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USE OF ICT AND INAPPROPRIATE EFFECTS OF COMPUTER USE – FUTURE PERSPECTIVES OF PRESCHOOL AND PRIMARY SCHOOL TEACHERS

The aim of this paper is to gain an insight into some aspects of personal computer literacy and preschool and primary school teachers' education on the use of information and communication technologies (ICT). Another aim of the paper is to point out the inappropriate effects of computer use (personal as well as with children of school and preschool ages) according to the students of the Department of Preschool and Primary School Teaching of the Juraj Dobrila University in Pula. The x2 test was used in the data processing, along with the calculation of marginal frequencies for all the examined variables. The scientific and application value of this work is that, based on the indicators obtained, it suggests a need for permanent education of both preschool and primary school teachers on the applicability of ICT at all pedagogical and educational levels, and on all the positive but also negative aspects of ICT use in the widest sense.

Key words: ICT use, computer games, inappropriate effect of computer use, permanent education

Introduction

Educational programs for children of preschool and school age point out the importance and the role of using information and communication technologies (ICT), while the integration of ICT in educational groups is becoming an indispensable part of a pupil's educational process.

The use of computers by children has many positive aspects, including the development of memory, learning methods, problem-solving skills and the feeling of one's own competence and self-confidence. Playing computer games can encourage hanging out with peers having similar interests as well as communication; it develops coordination, spatial relations and presentation. On the other hand, the Internet enables quick access to different information and the exchange of experiences.

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How children use computers and what the negative effects of this can be depends on various factors. The effects of computers can be both positive and negative, and they depend on the way the computer is used. In both cases these effects are rarely simple and direct, but almost always mediated by a number of social and other factors (Gunter & McAller, 1997).

When the potential effect of computer use is in question, children are the most vulnerable segment of the population. Their vulnerability stems from the fact that they go through a process of socialization, and at their young age they are the most subject to different influences that are relatively hard to dose and control.

The research by Roberts and partners (1999) has studied the connection between different demographic and social characteristics and the use of computers by children and teenagers. Among other things, the authors start from the fact that the media are generally a potentially important factor in the socialization of young people, and their influence depends on the choice of media, the time of use, the selection of content, the terms of use and other different characteristics.

Around the world and in our country, studies on the notion of violence and the application of information and communication technologies are becoming more common.

Studies have shown that in the United States 90 percent of 8- to 16-year-olds play computer games, and that they spend an average of 13 hours a week on computer games (Tportal, 2008)

Mathews and partners (2006) have proved on a sample of 44 adolescents aged from 13 to 17 that violent games can cause short-term dangerous effects to teenagers' brain function.

How children distinguish between the positive and negative characteristics of a computer, between fiction and reality, how they choose appropriate content and grasp the meaning of the presented content, depends on many factors. Preschool and primary school teachers play an important role here. The influence of primary school and preschool teachers on the child will be different, and it will depend on a number of characteristics like teachers' competences in using ICT. Their correct and appropriate intervention will also be important.

However, although ICT is an inseparable part of a pupil's educational process, some primary and preschool teachers do not feel competent in their use. In the past, during their academic education, primary school and preschool teachers were not familiar with ICT as they are today, which makes them consider themselves insufficiently competent in using them with educational groups of children. Despite that, their knowledge about the use of ICT mostly depends on themselves, their interests and their readiness to educate themselves independently and permanently. The ICT "revolution" is an enormous challenge to the professional development of teachers. Teachers not only have to get acquainted with ICT, they have to gain pedagogical competences which are the precondition of successful work with new technologies (Dinevski & Plenković, 2002).

The American national educational technology standard for teachers (2008) should be applied in all educational institutions, enabling and encouraging learning and creativity. With their knowledge of the subject, technology, learning and teaching methods, with the aim of promoting pupils' experience, creativity, innovation in their work (the classical form of education or work in a virtual environment), teachers should:

a) advocate, support and model a creative and innovative way of thinking,
b) include pupils in research projects, prepare them for solving life and authentic problems using digital tools and information sources,
c) by using cooperation methods (teacher-pupil), improve and fulfill the educational process, and
d) model cooperation knowledge in their learning with pupils, colleagues and others (the classical form of education or work in a virtual environment).

In view of the above, there is a need for preschool and primary school teachers' permanent education, as the precondition for good transmission of knowledge to pupils. The educational system's information infrastructure is the precondition for all citizens to obtain basic computer literacy during their education, but also for their whole educational process to be of quality, modern and in line with the real needs and life conditions in the information society (MZOS, 2009).

