

## **Developing digital competence in Slovenian education**

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### **The national context**

The Republic of Slovenia lies at the heart of Europe, where the Alps face the Pannonian plains and the Mediterranean meets the mysterious Karst. To the north is Austria; Hungary is to the east; Croatia to the south and Italy to the west. It covers an area of round 20,000 square kilometres and has 2 million inhabitants.

The roots of organized education in Slovenia can be traced way back in history. Church schools intended for training priests and other educated clergymen first appeared in 13<sup>th</sup> century. In 1550 the first Slovenian book was printed. Compulsory education for all children was introduced in 1774, the first standards of knowledge were laid down and teaching as a profession was regulated anew.

The initial one-year education was extended gradually to present compulsory nine-year basic education. Children start schooling at the age of six with basic education (single structure of primary and lower secondary education). This is followed by two-, three- or four-year middle (upper secondary) vocational, technical or general education. Then there are three universities for graduate and postgraduate students.

The competent body for planning and implementing education is the Ministry of Education and Sport. But the charge of introducing changes in the education system lies on The National Education Institute. It has a significant role in the shaping of the Slovenian education system at the pre-university level. Together with faculties, pedagogical institutes, teachers and others it has devised new curriculum solutions, developed methods for the successful transfer of modifications into the education system and devised a plan for ac-

comparing the curriculum or programs and new elements into practice.

### **Preface**

School systems round the world has seen a number of changes in recent years. For us, people dealing with these changes, there are two news ahead: good one and less good one.

Let's make a start with a good one. In the time ahead, the price of digital technology will sink down (Gray and Siewiorek, 1991). This will make computers accessible to nearly everyone: be reach or poor, a man or a woman, a boy or a girl from city downtown or rural village, to buy and use computer as a tool to connect in learning community - to become an active learner and learn throughout his life.

Now, the less good one. While digital technology makes a learning revolution possible, it certainly does not guarantee it. Research results are not encouraging (e-learning Nordic 2006). In many places where digital technology is used in education today, it simply reinforces outmoded approaches of learning. (Resnick, 2002). Computers are mostly used just as a new fascinate tool for transferring information from teacher to pupil and not as a tool for new education, where potential advantages of digital technology come to the fore and every learner can create and express their own ideas, experiment on them and create results in his or her own way (e-learning Nordic 2006).

To take advantage of accessibility of a digital technology we need to rethink our approaches to learning and our ideas on how this technology can support it.

When people are cogitating upon education they are usually thinking about information like: "What information is the most important for the learners and what are the most understandable and learnable ways to transmit it to them. Thinking so, it is not surprising that teachers see a natural connection between computer and education. Computers namely enable accessing, processing, representing and transmitting information in a many new ways. Thinking so, it seems using computers in education make a successful marriage.

This focus on transmitting information, however, is mutilation of digital technology and education itself. If we want to take a full advantage of a digital technology and if we want youth become better thinkers and learners, we need to move beyond this information transmitting view of education.

Psychologists and educational researchers, building on the work of Jean Piaget, have come to understand that learning is not a simple matter of information transmission. No one, even the best computer, can put information into the head of the learner. Rather, learning is an active process in which learner construct new understanding trough different activities: exploring, experimenting, discussing and reflecting. Shortly, learners do not get information, they have to make it.

Nearly the same is the true for computers. Of course, they are wonderful for accessing and transmitting the information. But for the education they are, in the first place, a new medium through which every learner can create and express their own ideas, experiment on them and create out of them whatever results. Indeed, computers and all digital technology connected with them are the best creating things ever invented: we can make music with them; we can draw our imaginations and blogging everyday life. Using this technology so, we greatly expand what can be learned in a common learning process.

Using digital technology efficiently learners have to have competence on using it. Unfortunately, such digital competence does not develop from books or when learners are introduced how to look up for information on the web, how to use a word processor or how to send an e-mail. Even they are active, they do not become competent and fluent in using digital technology.

### **Developing digital competency in Slovenian Education**

Using digital technology has a very long tradition in Slovenian Education. Computer science became an optional subject in Slovenian secondary schools in the school year 1971/72. It became compulsory ten years later in all middle schools in Slovenia. Carrying out students learn about computers and programming in program language Fortran (later Pascal).

With the development of computer science and fact that more and more computers were coming into the schools, the curriculum on computer science was changing many times. In the year 1989 the first curriculum for using computer integrated in primary education subjects Art, Technology and Slovenian were made. (Wechtersbach, 1993) The main methods of the curriculum were team teaching and pupil cooperation work on project.

Major methodological and content changes in the digital technology curriculum have been made in the year 1995. The subject in the middle school has been renamed to “Informatics”. Its main goal became developing a higher level of information literacy. In this context, information literacy was used as an intellectual framework for recognizing the need for information, finding, evaluating and processing data needed to build this information, and finally understanding and using this new information. (Krapež, 2001) The “Computers” has become an optional three years subject with names Dataprocessing, Multimedia and Computer Networks in the last three years of basic schools (<http://www.zrss.si/default.asp?link=predmet&tip=6&pID=24&rID=291>). It becomes a major point for developing basic information literacy. Developing computer literacy move down and was integrated in different subject of basic schools.

