



THE FORMATION OF PRE-SERVICE EARLY CHILDHOOD EDUCATORS' PERCEPTIONS ABOUT ICT USE IN EARLY CHILDHOOD EDUCATION AFTER AN EXPERIENTIAL APPROACH

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Abstract:

This research focuses on the views of the pre-service early childhood educators concerning the use and exploitation of computers in preschool children's education. It is attempted through this research to capture their perceptions before the attendance of a relevant laboratory course and it is compared with the formation of their views after the attendance of this course. During the laboratory course, students contact and interact with children of preschool age, ones that are occupied with computers, in order to gain a biomatic experience. Their views, initially, are recorded as cautiously positive, though it appears to be independent of their degree of familiarity with the use of computer. After gaining the experience with children, their views are configured as positively reinforced. The result suggests that the biomatic experience and the contact with children help future early childhood educators in shaping positive attitudes with regard to the use of computers in preschool children's education.

Keywords: early childhood, education, educators, computers, attitudes, information and communication technology (ICT), theory of experience

1. Theoretical Framework

The rapid development of new technologies and their diffusion in society, has as a result the phenomenon that computers are available and accessible for children of

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preschool age from the early stages even in the age of this spectrum (Jordan and Woodard 2001; Lee and O'Rourke 2006; Li and Atkins 2004; Robinson 2003).

Studies from the international environment note that while in education the exploitation of computers spreads rapidly, does not happen the same in early childhood education, where the diffusion rates are slower (Hill 2010; McCarrick and Li 2007; Plowman and Stephen 2003). However, a growing body of research data concerning cases of instructional use of computers in preschool children's education (Segers and Verhoeven 2003). In parallel, it has begun to be recognized the dimension of the value of computers as a tool for knowledge (Forcier and Descy 2002; Jonassen 2000; Klein et al. 2000). Research evidence supports the positive impact of computers in the educational process as it appears that the interaction of children with the appropriate software enhances creative thinking, and also helps to form a positive attitude towards the learning process (McCarrick and Li 2007). Similarly, the use of computers strengthens the active participation of children in the learning process (Yelland 2005). The use of computers by children enhances their ability in problem solving and structural knowledge (Haugland 1992), facilitates the understanding of abstract concepts and enhances non-verbal skills (Haugland 1992), improves the ability of abstract thinking (Nir-Gal and Klein 2004), and can also enhance the memory ability of children (Haugland 2000, 1992).

The educator with the assistance of computers and by adjusting his/her educational role enhances the cognitive abilities of the child, as the use of computers with the intervention of the adult seems to have positive effects (Nir-Gal and Klein 2004). Generally, it appears that the appropriate integration of ICT in preschool education can enhance almost all sectors and disciplines of preschool education (Brooker and Siraj-Blatchford 2002; Plowman and Stephen 2003). Moreover, there is research evidence to suggest that young children become rapidly familiar with the ICT (McKenney and Voogt, 2009). Of course, some maintain a critical position concerning the growing movement towards the dissemination of ICT in early childhood education, noting their potential unsuitability (Cordes and Miller 2000), while there are those who argue that children at this age should be concerned with "concrete-tangible" material, considering computers as inappropriate because they require symbolic thinking (Fein et al. 1987; Lee and Houston 1986).

However, criticism constantly weakens while it is promoted the development of a common rational and of an appropriate use of computers in preschool education (Gimbert and Cristol, 2004; NAYEC, 1999; Plowman and Stephen, 2003; Yelland, 2005).

2. Literature review

Despite the spread of ICT in young children's everyday life, the inclusion and integration of the use of ICT in early childhood education and care of preschool children, still is treated as an innovative project (Gialamas and Nikolopoulou 2010). Surveys show that teachers' views have a strong impact on the way they teach and their options, when they will be called upon to teach in the classroom (Charlesworth et al. 1993; Clark and Peterson 1986; Fang 1996; Lara-Cinisomo, Sidle Fuligni, Daugherty, Howes, & Karoly 2009; Palenzuela 2004; Stipek and Byler 1997; Vartuli 1999). The study also of the modulation scheme of the views of teachers can improve the educational work they produce (Maxwell et al. 2001; OECD 2009). Generally, it has been proved that the educators' perceptions are an important element in the success of innovations or reforms in education (Fullan, 1993), because these perceptions largely determine whether the educators will use ICT in the educational process (Ma et al. 2005).