Aims of the research

The starting assumption in the research is that students from the Department of Preschool and Primary School Teaching can, based on "heard out" subjects and "worked off" student training, estimate some aspects of their personal computer literacy and the education of primary and preschool teachers in using ICT, as well as some improper effects of computer use (personal or for school and preschool children). There are differences in their estimates because of differences in their academic programs or age.

In light of the above, the research aimed to gain an insight into the following:

– some aspects of personal computer literacy and education of primary and preschool teachers in using ICT, according to the students' estimates,
– inappropriate effects of computer use (personal or for school and preschool children) according to the students' estimates, and
– differences in estimates between students of the Primary School Teaching and the Preschool Teaching departments, as future primary school and preschool teachers.

Methods

Sample

The whole sample comprised 122 students from the Department of Preschool and Primary School Teaching of the Juraj Dobrila University in Pula. In line with the aims of the study, the sample was divided into three subsamples:

- first- and second-year students of the Preschool Teaching course, N=67,
- third- and fourth-year students of the Primary School Teaching course, N=55, and
- 49 subjects who use the computer for playing computer games (Preschool Teaching, N=29 and Primary School Teaching, N=20)

Sample of variables

The questionnaire was designed for this study and consists of 29 variables. Three groups of variables have been analyzed for the needs of this questionnaire:

I Variables related to personal use and the effects of the computer:
1. Do you consider yourself a computer-literate person?
2. Do you think you are sufficiently informed about the negative consequences of computer overuse?
3. Do you use the computer for playing computer games?

II Variables related to the negative effects of computer overuse:
4. Do you think that computer games affect your everyday functioning (you are tired because you have been playing till late at night, you do not fulfill your duties or you postpone them because you are playing an "interesting" game or something similar)
5. Do the games you play contain elements of violence?
6. Do you think that games with elements of violence increase your aggressiveness?
7. Do you think that games with elements of violence affect aggressiveness, hyperactivity or the occurrence of other behavioral disorders in preschool/school age children?

III Variables related to the education of primary and preschool teachers in some aspects of the use of ICT:
8. Do you think that primary school/preschool teachers pay insufficient attention to media education of children?
9. Do you think that primary school/preschool teachers are familiar with different types of computer games?
10. Do you think that primary school/preschool teachers are sufficiently familiar with the negative consequences of computer overuse?
11. Do you think that, as future primary school/preschool teachers, you should permanently educate yourself in the use of information-communication technologies (ICT) in your future work?

All the questionnaires in this study are anonymous and used solely for the needs of scientific research. The questionnaire used is not standardized.

Data processing methods

The χ^2 test as a component of the SPSS for Windows software, along with working out the marginal frequencies for all the examined variables, has been used for data processing.

Table 1. Variables related to personal use and the effects of the computer

Absolute and relative frequencies										
Variable	Category	Total		Preschool Teaching group		Primary School Teaching group				
		ap.	%	ap.	%	ap.	%	χ^2	df	p
		122	100.00	67	100.00	55	100.00			
Do you consider yourself a computer-literate person?	Yes	101	82.8	49	73.1	52	94.5	10.583	2	0.05
	No	7	5.7	7	10.4	0	0			
	I don't know	14	11.5	11	16.4	3	5.5			
Do you think you are sufficiently informed about the negative consequences of computer overuse?	Yes	62	50.8	31	46.3	31	56.4	12.270	2	0.03
	No	42	34.42	27	40.3	15	27.3			
	I don't know	18	14.8	9	13.4	9	16.4			
Do you use the computer for playing computer games?	Yes	49	40.2	25	37.3	24	43.6	15.002	1	0.04
	No	73	59.8	42	62.7	31	56.4			
	I don't know	0	0	0	0	0	0			

Results

The descriptive results of the group of variables related to personal use and the effects of the computer (Table 1) show that 82.8 percent of the subjects (94.5 percent of future primary school teachers and 73.1 percent of future preschool teachers) consider themselves to be computer-literate, while 5.7 percent of the subjects do not consider themselves literate (all preschool teachers). That almost half of the students say they are not, or do not know if they are, sufficiently informed about the negative consequences of computer overuse is an interesting and significant fact. It can mean that they will not, as future primary and preschool teachers, feel sufficiently competent in this field. At the same time, 40.3 percent of Preschool Teaching students say that they are not sufficiently familiar with the negative consequences of computer overuse, the figure being 27.3 percent for Primary School Teaching students. With small differences between the two groups of students, around 40.2 percent of them use the computer for playing computer games.

The result of the χ^2 test is higher for all the analyzed variables than the marginal values on the corresponding levels of freedom, which means that the indicators can be considered significant, not accidental.

