Informativka has considerably increased the efficiency of school information system but one should not neglect the problems that accompany its implementation. First of all, primary and secondary school teachers who have not taken an appropriate course and do not know how to use a computer will face problems putting information on the web interface. This obstacle will no longer exist once the information literacy project for school staff has been completed. One of the negative aspects is that primary and secondary school teachers do not have enough time during a five-minute break to put information onto the web. In addition, many schools have only a few computers connected to the Internet which reduces the efficiency of information system. It is also unrealistic to expect that under present conditions, marked by lack of finances, the schools will be able to employ a person who would be in charge of SMS Informativka system maintenance only. Special attention will have to be given to solving the above-mentioned problems. In this way, the application, which has the potential to become a successful Croatian export product, will confirm its use value.

CONCLUSIONS

Over the last couple of years, a comprehensive education reform has been implemented in the Republic of Croatia with an aim to improve and adapt education to the requirements and needs of the modern society. It reached all levels of education system. The reform is to a large extent connected to the implementation of the Program e-Education. Its implementation, prompted by the development of information and communication technologies, has created the conditions for improving the present school information system. In view of the above, the creation of an information system based on digital communications has been initiated. The result was the SMS Informativka application that has directly contributed to stronger connections between school system stakeholders. Improved interconnection enabled parents to follow and participate more actively in the education of their children, while teachers’ work was made easier. Although the application of SMS Informativka has considerably increased the effectiveness of the school information system, it will reach its full potential only after the problems associated with its implementation have been resolved.

REFERENCES