

## INFORMATION AND COMMUNICATION TECHNOLOGY IN SLOVENE EDUCATION SYSTEM - PRESENT STATE AND TRENDS

### INFORMACIJSKE I KOMUNIKACIJSKE TEHNOLOGIJE U SLOVENSKOM OBRAZOVNOM SUSTAVU – TRENUTNO STANJE I TRENDOVI

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#### *Abstract*

The following article analyses some results of investigation "Present state and trends of using computers in Slovenian primary and secondary schools". This research the author performs biannual for Ministry of education and sport and national project "Informatization of Slovenian education system". Research project has covered the following topics: analysis of ICT, design and definition of didactical aspects of ICT in Slovenian learning system, design and definition of didactical forms, methods, approaches, models of ICT in education and training, their practical value, and compatibility with contemporary educational systems goals. The article presents some problems on educational hardware, software, pedagogic staff and some didactic criteria of learning Informatics and Computer sciences and computer applications in the Slovenian educational process.

#### *Sažetak*

Članak analizira neke od rezultata istraživanja »Sadašnje stanje i trendovi korištenja računala u slovenskim osnovnim i srednjim školama. Istraživanje autor izvodi u dvogodišnjim ciklusima za Ministarstvo obrazovanja i sporta i nacionalnog projekta "Informatizacija slovenskog školstva". Istraživački projekt pokriva slijedeće teme: analiza ICT-a, dizajna i određivanje didaktičkih aspekata ICT-a u slovenskom sustavu za učenje, oblikovanje i određivanje didaktičkih formi, metoda, pristupa, modela informacijske i komunikacijske tehnologije u obrazovanju i osposobljavanju, njihove praktične vrijednosti te kompatibilnost sa suvremenim ciljevima obrazovnih sustava. U članku se navode neki od problema obrazovnog hardvera, softvera, pedagoškog osoblja i neke didaktičke kriterije učenja informatike i računalne znanosti i računalne aplikacije u slovenskom obrazovnom procesu.

#### INTRODUCTION

ICT (Information and Communication Technology) have their place in our education system. Computer and ICT are used at all levels of education but the research shows that it is not used with the same efficiency or success everywhere. The technology enables different types of contemporary and high quality education. It is also used successfully in the process of individualization and differentiation and problem oriented learning. Present trends in the education are creative thinking oriented and dismiss the memorized oriented learning /1/. Despite the fact that this is very important in our education system we have little or almost no didactical research in this area. Therefore we cannot verify which expectations are achievable and which are not. Even the use of didactical forms, methods and additional knowledge needed by students and teachers is

not yet categorized. We must avoid the possible negative effects of ICT usage. Technology should motivate and prepare mental base for students learning process. Our research /2/, /3/ verifies world literature analysis /4/ where computer appliance in education are shown only in the partial interest fields. Social and economical systems difference also have influence how ICT is used in education. Wealthy society needs much more computer literate individuals and efficient educational systems. The same views, goals, sideways and implementation trials are used in our country. In the last period we can see more detailed design, clear oriented, strong government supported activities of e-education and of course more application and research work even in countries which used to fall behind Slovenian education system. Sadly the advantages we gain in the early years of Computer literacy project are diminish and it is highly important that we join

the problem again very organized, unified and at all fields and directions of traditional learning and e-learning. In some segments we have come close to the state of developed countries of Europe and the rest of the World. But there are still segments where we fall behind. Our research shows even negative trend. In Slovenia it is surely reason a years long "pause" or slow moving activities in last years.

### DIDACTICAL ASPECTS OF ICT USAGE IN PRIMARY SCHOOLS

Special didactical analysis show that computer and ICT in Slovenian primary schools are not used only in computer education but also in the time frame from 1988 – 2009 have been included in almost all subjects fields. Surely were in the early period except in natural and mathematical fields other subject fields less covered but all this has later changed in favor of these subjects. This fact is joyful but also concerned because the negative trend natural and mathematical area is not suitable and even in other

subject fields the frequency of appliance of computer in the education is still very low. Concerned is the fact that despite of all activities of RO (Computer Literacy project) the trends in other subject areas (not only limited to the natural and mathematical subjects) have not significantly changed. What we succeed in the previous era of the project PETRA that apply the computer in the subject of Slovene language, technical education and art education in the 5PPthPP year primary school students was not repeated in the same success level in project RO (even worst was in the project of Computerization of Slovenian education system). This is surprising based of the money spend in the RO. We sill miss subject designed and considered activities in appliance of computer and ICT in mathematic, foreign languages, geography, history, music etc. in all years of primary school (even early learners level)!