Several research activities relating to the detection of the views of early childhood educators on the integration of computers in early childhood education have been previously attempted (Angeli 2004; Chen and Chang 2006; Gialamas and Nikolopoulou 2010; Kalogiannakis 2010; Kiridis et al. 2004; Tsitouridou and Vryzas 2004; Zaranis and Oikonomidis 2009). Generally, the sense of insecurity and fear concerning the integration and use of ICT in education is reflected (Tsitouridou and Vryzas 2004; Zaranis and Economides 2005), while elsewhere the use of ICT in the teaching process is treated with caution (Economides and Zaranis 2010). Compared to the views of Greek teachers at other levels the positive attitude is at a lower level to teachers of preschool education (Jimoyiannis and Komis 2007). According to research data concerning early childhood educators, it seems that computers thought to be (or treated) as a useful, supportive tool, as well as a tool of enrichment for pre-schoolers' learning, while it is expressed the intention to be used in the kindergarten (Sivropoulou et al 2009). Other surveys show that computers are welcomed mainly from the part of which they are faced as a means of administrative support and less as an educational tool (Gialamas and Nikolopoulou 2010). The formation of positive views is influenced by variables such as familiarity and confidence felt by teachers themselves with computers (Afshari et al. 2009; Albirini 2006; Bingimlas 2009; Gialamas and Nikolopoulou 2010; Jimoyiannis and Komis 2007; Tsitouridou and Vryzas 2003; Zaranis and Oikonomidis 2014), while the experience is inversely correlated to the positive attitude (Gialamas and Nikolopoulou 2010; Jimoyiannis and Komis 2007). However to familiarize educators with the basic principles of computers during their studies is not enough for them to teach in the kindergarten with computers (Selinger 2001; Wetzel,

Wilhelm, and Williams 2004). The education of future teachers concerning the use of computers in education is critical to the successful use of ICT in education (Kalogiannakis 2010; Wedman and Diggs 2001; Wheeler 2001). As Dewey has pointed (1938) to his approach in "The Need of a Theory of Experience", educators must recognize and understand the connection between education and personal experience. Dewey believes that any new education must be committed to some form of empirical and experimental philosophy. It is therefore proposed for the teachers to acquire experiential knowledge during their professional preparation (Schon 1996).

It is accepted that the views of prospective teachers influence the attitude they will keep when they will take an active role in education on the issue of inclusion of ICT in their educational work (Sime and Priestley 2005). In this context there have been made researches with students of early childhood educational studies, in which positive opinions were expressed regarding the use of computers in early childhood education (Kyridis et al. 2004). However, it seems that students find it difficult to cope with the technology as part of their future relationship with infants (Angeli 2004), or that despite the familiarity they feel to the ICT (variable that would be expected to correlate with the configuration of a very positive view), lack of educational experience makes them more modest (compared to the experienced kindergarten teachers) and cautious in the formation of the expected positive attitude based on their familiarity with ICT (Gialamas and Nikolopoulou 2010). We are counting on research data which show that the educators' perceptions are formed through their existing views, their direct experience and their professional studies {professional in-service training courses} (Palenzuela 2004). Prospective educators during their studies bear plenty of unconfirmed views on education (Bullough and Gitlin 2001; Raths 2001). The views that are formed during their studies and withstand the early years of educational experience are crucial for their educational profile to develop during their careers (Richardson 1996). There are results which show that the training of students during their university education is very important in determining their attitude towards ICT (Wedman and Diggs 2001; Zaranis and Oikonomidis 2014).

We take into account the view that "caution" and "weakening" of positive attitude seems to be associated with preconceived negative views associated with sensitivity of addressing early childhood. We therefore consider very interesting to shift the research focus of views on teachers invited to train children even younger detecting their views.

