

ICT AND EDUCATIONAL SOFTWARE IN THE MACEDONIAN SCHOOLS

Metodija Janceski
 Institute of Informatics,
 Faculty of Natural Sciences and Mathematics,
 “Ss. Cyril and Methodius” University
 Skopje, Macedonia

ABSTRACT

After a brief review of the newer history of ICT in Macedonian education and the concrete steps of the Macedonian government in the computerization of both, the Macedonian society, and especially Macedonian primary and secondary schools in the last two years, the paper will discuss about the profile of IT teachers, and the current situation of theirs continuous education in Macedonia, as well as, about the continuous education with implementation of ICT of non IT teachers.

After the review of the educational portal, follows the brief report for implementation and use the ToolKid software in primary schools by lower primary teachers.

In the conclusion the author proposes the further steps and defines the challenges in the field of ICT and education software in Macedonian schools.

I. THE BRIEF HISTORY OF ICT IN MACEDONIAN EDUCATION

The first serious computer procurement in the Macedonian schools was the donation of the Government of the People’s Republic of China (PRC). Thanks to the former Macedonian president Boris Trajkovski, 5300 PCs were obtained and installed in primary and secondary schools in the period 2003-2005. [1]

During the last couple of years PRC USAID became one of the main actors in the education reform and transformation process in Macedonia. As a result of USAID involvement in this process the following projects were established: “Macedonia Connects”, “E-school” and “Primary education project”. Follows brief explanation of these projects.

- Macedonia Connects project (2004-2007) has enabled broadband Internet access to be readily available and affordable throughout the country and facilitated its use by all sectors of society, besides schools. “Macedonia Connects” also has resulted in Macedonia becoming the first all-wireless internet country in the world. [2]
- E-Schools Project (2003-2008) Creation of 460 computer labs with PRC computers in all primary and secondary schools. Also, a series of training programs were conducted for most of the secondary and primary school teachers, focusing on use of ICT through project-based learning strategies and networking. One of the main “e-School project” activities was translation and adaptation of the software package titled “ToolKID”, based on Comenius Logo, for use by K-4 children. This educational software, together with four manuals was donated to 100 primary schools throughout Macedonia. Besides, a large number of teachers passed the training for using this software. This process continues. [2]



Figure 1: Macedonia Connects project Web site



Figure 2: E-Schools Project Web site

- Primary Education Project” (PEP) (2006-2011) is the latest USAID’s initiative targeting all public primary schools in Macedonia. PEP seeks to improve the quality of instruction and increase employment skills in youth. This project is a continuation of a cluster of USAID-funded projects to strengthen education in

Macedonia and support decentralization efforts, as Macedonia seeks entrance to the European Union. This project has four components: renovate selected schools and improve energy efficiency; increase access to and improve use of information technology; improve math and science education; and improve student assessment. [2]

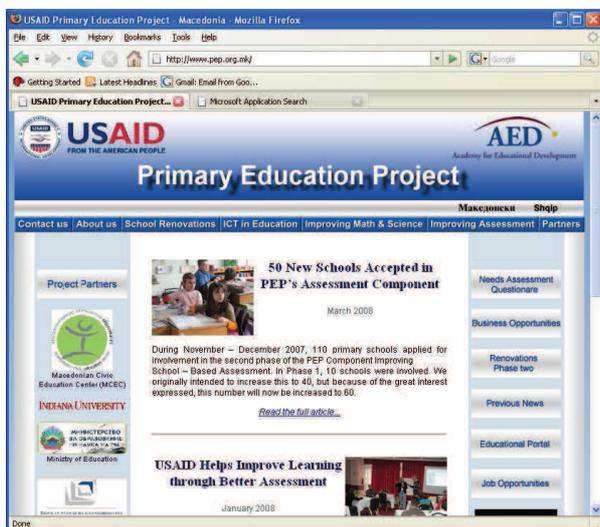


Figure 3: PEP Web site

As described before, the PRC donation and USAID projects were the main factors for initialization of the process of computerization in our schools.

Before the start of the current school year (September 2007) each primary school was equipped with computer laboratory with 5-20 personal computers, and each secondary school was equipped with one or two computer laboratories with 20-40 computers. Most of the time these laboratories were used for teaching and learning the regular subjects: “Informatics” in primary schools, and “Informatics”, “Information technology”, and “Programming languages” in secondary schools. Statistically in Macedonia there was one computer per 56 children.