From the broad perspective of the special – didactical work of the research in the time frame 1988 -2005 we can make the following global conclusion /5/ /6/:

CATEGORY	1985	1987	1988	1990	1992	1994	1996	1998	2000	2003	2005	2009
Common number of computers	1079	1647	1802	1975	2568	3703	5754	7609	8318	12245	16062	16691
Number of computers on school	1.2	4	4.8	5.2	7.3	10	14	19	23	29.5	39.1	51.4
Number of students on computer	215	130	118	109	89	60	39	28	25	17.4	13.3	8.4

Table 1: Number of computers in Slovenian primary schools

- Computer has its place in the most of the study subjects in the Slovenian primary schools on the subject level and even at the early learner level (especially from year 1998)
- The frequency of application of computer in the natural subjects and mathematics and educational area of subject level shows negative trends but in the social subjects shows positive trends (with occasional perturbations).
- Highly visible is the negative trend of elective subjects and personal interest activities of computers education
- Computer was used from 1994 in the education mainly in the mass work learning forms (frontal and group teaching) but in the recent time we see positive trend in individual work with the computer.
- Computer is mostly used in the separate parts of lectures (most frequently for new knowledge acquisition) and there are still very little done in

the entire approach

- In the lectures with the computer in the world most known strategies are used. Most positive trend we see in the year 2009 in the use of multimedia and internet
- Teachers and students have positive attitude to the computer appliance in the education and the trend remains significantly positive.
- Teachers and principals still do not have sufficient special didactical knowledge how to apply computer in the class and computer in the educational system in general.

Computer is used in the accompanying educational activities but most frequently in the basic administration and financial operations. In the activities that use broad possibilities of computer application in the educational information system the computers are not used enough.

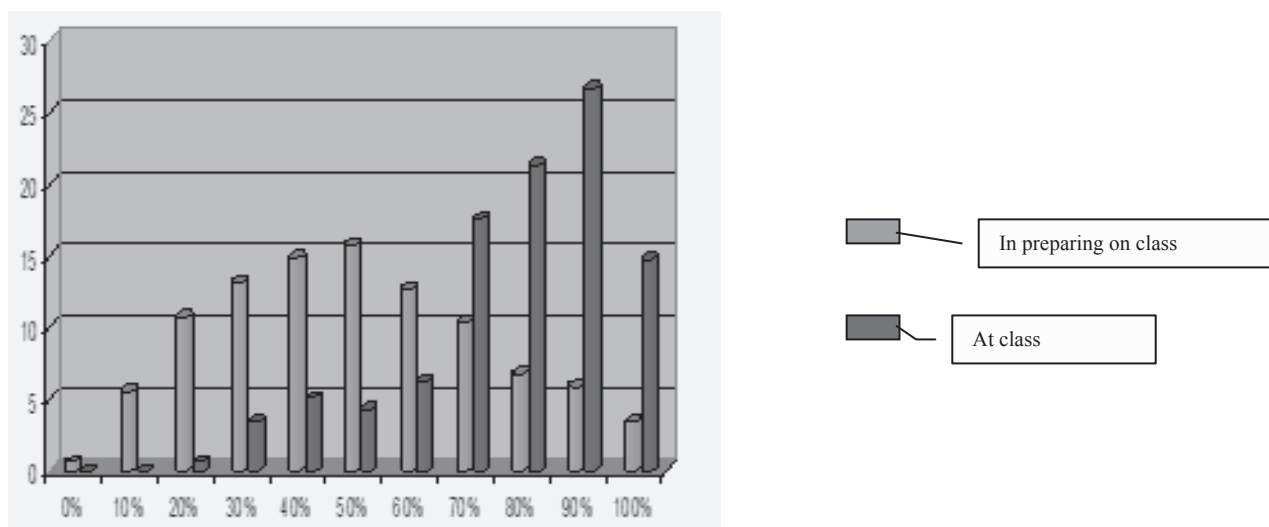


Figure 1. How many teachers on primary schools uses computer at class or in preparing on class.

