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Sanja Tatalović Vorkapić^a & Sandra Milovanović^b

^a Department for Preschool Education, Faculty of Teacher Education, University of Rijeka, University Avenue 6, Rijeka, 51000, Croatia

^b Croatian Foundation of Science, Programme Office in Opatija, Rijeka, 51000, Croatia

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Computer use in pre-school education: The attitudes of the future pre-school teachers in Croatia

Sanja Tatalović Vorkapić^{a*} and Sandra Milovanović^b

^aDepartment for Preschool Education, Faculty of Teacher Education, University of Rijeka, University Avenue 6, Rijeka 51000, Croatia; ^bCroatian Foundation of Science, Programme Office in Opatija, Rijeka 51000, Croatia

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According to the relevance of teacher attitudes in the teaching process as well as to the great number of discussions among experts of pre-school education, it was interesting to examine the students of pre-school teaching about their attitudes toward the use of computer among pre-school children. The sample consisted of $N = 40$ students from regular study and $N = 37$ students of irregular study of Pre-school education from Faculty of Teacher Education in Rijeka. Their attitudes have been investigated using an 18-item questionnaire created for the purposes of this study only. Overall, it was determined that future pre-school teachers have no clear and decisive general attitude toward the use of computer among pre-school children. In addition, they have shown from neutral to more positive attitudes according to all other items but with certain conditions. The discussion resulted with the recommendations for pre-school teacher's education.

Keywords: computer; pre-school years; pre-school teacher attitudes

Introduction

New generations that enter educational process grow up with modern technology. New technologies are available to them from their earliest years. Computers are tools for playing, but also the access to information as young children frequently use mobile phones, tablets, etc. It is obvious that computers are widespread and becoming an increasingly important part of children's life (Li and Atkins 2004). Due to the availability of technology, its use is becoming more prominent in general education as well as in pre-school education. Being one of the most important processes, the education begins in pre-school and continues throughout the lifetime and it relies on the teaching, materials and methods. Pre-school education should be organised at the most efficient way as today's educational technology enables easier fulfilment of the requests of formal education. Nevertheless, pre-school teachers' attitudes towards computer use in pre-school settings are very important and they determine whether computers will be used or not, or at which level they will be used in pre-school. Following the idea of significant influence of pre-school teachers' attitudes towards computer use in pre-school, which could be positive, negative or something in between, it was very interesting to examine those attitudes among the students of pre-school education from Croatia.

*Corresponding author. Email: sanjatv@ufri.hr

The use of technology in education

Different attitudes arise from the large amount of different and controversial research findings. Research of the technology-aided learning started in 1980s and in the last decade its focus was on the role of technology in facilitating learning, emphasising various cognitive processes connected to learning such as multimodal memory, mental animations, multiple animations and in learning outcomes (Azevedo 2005). However, some authors stress certain threats related to technology use in education. Okan (2003) states that certain educational technologies connect learning and playing using animations, sounds and other content. In that environment, learning is enabled without effort so children can develop the expectation that learning is colourful and fun. Also, the learner develops an expectation that learning should not be a difficult and hard process that sometimes is. Some researches show that educational technology should be designed according to the capacities of learning memory and split attention hypothesis (Mayer and Moreno 1998). Furthermore, some authors emphasise the dangers that technology use in pre-school education can have on the overall development of a child, especially in relation to risk of becoming overweight (Mendoza, Zimmerman, and Christakis 2007) and the presence of the negative correlates of 'sedentary behaviours' (Hinkley et al. 2010) that have a negative effect on the neurological development of the child (Rajović 2010). On the other side, use of technology in pre-school education can have certain positive educational outcomes. Kacar and Dogan (2005) showed by using experimental methods that six-year-old children who learned shapes and numbers with computers were significantly more successful than children that learned the same using traditional methods, without computers. Similarly, Din and Calao (2001) showed that playing educational videogames has positive influence on development of reading (decoding) and writing skills, but not of mathematical skills. Shute and Miksad (1997) showed that use of *Computer Assisted Instruction* software increased verbal and language skills, but not math skill in comparison with control group that did not use the software. Li and Atkins (2004) showed that availability of the computer before school is the positive predictor of the school readiness and the cognitive development of the child. Positive correlation between educational technology use and school readiness have also been shown by other researches (Stephen and Plowman 2008; Couse and Chen 2010; Kacar and Dogan 2010). Willoughby et al. (2009) pointed out that working on the computer can stimulate social interaction of pre-schoolers as well as cooperative learning if the group has one or few computers. Therefore, pre-school teachers play a very important role in using computers to enhance learning. These teachers should be suitably prepared to integrate new technologies into the pre-school environment in such a way that they will respond to the developmental needs of the child.