Table 2. Variables related to the negative effects of computer overuse

Absolute and relative frequencies										
Variable	Category	Total		Preschool Teaching group		Primary School Teaching group		χ^2	df	p
		ap.	%	ap.	%	ap.	%			
		49	100.00	29	100.00	20	100.00			
Do you think that computer games affect your everyday functioning?	Yes	10	20.4	4	13.8	6	30	13.190	2	0.025
	No	31	63.3	21	72.4	10	50			
	I don't know	8	16.3	4	13.8	4	20			
Do the games you play contain elements of violence?	Yes	13	26.5	6	20.7	7	35	12.508	2	0.028
	No	33	67.3	22	75.9	11	55			
	I don't know	3	6.1	1	3.4	2	10			
Do you think that games with elements of violence increase your aggressiveness?	Yes	14	28.6	9	31	5	25	10.607	2	0.007
	No	25	51	15	51.7	10	50			
	I don't know	10	20.4	5	17.2	5	25			
Do you think that games with elements of violence hyperactivity or the occurrence of other behavioral disorders in preschool/school age children?	Yes	34	69.4	19	65.5	15	75	10.994	2	0.006
	No	7	14.3	4	13.8	3	15			
	I don't know	8	16.3	6	20.7	2	10			

The analysis of indicators in Table 2 was conducted on the subsample of 49 subjects who use the computer for playing computer games, 20 of them being Primary School Teaching and 29 being Preschool Teaching students. In 63.3 percent of cases, the students estimate that games do not influence their everyday functioning. However, 20.4 percent of the subjects (one in five) think that games influence their everyday functioning in the sense that they are tired because they have been playing till late at night, they do not fulfill their duties because of this or they postpone them because of playing an "interesting" game. All this can be seen as an indicator of markedly negative effects of using the computer or addiction to computer games. The number of Primary School Teaching students who think that games influence their everyday functioning is double compared to the Preschool Teaching group.

Just over one-fourth of students who use the computer for playing computer games say that violent games increase their aggressiveness. Almost every third subject thinks the same of games with elements of violence. More Primary School

Table 3. Variables related to the education of primary and preschool teachers in some aspects of the use of ICT

Absolute and relative frequencies										
Variable	Category	Total		Preschool Teaching group		Primary School Teaching group		χ^2	df	p
		ap.	%	ap.	%	ap.	%			
		122	100.00	67	100.00	55	100.00			
Do you think that primary school/ preschool teachers pay insufficient attention to the media education of children?	Yes	72	59	33	47.8	39	70.9	5.890	2	0.05
	No	26	21.3	18	28.4	8	14.5			
	I don't know	24	19.7	16	23.9	8	14.5			
Do you think that primary school/ preschool teachers are familiar with the types of computer games?	Yes	31	24.6	23	32.8	8	14.5	8.734	2	0.013
	No	63	51.6	27	40.3	36	66.5			
	I don't know	28	23.8	17	26.9	11	20			
Do you think that primary school/ preschool teachers are sufficiently familiar with the negative consequences of computer overuse?	Yes	44	36.1	30	44.8	14	25.5	20.245	2	0.000
	No	51	41.8	16	23.9	35	63.6			
	I don't know	27	22.1	21	31.3	6	10.9			
Do you think that, as future primary school/preschool teachers, you should permanently educate yourself in the use of information-communication technologies (ICT) in your future work?	Yes	82	67.2	37	55.2	45	81.8	19.726	2	0.008
	No	29	23.8	22	32.8	7	12.7			
	I don't know	11	9	8	11.9	3	5.5			

Teaching students (35 percent) than Preschool Teaching students (20.7 percent) play games with elements of violence, while 31 percent of future preschool teachers and 25 percent of future primary school teachers think that games with elements of violence increase their aggressiveness.

It is significant that 69.4 percent of the subjects (75 percent of future primary school and 65.5 percent of future preschool teachers) think that computer games

with elements of violence affect aggressiveness, hyperactivity or the occurrence of behavioral disorders in preschool/school children.

In the literature it is common to link the overuse and improper use of computers to some forms of pupil behavior (usually violent, aggressive). There always exists the unsolved dilemma if playing violent games and watching violence in general encourages such behavior in young watchers, or if already existing violent traits of a young person who watches such content manifest themselves through a higher tendency to watch violence, something that is not analyzed in this study.

The value of the χ^2 test for each of the variables from Table 2 is higher than the marginal value on the second level of freedom, which means that the indicators can be considered significant, not accidental.

Both groups of students (Table 3) have provided relatively high estimates that primary/preschool teachers pay insufficient attention to the media education of children (59 percent), and that they are not familiar with the types of computer games (51.6 percent). Differently than the 47.8 percent of future preschool teachers, 70.9 percent of future primary school teachers think that primary/preschool teachers pay too little attention to the media education of children. The estimates inside the groups are very similar when it comes to the fact that primary/preschool teachers are not familiar with the different types of computer games.