### DIDACTICAL ASPECTS OF ICT USAGE IN SECONDARY SCHOOLS

Computer and ICT is not used only for computer education in Slovenian secondary schools but it was in the specified time frame used more or less successful and frequent in almost all study area. Very interested is the comparison of frequent use of computer in the lectures between different study programs and calculated of mean of relative frequencies for individual programs. Result is similar than in the years 1998, 2003, and 2005. Mostly the computer is used in the four-year technical and other vocational schools. The advantage between other secondary schools was gained exclusively with the application of the computer in the vocational – theoretical subjects and practice

training. The second on the scale are two and three – year vocational schools and the least the computer and ICT are used in secondary grammar schools despite the small positive trends in the recent year. From the research results in the special didactical area we summarize few important conclusions that shows adequacy or unsuitability of the use of computer and ICT in the lectures in the secondary schools /7, /8/:

- Computer and ICT has its place in the most subject areas in the Slovenian secondary schools and it is highly regarded
- Very few secondary schools have employed a laboratory assistant for area of computer science. This is very critical because the computer subject demands many (or even most) preparations and maintenance of hardware and software.

CATEGORY	1994	1996	1998	2000	2003	2005	2009
Common number of computers	2669	3856	4567	4260	6309	8361	11114
Number of computers on school	21,5	27,7	34,2	47,3	50,2	67,4	108.45
Number of students on computer	17,9	12,3	9,4	7.5	7.2	5.1	3.9

Table 2: Number of computers in Slovenian secondary schools

- The overview of the application of computer in the lectures in the two or three – year vocational programs shows positive trend. Computers are mostly used in practical training, general vocational subjects but much less in the common subjects of the program (i.e. mathematics, physics, language etc.)

- The overview of the application of computer in the four – year secondary technical schools and other vocational programs in general shows no significant difference. ICT and computers are still used in practical training and vocational subject (with minor negative trend) and less (globally with the negative trend) in the common

programs' subjects (mostly in the natural sciences area and mathematical area in the last sample even social science area – i.e. Slovene language,

history, foreign language a minor positive trend is noticed)

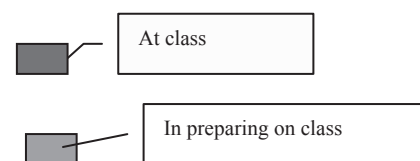
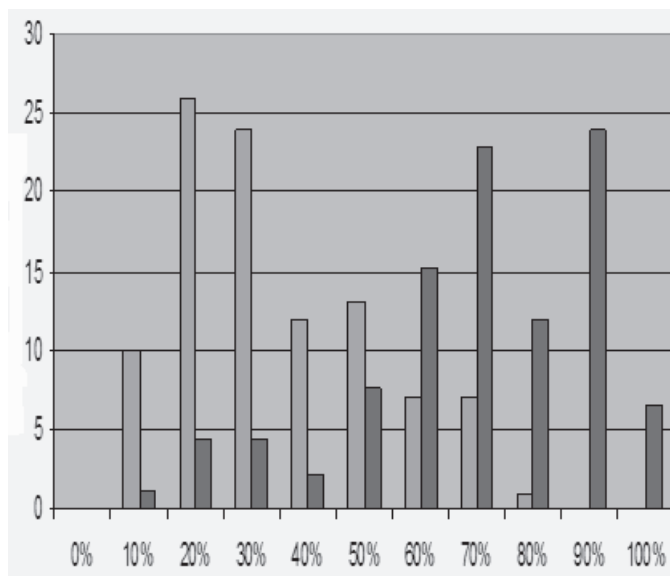


Figure 2. How many teachers on secondary schools uses computer at class or in preparing on class.