II. THE LAST STEPS OF THE MACEDONIAN GOVERNMENT IN THE FIELD OF EDUCATION AND ICT

After the last elections in summer 2006, the new Government made outstanding efforts to accelerate the computerization of our schools. Here is the list of the most important Government steps in the field of education and ICT in Macedonia since then [1]:

- a new Minister for Informatics Society was included in the Government.
- for the first time in Macedonia, the subject “Informatics” became obligatory in primary schools by the current (2007/2008) school year.

- the Council for implementation of ICT in primary and secondary school in Macedonia was established. This consultative body includes people from: universities, schools, actual of former IT projects, IT companies, and other government and nongovernment organizations. The main areas of work of this Council are: computer installation and maintenance, creating digital materials, as well as teacher ICT training.

- in the first half of 2007 the Government announced international tender for purchasing the first 100.000 computers. For that purpose more than 20 million euros were projected in the 2007 and 2008 Budgets. This project, called “One Laptop per Child”, is the largest and most important education project undertaken in the 16-year history of the Republic of Macedonia. The Macedonian government has opted to use Client - Server based technology rather than offer one laptop per child.

- within the second project, called "Macedonia - Country of Computer Experts", from May 2007 all the citizens have the opportunity to be trained for basic computer skills free of charge in partnership with private sector. Macedonians interested in upgrading their computer skills can get free training under a new government programme. So far, the first phase of the programme has drawn 22,534 people from various age groups and professional backgrounds. Attendees are offered lessons in Windows, Word, Excel and the Internet.

- the third project (“Free Internet for all citizens”) provided free dial up connections from all homes; Internet tax and phone fees were waived.

- With the fourth project started in 2007 the Government started financial support (four-year scholarship) for 125 students that will study information technologies at some of the faculties in Macedonia (including those at privately sponsored Universities).

- 200 free Internet cafes, opened throughout the country, offer free Internet access for all citizens.

- in November 2007, the university seniors were given vouchers worth 200 euros. They were able to use these towards a computer purchase. According to the Ministry of education, an estimated 10,000 seniors received the vouchers. The vouchers were redeemable at any registered computer store. This initiative will continue next years.

- The process of fixing the schools’ electricity infrastructure, organized by Ministry of education, is almost over.

- These days (March 2008) 17.818 PCs are being supplied (and most of them installed) by Haier, a Chinese PC maker, as well as additional 80.892 thin clients from NComputing, and 98.710 LCD monitors. 180,000 students will be able to share those machines using hardware. These 180,000 seats make 50 percent of the students in the country because we do not have

enough classrooms for all the students, (in essence, half of the students attend school in the morning, and half in the afternoon).

- Thin clients are connected to PC and can work as independent personal computers. They are significantly cheaper than PCs, with high quality and certainly will contribute to both maintenance and electrical supply saves. They are also protected from thefts, and unusable outside schools.
- As for the software, the final decision is that Ubuntu will run on the new PCs. By selecting Ubuntu as the operating system for all of our classroom virtual PCs, our education system can provide computer-based education for all schoolchildren within the limited financial and infrastructural confines that most institutions face today. The schools are using version 7.04 of Edubuntu, a version of Ubuntu tailored for classroom use.

III. THE PROFILE OF IT TEACHERS IN MACEDONIA

The two third of all IT teachers in primary and secondary schools have graduated (BSc) Informatics in two institution under the University "Ss Cyril and Methodius": the Institute of Informatics (II), under the Faculty of Natural Science and Mathematics (FNSM), and Computer Technique, Informatics, and Automatics Department, under the Faculty of Electronics and Information Technology (FEIT).

Curricula of informatics studies of the II-FNSM include two major study groups: educational (diploma for high and primary school teacher), and applied (Informatics engineering diploma). The graduated IT engineers from both, FNMS and FEIT, are given a chance, by completing the additional package of essential subjects (Methodology of teaching informatics, Psychology, Pedagogy and Language), to apply in schools for IT teacher's position.

Taking into account the lack of IT teachers with higher IT education, the last third of IT teachers are science teachers, especially from Mathematics, Physics and Technical education.

There are also graduated IT teachers who are employed in the IT business sector, mainly because of higher salaries and better conditions for personal and professional development.