3. Methodology

3.1 Research Framework

The survey was attempted to future teachers in their studies at the Department of Preschool Education. The sample consisted of 157 students who attended the course of the first semester (154 women and 3 man), during two academic years. As data collection tool was chosen the questionnaire, which was updated by the students at the beginning and at the end of monitoring the laboratory. During the laboratory course students, after having experienced a wide range of educational software for preschool children, they were asked to contact and interact with children aged 3-5 years, outside the laboratory, using software of their choice (within the range of software that experienced under the monitoring of the laboratory). The aim was to raise children's experiences of interaction with computers under the guidance of an adult.

The sample was only 157 students from a total of 228 students who attended the workshop, on the basis that they managed to have sufficient experience of the interaction between preschool children and computers.

The research aims to:

- a) record the data on the familiarity of future educators with the ICT and how these affect their views. At the same time, the research detects the views of future educators on the integration and use of ICT at an early age range of early childhood education.
- b) examine whether the training in the field of utilization of ICT to preschool education affects the change of their perceptions, particularly on whether the experience, i.e. the experience of the interaction of students with children younger than five years who with their guidance contacted with the computer and exploited an appropriate educational software.

3.2 Questionnaire

The questionnaire included questions of closed type that are characterized by aggregation of two kinds, demographic questions related to literacy profile with the ICT according to the students' self-esteem and questions of detection of perceptions. In questions concerning perceptions, future preschool educators were interviewed in a 5 numbered scale type Likert (Javeau, 1996), with the matching "1 = Not at all, 2 = 'bit', 3 = 'Enough', 4 = 'Very', 5 = 'Great' ", which responded to the installation " To what extent do you believe that.... ".

The questionnaire was e-type, anonymous and constructed to support the implementation of Google Forms. According to the rationale of the survey was asked by

the students to complete the questionnaire at the beginning of the laboratory course, to attend the workshop along with the living experience of contact with the children and with the completion of the course to fill again the same questionnaire, so as to reflect the potential change of their views as a result of their training combined with their experience. In order to match the questionnaires of each subject, each of the participants created her/his own code, which was used in the initial and final questionnaire.

4. Research's Results

Table 1 depicts the familiar profile of students of the use of the computer. As a result of the rapid development of the spread of ICT we observe that 97.4 % possess a computer. The 42.9% has already started the contact with computers from high school. 65.8 % daily deals over 1 hours with the computer. The computer is seen primarily as a means of communication and entertainment, and find the most appropriate working tool rather than a toy. The self-concept of familiarity with the computer corresponds to the moderate level of 50.3 %, while above the moderate levels considers that it moves the 47.7 %. After an adjustment from individual elements reference, the resulting degree of familiarity only 19.1% seems to be familiar to levels below the moderate ones, while 26.2% seems to have greater familiarity.

It seems that the spread of ICT in society now creates the fact of preexisting students' familiarity with ICTs who are oriented to the studies of preschool teacher.

Table 1: Questions of the familiarity profile with the use of ICT

Question	Distribution of the answers				
Do you hold a computer at home?	Yes 97,4 %	No 2,6 %			
From what age do you use a computer?	Preschool 10.9 %	Primary School 46.2 %	Secondary School 42.3 %	High School 0.6 %	
How often do you use the e-mail?	Never 7.2 %	Seldom 29.6 %	Sometimes 31.6 %	Often 27.0 %	Veryoften 4.6 %
How often do you use the Skype?	Never 35.9 %	Seldom 17.9 %	Sometimes 23.7 %	Often 17.3 %	Very often 5.1 %
How often do you use the Facebook?	Never 9.6 %	Seldom 4.5 %	Sometimes 9.6 %	Often 38.2 %	Very often 38.2 %
Mean: day use of the computer	Seldom	Some days 7.7 %	10' – 30'/ day 6.5 %	30' – 1/day. 20.0 %	> 1 hour/day 65.8 %
How do you face computers	As a working tool 65.6 %	As an entertainment mean in general 85.4 %	As a mean of communication 89.8 %	Mainly for games 36.9 %	