Pre-school curriculum and computer use

Although computer use is present in the pre-school education throughout Europe, research in various European countries shows that there is no clear pedagogical application and guidelines for its use in education. The same situation is present in Croatia (Vican, Rakić, and Milanović Litre 2007). Parents in Croatia can choose to enrol their children to those kindergartens that offer computer-aided teaching programme as one of the additional programmes. Usually those additional

programmes cost additionally and are not implemented within regular pre-school curriculum but are organised as independent educational programmes conducted by special teachers mostly two times a week. Therefore, besides others, those present are the reasons why pre-school teachers in Croatia cannot use the full potential of this method in the educational process. Research by Ljung-Djarf, Aberg-Bengtsson, and Ottosson (2005) shows that although the use of computers is a part of the Swedish national curriculum for pre-school education for children between 3 and 6 years, teachers find this method useful in terms of equal future possibilities such as access to formal education or equality at the labour market. However, the teachers in this research do not find computers useful for developing competencies in pre-school. The same research shows that attitudes of the teachers regarding technology use create an environment that can influence experience, knowledge and skills of the pre-schoolers. In line with this research, if teachers find computers threatening for other activities, such as learning and play, they can be used only if their influence is positive. A protective environment is created where children do not need help or supervision. If computer use is allowed or stimulated and teachers provide support and help in its use, interaction with the computer is encouraged and interaction of children in collaborative learning can occur so that positive attitude towards computers can be developed. Some authors point out that preconditions for successful technology use in pre-school are based on two radical changes that must occur with educators: they must start to use the technology and to change the way of early learning and teaching (Specht, Wood, and Willoughby 1999; Ljung-Djarf, Aberg-Bengtsson, and Ottosson 2005). In addition, Plowman and Stephen (2005) report that those teachers who can use technology and feel confident using it can more efficiently use various programmes and lead children through its use that enables learning and insight in technology

Pre-school teacher formal training and the impact of their attitudes

Whether or not computers will enrich the young children's learning environment depends on the knowledge, skills and attitudes of their teachers (Haugland and Wright 1997). Therefore, the faculties of education play a significant role in enabling its students to obtain the adequate knowledge, skills and positive attitudes towards computer use in pre-school education (Kutluca 2011). Since two years ago and within a new regular study programme titled Early and Pre-school Education and Care, the Faculty of Teacher Education in Rijeka, Croatia offers an elective course titled Computer in Pre-school Setting. The main aim of this course is to build the knowledge, skills and competencies of future pre-school teachers that will enable them to adequately use computer in pre-school setting (http://www.ufri.uniri.hr/data/predipl_RiPO.pdf). The course is organised within one semester and includes a combination of lectures and practical training. Since it is relevant for this study, it is worth to mention that besides the regular study programme, there is a part-time study programme for future pre-school teachers that does not include that course. Also, students enrolled at the part-time study for Pre-school Care and Education are very heterogeneous in age, very often older than regular students, and already have their own families and some level of working experience, which could definitely influence their attitudes towards computer use. Therefore, even though regular students of pre-school education are trained to adequately use computers in work