IV. CURRENT SITUATION OF TEACHERS' CONTINUOUS EDUCATION

A. *IT teachers' continuous education*

According to the national documents, the Universities and Faculties are responsible for continuous (permanent, life-long) education of their students after graduation. This education is also one of the main challenges of the Computer Society of Macedonia (CSM), which is association of all IT

teachers in the country, from primary schools to faculties. CSM has a long term experience in organizing trainings for IT teachers. All these years after being established in 2000, CSM is the main organizer of such trainings and workshops that include the following topics: didactics and methodology in teaching computer science, interactions in education, preparing IT lessons, implementation of ICT in the primary and secondary schools in Macedonia and different software packages. The most of these trainings were held in the lecture rooms and labs of the II, under the FNSM. CSM is the link between the II, an institution with more than two decades experience in the field of IT teachers' education, and IT teachers after their graduation.

The most significant activities in the field of permanent education in the last three years include:

- the annual distance learning training "Administering computer networks" for the most of IT teachers from primary and secondary schools. This training was intended for all IT teacher who apply, and was organized by Clear View and financed by USAID, at the initiative of CSM (2005-2006)
- the training "Creating and Maintaining Web Pages with MAMBO Tool" for all IT teachers from secondary schools in the country, organized and conducted by CSM and World Learning, and financed by USAID (2006).
- the training "Creating and Maintaining Web Pages with MAMBO Tool" for all IT teachers from primary schools in the country, organized and conducted by CSM and World Learning, and financed by USAID (2007).
- Student Support Technician Clubs (SSTC) workshops (Windows XP and WLAN) for motivated teachers, included all IT teachers from 6 pilot schools in the country, organized and conducted by PEP, USAID project (2007).

B. *Other teachers' continuous education in the field of ICT*

Follows the list of the most significant ICT in education trainings for other teachers (non IT teachers):

- Trainings for basic ICT skills (2005-2006)
- The two phases training "Implementation of ICT in secondary school" (intended for all teachers, including IT teachers), organized and conducted by e-School, USAID project (2005).
- The two phases training "Implementation of ICT in primary school" (intended for all teachers, including IT teachers), organized and conducted by e-School, USAID project (2006).
- the trainings: "Using the Internet", "Microsoft Office FrontPage 2003", and "Data uploading and Web site publishing on the free Web servers" in the

framework of the *Multilingual Web-based science courses*, Tempus project, FNSM, (2006).

- “Integration of ICT in the system of primary schools-ToolKid in classroom”, two one-week trainings in two phases for low-primary teachers (2007)

V. PORTAL OF PRIMARY AND SECONDARY SCHOOLS

This educational portal links the teachers and the students from all primary and secondary schools in a virtual working environment. The education portal would provide on-line resources for the school directors, teachers and the students and would enable them to easily share their experiences and practices. The education portal will mark the beginning of a new quality of the education system in Macedonia, thus bringing it closer to the modern education trends and practices in the world. [3]

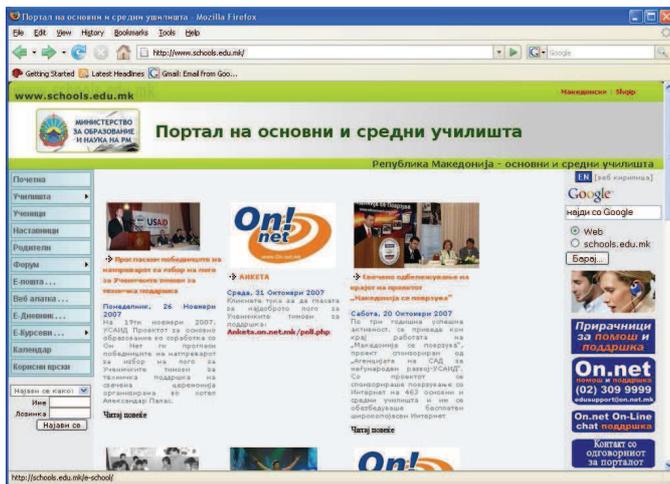


Figure 4: Web portal of Macedonian schools [4]

The goal of this portal is to enable public access to all information regarding the secondary and primary schools and a wide range of services for the students and the teachers.

Through this portal, the visitors have access to the list of all schools and their contact information. All secondary and primary schools have the opportunity to create their own web page which will be hosted on the portal, and all students and teachers will be able to get an e-mail address. [3]

The on-line collaboration and exchange of information and experiences of all teachers and students from primary and secondary schools and the educational system institutions are enabled through the discussion forums which are already functioning on the portal. Other functionalities, such as the calendar and the library of uploaded documents, are under construction. [3]

VI. COMENIUS LOGO AND TOOLKID IN PRIMARY SCHOOLS

Because of the lack of educational software in Macedonian and Albanian language, the e-School.mk project identified ToolKid software represents a comprehensive educational resource center and research tool for the needs of all primary school students from grades I to IV. This software represents the starting point for the future development of similar software by local capacities.