- The overview of the application of computer and ICT in the lectures of individual subjects in the grammar schools shows globally minor negative trend except in geography, history, Slovene language and especially foreign language. Generally the comparison of frequent usage of computer and ICT in the lectures the secondary grammar schools fall behind the two previously mentioned secondary programs.

- Even in the secondary schools teachers and students have positive attitude toward the application of computer in the lectures and this results in the continuous but not explicitly evident positive trend.

## CONCLUSION

Analysis of the conditions and trends shows that computer and ICT are not used in Slovenian primary and secondary schools for computer education only but especially in the recent time it was included into almost all study subjects area somewhere most and somewhere less successful. With the current condition we cannot be satisfied therefore we should clearly define implementational weaknesses in this area especially in the cadre – educational. With the suitable correction of regular study programs we need to arrange and strictly implement the system of additional education and permanent education of teachers for this area to enable them to achieve those levels of knowledge:

Level of common computer and information literacy /9/

Level of pedagogical computer and information literacy (computer handling and contemporary

information technology as pedagogical tool) and Authors level /10/ (handling procedures for developing educational software, building and management of pedagogical information systems etc.) We think that it is not over optimistic demand for all the teachers in the course of regular and additional education in Slovenia to gain as soon as possible first two levels of knowledge. For the most capable teachers we should provide motivation and available them to gain even third level of knowledge because this means (under suitable counseling and verification activities) fairly fast gaining of over needed personal software, personal didactics and above all politics of informatization of Slovenian educational system.

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## NECESSITY OF EDUCATION CHANGES UNDER DEVELOPING INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)

## NUŽNOST PROMJENA U OBRAZOVANJU ZBOG RAZVOJA INFORMACIJSKIH I KOMUNIKACIJSKIH TEHNOLOGIJA (ICT)

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### *Abstract*

It is assumed that another technological revolution – known as cognitive – will open schools to the intellectual achievements of mankind in the scope and extent that have not been experienced yet. However, it requires the change of schools themselves as acquiring such great extent of knowledge is based on the experience of applying regulations and principles of dealing with information, profound intellectual sensitivity since learning is a manner of incorporating into culture.

### **Introduction**

A contemporary information civilisation is based upon information and communication technologies (ICTs) which are the basic and indispensable tools to gain and process information resulting in the creation of knowledge.

#### **1. Tomorrow's school – civilizationally developed school**

The results of the most recent research enable a better understanding of functions of the ICTs in didactic processes, however occasionally, researchers focusing on pedagogical problems had neglected those related to possibilities of the ICTs. Research results indicate new links between education and the outside world (socio-cultural environment). Students grow up in an environment of information technology, and that type of environment is also expected at school. Due to the ICTs, space-time barriers disappear (e.g. on-line connections with any place on Earth), supracultural (and cross-cultural) cooperation is established and a new context is created: everything is a virtual world that

### *Sažetak*

Pretpostavlja se da će još jedna tehnološka revolucija – poznata i kao kognitivna – otvoriti škole prema intelektualnim dostignućima čovječanstva u opsegu i mjeri u kojoj nisu još doživljene. Međutim, to zahtijeva promjenu samih škola pošto se pribavljanje takve velike mjere znanja temelji na iskustvu primjene propisa i načela koji se bave informacijama, duboke intelektualne osjetljivosti, jer je učenje način uključivanja u kulturu.

enables further unending exploration.

Closer analyses of educational changes that have taken place within the last 20 years indicate that they have been related to the following issues:

- 1) redefining of terminological convention related to educational phenomena, including the term of education itself, which is to be recognised as all of the phenomena in which learning of processes of conscious and organised use of information in order to create new knowledge takes place;
- 2) resignation from transferring knowledge by a teacher in favour of constructing knowledge by each student individually – in this dimension learning processes become crucial, whereas a teacher resigning from the previous "authority" assumes the role of an advisor, student's partner, or in extreme cases even a student (!?);
- 3) emphasising active role of students in learning processes depending on their own needs and interests – here student's intellectual activity will manifest in search for new information, creating knowledge, work on research projects and in transfer of intellectual skills for new contexts and situations; students will be responsible for "their" learning whereas the teacher will be responsible