with pre-school children, the study programme is relatively young and the power of attitudes could be determined within real computer use in pre-school settings. Therefore, concerning the research focus in this study, the nature of the attitudes should also be emphasised. Attitude is one of the determining factors in predicting an individuals' behaviour. It has been defined as positive and negative dispositions to behave in certain ways towards some person, groups or objects (Santrock 1997). Within the frame of computer use in pre-school settings, computer attitude has been defined as a person's general evaluation or feeling of favour or antipathy towards computer technologies and specific computer-related activities (Smith, Caputi, and Rawstorne 2000). In other words, with the same level of knowledge and skills after graduation, two pre-school teachers – one with the negative and the other with the positive attitude towards computer use in pre-school education – would have rather different teaching styles and methods used in pre-school education. Consequently, with their positive/negative attitudes they will influence on developing positive/negative attitudes towards computer use in their kindergarten group of children. Even though computer attitudes have been influenced by different variables, some studies determined that one of the significant problems about the use of computers in educational settings is the teachers' ineptness at computer use (Sadik 2006). Therefore, it is essential to make the students of pre-school education aware of their attitudes towards computer use for successful education and teaching. In one sample of pre-school teachers, it was determined that early pre-school teachers had a neutral to positive attitude towards computers use in pre-school setting (Tsitouridou and Vryzas 2003), and the younger ones had more positive attitude than older ones (Derscheid 2003). Furthermore, besides the higher educational impact on developing attitudes towards computer use in pre-school setting, the society also has strong influence. Souza Barros and Elia (1998) proposed a model that shows in what way a variety of science teaching styles resulted from the strong interaction between teaching attitudes and competencies, school and society, as suggested by the model shown below (Figure 1). Even though this model was created within the frame of science teachers' attitudes, it could serve as a theoretical frame in analysing and discussing the pre-school teachers' attitudes towards computer use. As it could be seen in the model, teacher attitudes are influenced not only by competencies within high education, but also by pre-service training programme and in-service training programmes.

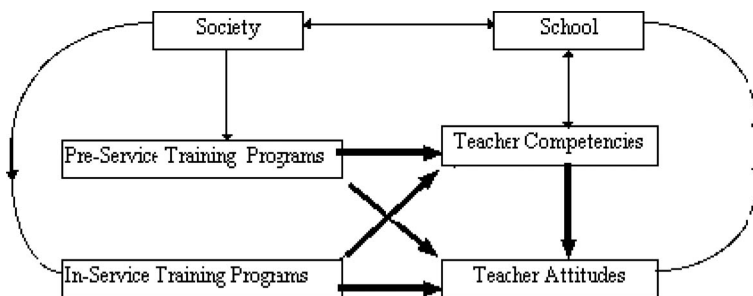


Figure 1. Model of complex interaction between society and education in creating teacher attitudes (Souza Barros and Elia 1998, 1).

The aim of the study and hypothesis

Use of computers in pre-school education has certain advantages and disadvantages, so it is important to be vigilant in its use. Therefore, it is important to further educate all included in pre-school education in use and selection of educational technology (Saude et al. 2005). In addition, their attitudes will influence the use of technology in pre-school education, so it is significant and important to further investigate what future teachers think about use of technology in pre-school, so they can be aware of their attitudes. Since this topic has very short history (only 10 years) and is underrepresented in the formal education, it is to be expected that the attitudes of future teachers will be quite diverse but in general positive with regard to advance in technology and society development. Out of these reasons, it is essential to investigate and discuss future pre-school teachers' attitudes towards computer use in pre-school settings, as a means for effective development of teacher training curriculum that will prepare teachers to face the challenges in the information age. Therefore, the aim of this study was to determine the future pre-school teachers' attitudes towards computer use in pre-school settings. Since regular and part-time students have a variety of differences such as age, marital status, working experience, there is a rationale to expect some differences in their attitudes towards computer use, so these possible differences in attitudes between regular and part-time students should also be analysed.

Method

Participants

There were $N = 77$ participants in the study. Forty female students were in average 18 years old and were students of regular study, and 37 students (2 male and 35 female) were students of the part-time study of the Faculty of Teacher Education of the University of Rijeka. Part time students were more heterogeneous in age with the age range from 18 to 47, while regular students' age ranged from 18 to 19 years. This sample was occasional and presented one generation of the students at Pre-school Education study programme.