### **State of the art situation**

Three digital technologies: the personal computer, the mobile phone and internet, although unknown some years ago, have brought significant transformations, not only in administrative and industrial organizational structures, but also in education. These digital technologies are overcoming barriers of time and space in ways no other technology had made possible before. As communication behaviours evolve, as information access widens and e- culture is everywhere, new perspectives on information and knowledge are disrupting academic perspectives.

In 2005 the Ministry of Education and Sport forward new framework for developing digital competency. In this context the digital competence was defined as (Svetlik, 2006):

- abilities to use knowledge and skills and have habits of life needed for effective and successful use of digital technology to make creative and critical way in the world,
- managing security and integrity issues in a secure way for the individuals and for the society,
- understanding the need for lifelong learning, individual initiative, and personal development through the utilization of digital resources.

Become a digital competent person is, as we believe, at least four state long process.

At a first state learner comprehends the basic knowledge about computers (what computers are, how they operate and what for we can use them) and develops basic skills on using them (how to use a mouse, keyboarding, to run software, write simple text, draw picture etc.). Pupil should be taught to become familiar with digital technology hardware and software. This is, what we call, computer literacy. Computer literacy refers to the comfort level someone has with unpretentious using of computer. The focus of this state is a computer and it can not be integrated in other instruction contents.

We start with computer literacy in Slovenia normally in the first class of basic schools (age 5-6) but some kindergarten starts even earlier. The first step in digital world is made by playing computer games, using didactic programs, sending e-mails, writing text and draw to generate their ideas, taking and printing digital photos etc. (Mori, 2007)

In the year 2005 Faculty of Education Maribor did research about using digital technology in Slovenian basic education (Gerlič, 2005). Results shows, that less then half of teachers use computers at this level. In the web debate (<http://info.edus.si/studijske>) teachers had stated that a barrier to the brighter integration of computers mostly has been that too much teaching time is wasted and a lack of headmaster support. Teachers think, even they participate in few seminars; they do not have needed knowledge and skills to teach pupils digital technology. It is interesting that in the same time pupils hold an opposite point of view and thinks they have great computer skills.

In the debate we recognize that the teachers need more time to become fluent with digital technology and feel sure in front of a pupil. They grew up in a time without computers and do not know what a digital world is going on in a pupil's head: chatrooms, participating in game clans, blogging etc.

According to the headmasters, a special computer literacy teacher in teaching with general teacher will help to overcome this problem. Agree with this, The National Education Institute is putting forward in cooperation with teachers and university members (<http://info.edus.si/studijске>) a curriculum for a special “computer literacy” hours included in different subjects. In a Moodle LMS more than 1.000 teachers collaborate (what is almost 70 % of them). The first impression is that the course will be very helpful. We plan it will take 35 hours and will be leaded out with the half class in computer lab under the lecture of a special computer literacy teacher. It should be started in the first triad of basic schools in a school year 2008/09.

At the second state pupils are using digital technology for their usual school work. They do things like before but use computers instead of other technology. They look up for data on internet, write their project by word processor, manage digital photos, present results with computer presentation programs etc. In this state computer is the background but information is in the focus. Pupils learn how to presented information in different media and how settle it there to be most efficient. This is, what we call, developing information literacy.

We focus on information literacy in Slovenia most intensive from 5<sup>th</sup> to 9<sup>th</sup> class of basic schools (age 10 – 15) with selected subjects “Computers” i.e. Dataprocessing, Multimedia and Computer Networks. Pupils select there different themes, usually from other subjects but they also can choose titles from their own interest such as football, skiing, dogs etc. Then they search and collect data in different sources, organize them in a report and finally presented it in front of their classmates. During their work they become discerning in use of digital technology, and select information, sources and media to fulfil theirs ideas. Teacher orients and helps pupils on the work without imposing his or her own solutions. Usually pupils

worked out such projects alone, but in some cases, such as making web pages, it is disposed they cooperate in small groups with constellation of one or more teachers (sometimes team teaching).

At the third state we spread information literacy into new and unknown situations. We learn how to use new, till now unknown, software and hardware, do things we can not do without digital technology etc. Doing this pupils develop knowledge and skills that include innovative searching, locating, evaluating, manipulating, and controlling information from diverse digital sources and formats to become a critical and analytical user of digital technology in learning and work activities. We call this digital competence.

Developing digital competence is in Slovenia focused mainly from the first to third class of grammar schools and also in some middle vocational schools. There we have a special subject, called Informatics. The syllabus for this subject is now in renovation. New one will be implemented in the school year 2008/09. At the beginning students will be exposed to a wide variety of experiences like guest speakers, demonstrations, field trips, documentaries and other resources. The goal of these activities is to stimulate new interests that small groups of students may choose to pursue through intensive study. In these groups students will engage in research investigations, think, feel and act in an area of their personal interest. They will conduct research, gather data, solve problems, and create a collective final product so, that every student will present results in it on media of their interest: such as art, music, writing poems etc. All by using digital technology of course. At the end they will represent the result to an appropriate audience. We try to do this in 10 pilot schools in school year 2006/2007 and the results exceed all expectations.