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In what degree do you believe that you are familiar with computers	None	Low	Medium	High	Very High
		1.9 %	50.3 %	41.9 %	5.8 %
* Degree of familiarity with computers	None	Low	Medium	High	Very High
	0 %	1,2 %	17,9 %	54,8 %	26,2 %

* Statistical adjustment of data

In order to examine whether the degree of familiarity with ICTs affects the attitudes of students on the issue of the use of computers in early childhood education it was tested the correlation between the confidence that indicate and the degree of familiarity with the computer with their views before and after the completion of the course. In terms of statistical inference, and as was checked the validity of the basic conditions of application, was made use of the non-parametric statistical testing of the comparison of the percentages of categorical bivariate. Specifically was applied the statistical technique of correlation between two variables (Crosstabs), in accordance with the statistical criterion χ^2 by Pearson, with the significance $p < 0,05$, and association steps, such as the validity of the correlation ratio (γ) (Gamma) in relation to the sign of the index (γ). As a remarkable correlation between the variables is accounted the level of power factor ($\gamma \geq 0,30$) (Cohen and Manion, 2000). All correlation pairs lack of statistical significance (for all values was $p > 0,5$ και $\gamma < 0,2$). According to the statistical results there is no correlation between the views of students and their degree of familiarity with the use of computer, nor also between the views of students and between the views of students and the degree of confidence that declare how they feel about the use of computers. Therefore, in the current research, none of these two variables is proved to affect the formation of the views of students.

According to the results on the views of students, displayed in Table 2, positive perceptions were observed that are characterized by cautiousness, since the point of view "Great" is rarely found. Similarly, although not adopted, the possible risks or potential negative effects of using NT in this sensitive age are not discarded also completely. The following opinions are adopted with cautiousness: the benefits of computing (question 2), the possible unhealthy effects (question 5), the difficulty for the child to respond to the two-dimensional screen (question 12), the harm of the child's "sentimentality" (question 15), and the risk of diminish the role of the teacher (question 16).

More enhanced arise the attitudes: of the frequency of contact of children with computers (question 1), of dealing with computing as a chance for learning (question 3), the necessity of existence of computer in every Preschool Centre which is accessible by

children (question 6), children's ability to respond to simple software suitable for their age (question 8), the effect on the children's creativity (question 9), to the risk of computers to substitute other important activities (question 10), the risk of children's isolation (question 14), the view that computers are a tool for adults incompatible to the nature of children (question 17 & 11).

Despite the positive attitude, the view of the students clearly strengthened after experimental intervention in cases: of recognition of the advantage for the learning and educational process (question 4), the view that the computer gives children pleasure (question 7), and the opinion that children possess the cognitive development to interact with computers (question 13).

Table 2: Questions related to the Perceptions

Questions	Mean* Before	Mean After	Mean Comparison Paired Sample T-test
1. Do children contact with computers?	3.26	3.68	t= -8.597, df=151, p=0,000,
2. Is the occupation useful?	3.09	3.70	t= -9.56, df=151, p=0,000
3. Is it a chance for learning?	3.68	4.13	t= -7.16, df=149, p=0,000
4. It is advantageous for the learning and educational process?	3.81	4.07	t= -4.51, df=150, p=0,000
5. NO to the use of computer because of possible unhealthy effects?	2.91	2.79	t= 2.77, df=153, p=0,006
6. In every Preschool Centre there should be a computer accessible by children?	3.40	3.75	t= -5.41, df=153, p=0.000
7. Will the child be happy by using a computer?	3.98	4.63	t= -7,24, df=153, p=0.008
8. Are children able to respond to simple software suitable for their age?	3.56	3.71	t= -3.33, df=151, p=0.001
9. Do computers cultivate children's creativity?	3.55	3.,82	t= -5.14, df=151, p=0.000
10. Risk of computers to substitute other important activities?	3.54	3.64	t= -2.85, df=150, p=0.005
11. Computers deprive the child 'childishness'.	3.36	3.38	t= -.631, df=150, p=0.529
12. Hard for the child to respond to the two-dimensional screen?	2.53	2.15	t= 6.17, df=151, p=0.000
13. Children do not possess the cognitive development to interact with computers.	1.59	1.55	t= 1.61, df=151, p=0.109
14. The occupation with computers isolates and prevents child's socialization?	3.27	3.18	t= 3.07, df=149, p=0.003
15. The occupation with computers harms the child's "sentimentality"?	2.76	2.68	t= 2.02, df=151, p=0.045
16. The occupation with computers reduce, diminish the role of the teacher?	2.46	2.25	t= 4.07, df=152, p=0,000