Instruments and procedure

The attitudes of students were tested with a simple set of questions ($N = 18$) where they expressed their opinions. Even though there are various computer attitude scales being developed (e.g. Loyd and Gressard 1984; Smith, Caputi, and Rawstorne 2000), a novel inquiry was created only for the purposes of this study. One reason for doing that is the language barrier that has been avoided and second the questions could be totally adjusted to the aim of this study and the specifics in the pre-school settings. Therefore, the closed-type questions were created based on the relevant literature in the field described in the introduction and based on the questions that students had within the lectures. Overall, the questions are about: usefulness and adequacy of computer use in pre-school years, the impact of computer use on children's psychophysical development and the ways through which computers could be presented to pre-school children. Finally, those questions have been chosen because of their relevance to the aim of this study. Self-evaluation was based on the 4-point Likert scale: YES – completely agree (1), yes – agree (2), no – do not agree (3), NO – completely disagree (4). Reliability analysis showed a rather small but still

satisfying Cronbach alpha coefficient $r = .51$. Both groups of students fulfilled the inquiry at the end of the winter semester, and it lasted for about 5–10 min, at the Department for Pre-school Education in the Faculty of Teacher Education, University of Rijeka. Questioning was anonymous, it was conducted at the end of the semester, and students voluntarily participated in the research.

Results and discussion

General attitude towards computer use

The results for the first question regarding the use of computers in pre-school are presented in Table 1. The students were asked to answer the following question ‘*Use of the computers in pre-school is often debated. What do you think about that?*’. The students could respond with one of the following answers: (a) generally I agree with the use of computers in pre-school education; (b) generally, I do not agree with computer use in pre-school; (c) neither agree nor disagree with the use of computers in pre-school. Most students ($N = 48$) chose the answer (c) that stated that they are not sure whether computers should be used in pre-school. Some students ($N = 13$) stated that they agree with the use of computers in pre-school and 11 students disagreed with the use of computers in pre-school. In other words, students do not have clear nor determined opinion of whether computers should be used in education. This is possibly due to the complex subject that cannot be viewed as ‘black and white technique’ and it proves the hypothesis but also previous research (Couse and Chen 2010). The potential of technology and computers as integral tools for promoting cognitive, linguistic and social development of the pre-schooler and school children is recognised (Gimbert and Cristol 2004) and it points to the question not regarding the extent to which it should be used but how it should be used in the learning and teaching of the pre-schooler (Clements and Sarama 2003). Therefore, following the modern technologies (Clements and Sarama 2002), one of the leading questions for the teachers is to carefully think through the use of computers in the pre-school curriculum (Swaminathan and Wright 2003). In line with that, it was important to question the attitudes of the students with the different questions regarding computer use in pre-school.

The attitudes about impact of computer use on children development

As already mentioned, the questionnaire consisted of 18 statements listed in Table 1. The attitudes of the students will be re-categorised within two categories; agreement or disagreement with the statement. Agreement includes all answers that include partial agreement (yes) and complete agreement (YES). Similarly, disagreement will include partial disagreement (no) and complete disagreement (NO). This way, the descriptive analysis will be clearer and it would preserve all information value of the data. Average results are presented in Table 1.

For better understanding of determined results, this section will explain those results grouped in Table 1 around the theme of students’ attitudes towards computer use from the aspect of the computer impact on development of children. Those items are as follows: first, fifth, eighth, eleventh, seventeenth and eighteenth, and they are coloured in grey. Therefore, analysis of the first statement shows that there is average disagreement with the opinion that computers are a burden to the pre-schooler and that they can disturb their psychophysical development. More than one-third of the

Table 1. Average answers (M) and standard deviations (SD) at the general question (0) and 18 statements about the use of computers in pre-school ($N = 77$).