For this project we also developed a special conceptual framework called IKIS (*Izražanje, Kakovost, Inovativnost, Sodelovanje* - Expressive, Qualitative, Innovative, Collaborative) to encourage teachers to adopt more creative and imaginative approaches to teaching and learning by digital technology and a more holistic approach to assessment. The use of IKIS is an attempt to challenge teacher views and beliefs about learning and to link learning in the classroom more closely to socio-cultural theory and practice. It is designed to be

used alongside more traditional and analytic forms of assessment and in a way that paints a more holistic and accurate picture of learning as it occurs using digital technology.

Its use places the emphasis on pupils exploring and finding out, being inquisitive and open-minded, and seeing purpose and meaning in their learning. Such an approach fosters flexibility in thinking and increases children's agency in learning through physical engagement, dialogue, interaction and collaborative inquiry. A creative context for learning is one that offers choice and encourages children to experiment with ideas, explore alternatives, take intellectual risks and find innovative ways of resolving difficult situations or solving problems.

The final state of developing digital competence is intensive use of knowledge. Within academic circles, knowledge is seen as the result of understanding data, building information and then integrating it meaningfully with pre-existent knowledge in a human mind. However, this educational conception of knowledge does not account for a widening notion of knowledge used to designate strategic information selected and processed within specific contexts, such as industrial operations or global marketplace behaviours. Knowledge societies base their development mainly on scientific knowledge and measurable or quantitative data. It is this strategic conception that is referred to when companies talk of knowledge management, knowledge sharing and knowledge production. In this situation the relationship to information and knowledge is changing and it is this evolving relationship that needs to be mastered through education. Schools need to develop in learners' not only cognitive and critical thinking skills, but also a discerning capacity to interact with different types of knowledge. (Rosado, 2006)

Digital knowledge refers to a new condition of knowledge that can be processed, managed and transformed by digital technology. Understanding knowledge so, we introduce in education an organizational decision processes that combine a data processing capacity of digital technologies, and the creative and innovative capacity of human beings. With solving practical problems we show students the importance and usage of digital technology, for also controlling everyday problems. Within this context we particularly



deal with decision process and real live decision problems.  
(Rajkovič and Krapež, 2005)

With this, we hope, an opportunity to increase human mental capability is uncorked. Using knowledge technology we show students the applicability of digital technology on managing decision problems. In real life the decision process practically cannot be avoided. There is a variety of decision problems that can be found in everyday lives as well as in education and businesses. In the decision making process we do not know all the facts, which influence the decision, the alternatives among which we choose are not accurately defined for the accurate study of the decision problem and we may not have enough time and also data may not be available and the goals of the decision makers may differ. Nowadays, many different decision methods can help us to think systematically about the problem. Digital technology offers us sufficient support in the decision making and also in searching for the relevant data. Teaching decision knowledge management as a part of general education encourages creative use of digital technology. (Rajkovič and Krapež, 2005)

The project “Teaching knowledge technology” started in Slovenia in the year 2000 in fourth class of grammar schools. The project was running according to the program of The National Education Institute in collaboration with the Faculty of Organizational Sciences and the Josef Stefan Institute in Ljubljana. In the framework students learn about good decision making with the suitable digital technology. Doing so, their knowledge is cemented by building their own multi-attribute model and validating and analyzing the variants with which they are met in a concrete decision problem. During the lecture every student builds their own decision model for chosen case and at the end she or he presents and interprets decision results together with the whole process in front of their classmates.

### **Conclusion**

It looks that every country has a plan for educational reform. But, in most cases, they are thinking about new content and not about re-thinking goals, they are counting hours and subjects and no one ask what pupils are interested on, they are discussing about new forms of testing and assessment, but leave in place existing teaching strategies. Much of what children learn in schools today was designed for

the era of paper or even earlier. We need to update curricula for the digital age. Schools have to prepare pupils with the new skills and ideas of digital competence that are needed for living and working in a digital society.

If we want youth come to school with interest and pleasure to learn, we need to reform such educational reforms fundamentally. Instead of a teacher centralized education, where she or he delivers information to a roomful of students, we should take a more entrepreneurial approach to learning. Students should become more active and independent learners, with the teacher serving as consultant, not chief executive. Instead of dividing the curriculum into subjects, we should focus on problems and projects that spread out of school in reality, Instead of competition with one another we should encourage pupils to work together on projects, enabling them to learn from one another and to learn by teaching one another.

But digital technology is not a magic wand to solve all educational problems. It just gives us a chance. It is as creative as the people using it. And, as we know, childhood is one of the most creative periods of our lives. So let give pupils an opportunity to be creative and help them to be enthusiastic to learn how to extend and refine their creative abilities, so that the creativity of childhood persists and grows throughout their life. Let give them this and all other problems will be lost to sight.

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