17. Computers are a tool for adults -children's occupation with computers is incompatible to their nature?	2.78	2.57	t= 4.32, df=152, p=0.000
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* Mean = Mean from 5-point scale

In order to examine whether the degree of familiarity with ICTs affects the students' attitude on the issue of the exploitation of computers in early childhood education, was tested the correlation between the confidence they indicate and the level of familiarity with computers with their views before and after the completion of the course.

As shown in Table 2, after participation in lab classes and living experience in practice, the results were as follows:

It is worth to be mentioned that positively reinforced perceptions/attitudes in cases of corresponding to questions 1,2,3,4,6,7, 9, 12 & 14 which positively affect their attitudes towards ICT use in the learning process. Accordingly, it appears to further weaken the negative aspects such as those corresponding to questions 5, 12, 14, 16 & 17, which supported by statistical significance ($p < 0,005$). Particularly intense is the shift in views concerning whether and in which degree children are coming into contact with the computer in this age (question 1), how useful is this occupation (question 2), the degree of happiness that gives to the child the occupation with the computer (question 7), the degree of difficulty faced by the child in order to respond to the two-dimensional screen (question 12).

5. Discussion

The use of ICT in early age preschool education takes innovative dimension in relation to the traditional representations of the role of early childhood educator, making the perception of the role more complicated, an element that justifies the caution being recorded, which is not associated with a lack of familiarity the ICT with or sense of insecurity among students.

The beliefs of individuals are dynamic and are constantly changing as they are affected by their experiences (Thompson 1992). Information and training help to redefine the attitude of the pre-service educators (Savenye et al. 1992), especially when it is supported by positive experiences (Mueller et al. 2008; Teo 2009). It has been already supported the positive impact of personal experience to teacher education, which forms teachers' intentions for education (Schon 1996). Especially in preparing future educators during their studies, for using ICT in the educational process, should not be a theoretical updating of technology, but should involve practical application of teaching scenarios with the use of technology (Afshari et al. 2009; Albirini 2006;

Zaranisand Oikonomidis, 2014; Bingimlas 2009; Zaranis and Oikonomidis 2014). In our case, the training in the field which was enhanced by the experience and the actual implementation seems to have helped students to overcome prejudices and concerns related to the view that the early age of children makes the use of ICT inappropriate. It was also shown that future educators began to become familiar with the special character that the use of ICT gives to their role. Our research evidence moves parallel to the findings of Gialamas and Nikolopoulou (2010), where the caution in students' attitude is attributed to the lack of educational experience and not to their familiarization with ICTs.

In this research, the experience, the contact of students with children of 3-5 years of age who interacted under their direction with the computer, seems that it fueled the students by positive experience which enhanced their positive view and halted in a distinct level of skepticism.

It is typical their repositioning on the assumption that children have largely a contact with the ICT, that the impact of engagement is positive, they rejoice when they are dealing with the computer, and respond with ease to the two-dimensional screen content. Concluding is deduced that the experience contributed greatly to the students in order to redefine their reservations and deal more positive the aspect of the use of ICT in their educational work.

In the above discussion are highlighted some limitations of this study such as the limited statistical sample derived from a specific Technological Educational Institute and the local dimension of research in the city of Thessaloniki in Greece.

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