Statements	Average answers (M, SD, answer)
0. The use of computers today is often debated. What do you think about that:	
a) Generally, I agree with the use of computers in pre-school (1)	2.49 (0.79)
b) Generally, I disagree with the use of computers in pre-school (2)	2 – Generally, I disagree with the use of computers in pre-school
c) Neither agree nor disagree with the use of computers in pre-school (3)	
1. Computers are additional burden for pre-schooler and they can influence their psychophysical development	2.75 (0.76) – no
2. Computers as multimedia should be introduced in pre-school education, but with adult guidance	1.43 (0.72) – YES
3. Computers should be introduced in pre-school education at the late pre-school age (5 years), no sooner	1.58 (0.71) – yes
4. The age when pre-schooler is introduced with technology in not important	3.33 (0.86) – no
5. Computers can influence the development of the creativity of the child.	2.11 (0.8) – yes
6. Computers should be introduced to a child and after that there is no need for supervision	3.56 (0.68) – NO
7. The computers should be presented to the child as a toy.	2.68 (1.01) – no
8. Computer can only stimulate cognitive development and the development of the thinking of a pre-schooler	2.12 (0.69) – yes
9. Computer should be presented to a child as a learning device.	1.97 (0.76) – yes
10. Pre-schooler should use computer for all purposes: for playing and learning of different materials.	1.82 (0.81) – yes
11. Computers can only damage the development of the social skills of the child.	2.56 (0.94) – no
12. Anyone can train pre-schoolers to use computers; there is no need for additional training.	3.31 (0.89) – no
13. Pre-schooler should be introduced with Internet.	3.38 (0.89) – no
14. It is not important how much time the child spends at the computer.	3.8 (0.64) – NO
15. Today, the child must be introduced with the possibilities of the computer.	2.04 (0.86) – yes
16. It is not important weather the child plays videogames or learns a new language, it is important that computer is used.	3.25 (0.78) – no
17. While using the same computers two pre-schoolers can have the same quality time as if they were playing in a park.	3.38 (0.81) – no
18. Frequent computer use can damage normal eyesight of a child.	1.36 (0.72) – YES

respondents agreed with this statement ($N = 28$) and majority of the students ($N = 44$) disagreed with computers being a burden that negatively influences pre-schoolers' development psychologically but also physically. This result is understandable and logical since there are scientific and expert works that point to positive (Vernadakis et al. 2005; Stephen and Plowman 2008; Willoughby et al. 2009) and

negative sides of computer use in pre-school education (Mendoza, Zimmerman, and Christakis 2007; Hinkley et al. 2010; Rajović 2010). It is evident from the distribution of answers of the students that their proactive attitude can influence the way computers are used, so they do not negatively influence child development.

The fifth statement is related to creativity development and the possibility of computer application for its development in pre-schoolers. Average results show agreement with this statement and 52 of the students agreed while 22 of them disagreed with this statement. This result is in line with the recent research in the field of creativity and divergent thinking where conclusion about positive effects of computers on children's creativity is dominating (Plowman and Stephen 2005; Couse and Chen 2010). Some researches point to its negative effects (Henniger 1994; Scales and Snieder 1999). But the majority of researches emphasised that computer should have '*... the appropriate role for a computer system is not that of a teacher/expert, but rather, that of a mind-extension "cognitive tool"*' (Derry and LaJoie 1993, 5).

Furthermore, the majority of students agreed ($N = 58$) that computers can stimulate cognitive development of the pre-school child (average answer on eighth item). This is in line with latest research that demonstrates significant positive relationship between computer use and cognitive development of pre-schoolers and their school readiness (McNeely 2005; Stephen and Plowman 2008; Couse and Chen 2010; Kacar and Dogan 2010).

In addition, concerning the 11th statement that states negative influence of computers on social skills, 40 students expressed their disagreement and 36 of them expressed agreement. This result shows that students have quite divergent opinions and this is in tune with available research that determined positive effect of computers on children's play, communication and cooperation in pre-school activities (Plowman and Stephen 2005; Willoughby et al. 2009; Couse and Chen 2010). Other research findings showed that computer use could lead to loneliness, lack of social skills, lower emotional intelligence and lack of appropriate communication skills (Subrahmanyam et al. 2000; Cheyan and Cheyan 2008). One of the most important factors that should be considered in formal education of pre-school teachers is the personality of the child and reaction to the computer. Computers cannot be considered as the only cause of potential developmental problems children face. Therefore, computers should be used under guidance and should be used for cooperative activities and new experiences (Willoughby et al. 2009).