Almost 80 percent of students estimate that primary/preschool teachers are not, or do not know if they are, sufficiently familiar with the negative consequences of computer overuse.

The need to permanently educate themselves about the use of information-communication technologies (ICT) as future preschool and primary school teachers was estimated highly (67.2 percent). Primary School Teaching students recognize this need more than Preschool Teaching students (81.8 percent to 55.2 percent).

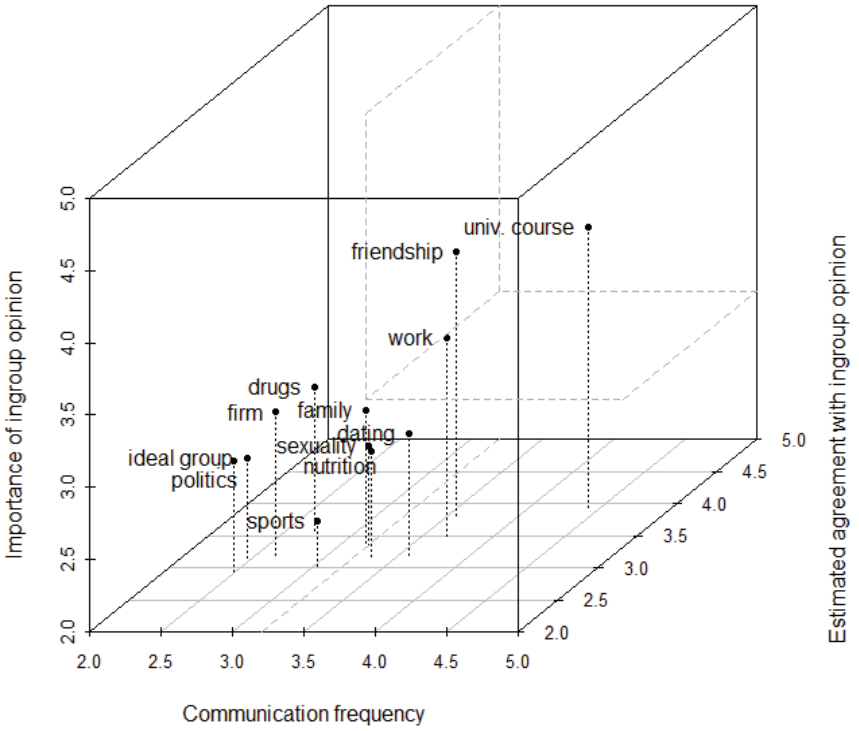
The result of the χ^2 test is higher for all the variables from this group, except for the variable "Do you think that primary/preschool teachers pay too little attention to the media education of children?", than the marginal value on the second level of freedom, which means that the indicators can be considered significant, not accidental.

Conclusions

Based on the obtained indicators it can be concluded that:

- the subjects consider themselves computer-literate (94.5 percent of future primary school teachers and 73.1 percent of future preschool teachers), but almost half of the students estimate that they are not, or do not know if they are, sufficiently familiar with the negative consequences of computer overuse,
- 40.2 percent of the subjects use the computer for playing computer games, both groups almost equally,

Figure 1. Communication relative to objects



- students who use the computer for playing computer games give a relatively high estimate that games do not affect their everyday functioning, while one in five subjects thinks that games affect their everyday functioning in the sense that they are tired because they play late at night and consequently do not fulfill their duties or postpone them because of playing an "interesting" game (future primary school teachers do this twice more often than future preschool teachers),
- just over one-fourth of students who use the computer for playing computer games say that the games they play contain elements of violence,
- almost every third subject says that games with elements of violence increase their aggressiveness,
- 69.4 percent of future primary and preschool teachers think that computer games with elements of violence affect aggressiveness, hyperactivity or lead to the occurrence of other behavioral disorders in preschool/school children,
- the students' estimates about the fact that primary/preschool teachers pay too little attention to the media education of children and that they are not

familiar with the types of computer games are relatively high. Primary School Teaching students agree with this more often than Preschool Teaching students,
- in all, over 60 percent of the students think primary/preschool teachers are not, or do not know if they are, sufficiently familiar with the negative consequences of computer overuse, and
- the need to permanently educate themselves about the use of information-communication technologies (ICT) in their future work as preschool and primary school teachers was highly estimated (more by the Primary School Teaching students).

It can be concluded that the Primary School Teaching students, who are also older, gave more critical and positive (competent) estimates than the Preschool Teaching students.

The scientific and application value of this work is that, based on the obtained indicators, it suggests a need for permanent education of primary and preschool teachers about the use of ICT at all educational levels, in all the positive but also negative aspects of using ICT in the widest sense.

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