One of the main e-School project activities was translation, localization, and adaptation of the software package titled “ToolKID”, based on Comenius Logo, for use by K-4 children. This educational software, together with four manuals was donated to 100 primary schools throughout Macedonia. Besides, a large number of teachers passed the training for using this software. This process continues. [2]

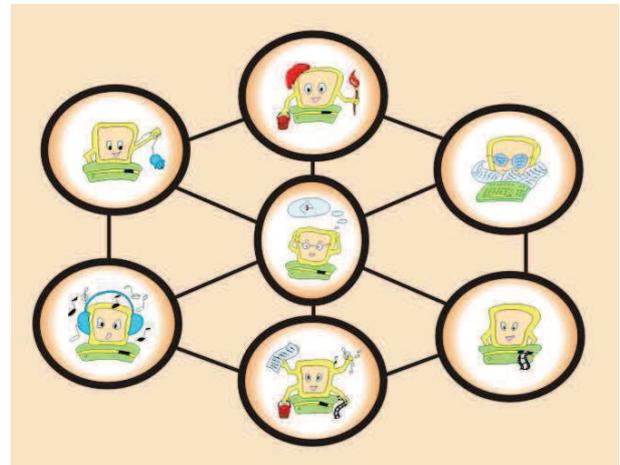


Figure 5: The entry screen of ToolKid

The ToolKid educational software could be useful in all subjects of K-4 education (mother tongue, mathematics, nature and society, society, art education and music education). It organization is such that enable students to acquire firm informatics literacy and culture. The primary education is the right place where the students need to obtain basic informatics knowledge. The curriculum needs to follow the informatics knowledge trends and to be redesigned in compliance with them. [3]

In this package are included programs provide all activities implemented in national school curriculum for working with computers in primary school. The software programs included in package are classified in 7 main groups: Educational games, Drawing Programs, Text Programs, Sound Programs, Animation and Video, Multimedia Programs, Algorithmic and Programming. The resources created with one program, like backgrounds, animation, images; sounds can be used in other in native and easy way by children. It is important and creative for them when they are going to work on different project topics.

VII. CONCLUSION

There are many things that moved the things in the right direction in the last two years in Macedonian education. The new computers and computer equipment, and broadband fast speed Internet are now reality in the most of the Macedonian schools. This is a result of the outstanding efforts of the Government, as well as, previous and current projects in the field of ICT in Macedonian education. The large-scale computerization of the Macedonian education is a crucial part of the process of creating and development of the Macedonian Information Society.

The situation with software is quite different. There is an evident lack of educational software on Macedonian language. The ToolKid package is a good example of such software, but its target groups are just K-4 teachers and students. The educational portal is also very useful, but it needs further development and improvements. This situation is a great challenge for university teachers, primary and secondary teachers, and business IT sector.

Teachers, parents, students, educational authorities, managers of the ICT projects in education, are the main actors in the process of computerization of the Macedonian education. They are faced with many challenges: creation of education software and digital educational material, proper implementation of ICT in education for learning, teaching, managing and administering, trainings for teachers in the framework of their professional development and continuous education. We need the synergy of all actors, mentioned above, in order to follow the way of the developed countries.

REFERENCES

- [1] Janceski M. and Pacovski V., "Macedonian experience, needs, challenges", *Selected papers of the International Conference Olympiad in informatics-Country experiences and developments*, Zagreb, Croatia, pp. 66-78, August 2007.
- [2] USAID Macedonia press releases
http://macedonia.usaid.gov/english/EDU/Macedonia_Connects.htm
http://macedonia.usaid.gov/english/EDU/E-schools_eng.htm
<http://macedonia.usaid.gov/English/EDU/pep.htm>
- [3] M. Kon-Popovska, M. Janceski and M. Jovanov, "ICT trends and challenges for research in Macedonia" in Proceedings of the III Balkan Conference in Informatics (BCI 2007) Workshop "Bridging the Digital Divide in South_Eastern Europe (SEE), Sofia, Bulgaria, pp. 35-111, September 2007.
- [4] Portal of primary and secondary schools in Macedonia
<http://schools.edu.mk>