Finally, there is average disagreement ($N = 67$) with 17th statement. It can be concluded that students do not find that quality of time spent in front of the computer is of equal quality as the time spent in playing outdoors. Students find that peer interactions and nonverbal signs are important for development of social competences and friendships, and it is still difficult to create this with computer use. In addition, there is significant agreement with the last statement (Table 1) that frequent computer use can damage eyesight ($N = 72$ students). This is in line with research of Rajović (2009, 2010) who found significant neurological deficits and negative effects on eye accommodation and hand – eye coordination that can influence development in the school age and school achievements.

The attitudes about different ways of computer use

As it can be seen in the Table 1 (no coloured items), the students agree that computer as multimedia should be introduced in pre-schooler education but with parental or

teacher's guidance. Almost all respondents ($N = 71$) agree with the second statement that computers as multimedia should be introduced in pre-school education, but with adult guidance. This attitude is in line with previous research that stresses the role of the adults in the use of computers in pre-school (Plowman, Stephen, and McPake 2010), and the importance of development of competencies and skills of teachers and especially parents (Specht, Wood, and Willoughby 1999). Concerning the third statement, students have agreed that computers should be used at the later age (after 5 years). Most of the students ($N = 69$) have agreed with this statement and eight of them disagreed. This result is in line with the results of Rajović (2009, 2010) that outlines the sensibility of the neurological development of the child while sitting in front of the computer since then the child does not engage in any physical activity necessary for normal development of synaptic connections and variety of cognitive abilities including intelligence. The same author also points to the fact that sitting and repetitive movements at the keyboard prevent the child from engaging in physical activity that could lead to new synaptic connections. On the other hand, this statement can be debated if the computer is adjusted for free movement of the child's hand since then the age limit for its use is not so limiting. Couse and Chen (2010) show that tablet computers are more adjustable to the pre-schooler in comparison to regular computer because of availability of motor manipulation, less resistance in application and easier learning, especially in drawing. The use of tablet computers must definitely be debated in the context of computer education for teachers, due to the mentioned advantages. The fourth statement is continuation of the previous and is stressing its agreement; the age when regular computers are introduced to child is very important. (Christakis et al. 2004). With this statement, 62 students agreed while 13 of them consider it unimportant.

Sixth statement again refers to the importance of the supervision during the use of computers but as something irrelevant. The majority of students ($N = 71$) did not agree with this statement. This result is important because it shows that future teachers are aware of their responsibilities in computer use in pre-school environment. There is an average disagreement ($N = 42$) with the seventh statement that shows students disagree with introducing the computers as a toy. This result is aligned with attitudes showed on previous statements, but also with research that show the need to create awareness that computers can be seen as nickels with a positive and a negative side. Although recent literature shows that computers, especially tablet computers, should be supplement to the play and teaching in the pre-school education, (Couse and Chen 2010) future teachers find that due to its dangers computers are not assumed to be typical toys.

Analysis of the ninth statement shows that computers should be presented to the pre-schooler as a learning device because the majority of students ($N = 60$) agreed with this statement. This is in line with their perception that computers in pre-school are tools that stimulate cognitive development by assisting learning and teaching. In the 10th statement, the multi-functionality of the computers and their application in pre-school is expressed. This implies that computers are used for playing and learning different themes. In average, 64 students have expressed their agreement with this statement and it represents high agreement. It can be concluded that, with advancement of technology, students acknowledge its advantages and possibilities of use for various purposes in pre-school education. In addition, this result is in line with future role and competences of the teachers who realise that in pre-school learning most efficient way to use computers is through play or to introduce a play.

The average result for statement 12 is encouraging since majority of students ($N = 59$) find that special competencies are necessary for training pre-schoolers to use computers. This level of criticism and awareness of future teachers is quite high and points to special care in computer use and implementation of these methods in formal education of teachers (Stephen and Plowman 2008; Plowman, Stephen, and McPake 2010). Furthermore, 64 students have expressed their disagreement with the statement that children should be introduced to Internet. Considering the possible dangers of Internet use for children, this attitude is expected. However, some research show that web and e-mail are important for socialisation of adolescents, and that children should know as much as possible about developments of technology (Subrahmanyam et al. 2000). Considering the 14th statement, the majority of students ($N = 71$) have not agreed with it, what points out the need of future teachers as control and guidance in computer use (Plowman, Stephen, and McPake 2010). The analysis of the 15th statement shows average agreement in introducing the possibilities of the computers to the child ($N = 57$) and that is supported with the need of future teachers to be informed with modern trends, changes in the society and technology advancement that shall be introduced to pre-school education. Finally, considering results on the 16th statement, there is higher level of criticism of students regarding use of computers for playing or learning foreign languages, or just using it. The majority of students ($N = 65$) do not agree with this statement. This is in line with above statement which implies that all activities that include computer use should be carefully planned to stimulate cognitive development in pre-schoolers and that the use should be limited, controlled and monitored through guided interaction. Overall, the attitudes of the students are quite critical towards the computer use in pre-school education. Some attitudes are quite differentiated, which implies the need for further education of teachers and also additional research in this field. Some limitations should be emphasised in generalising those findings, since the study has been carried out on relatively small sample of students. Future studies should be conducted on larger number of students, enrolled at different faculty programmes. Besides, regarding the lower reliability of questionnaire used in this study, some other form of questionnaire should be used in future research. Even though the factors of sample size and type of used questionnaire diminished the research findings, this study emphasised the relevance of future pre-school teachers' attitudes and gave a certain insight into the structure of those attitudes within one students' generation. Overall, there is a lack of similar studies in Croatia so this one also has a characteristic of a certain base for similar research in near future.

The differences in attitudes between regular and part-time students

The performed *t*-test differences are shown in first ($t = 2.18, p < .05$) and second ($t = 2.97, p < .01$) statement between regular and part-time students, because it was determined that the differences on those items were the only significant ones. In comparison to regular students, students of the part-time study are significantly more disagreeing with the computers being additional burden for the pre-schoolers and they significantly agree more that computers should be introduced to pre-schoolers but with monitoring and control. In other words, part-time students are more determined and radical whether computers are additional burden and regarding its implementation in pre-school while regular students are more careful

in their attitudes. This finding can be explained with age difference; first year students are mostly 18 years old and without work or parenting experience while part-time students are more heterogeneous in age and in average older since they study and work. Therefore, life and work experience have significant influence on attitudes regarding computer use in pre-school. In conclusion, evidently students do not have enough information based on scientific research about positive and negative effects of computer use in pre-school. Even so, their attitudes are not very different from existing research that should be noted in planning their formal education especially in the context of life-long education.

Conclusion

As assumed, based on conducted research, one generation of students enrolled at pre-school education, future pre-school teachers, do not have completely clear and defined attitudes regarding computer use in pre-school education.

However, as it was previously determined (Derscheid 2003; Tsitouridou and Vryzas 2003) and hypothesised, the positive attitudes regarding computer use in pre-school setting are dominating, but when certain conditions are fulfilled: (a) introduce them in later pre-school age, (b) assure quality control and guidance of parent/teacher, (c) computer and Internet are not the same, (d) use the computer for learning and teaching, not as substitute for socialisation or toy, (e) assure formal education of parents and teachers for pre-schooler use of computers. Therefore, future pre-school teachers have positive attitudes towards computer use in pre-school, but with certain conditions that point to the proper use of computers in pre-school setting as a prerequisite of qualitative pre-school education. As expected, due to some socio-demographic differences, there are very small differences in attitudes towards computer use in pre-school setting between regular and part-time students. As elaborated earlier, the future research directions should be aimed at using larger sample of future pre-school teachers, so these research findings could be verified. It would be very interesting to examine the attitudes of different generations of students, and of students from different faculties. In addition, methodologically a more adequate questionnaire should be used. Finally, it would be very interesting to explore these attitudes before and after studying an elective Computers in Pre-school Settings course, or at the beginning and end of an Early and Pre-school Education and Care study program. That kind of research would show possible influence of changes that are made within the structure of existing attitudes towards computer use, and the usefulness of relevant elective course at the same time.

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