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The Use of ICT in Pre-School Institutions

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Abstract

The application of modern ICT tools in pre-school institutions is conditioned by various factors, both general and personal, which are related to the personality of pre-school teachers. The main aim of this paper is to examine the attitudes of pre-school teachers regarding the use of ICT in the process of upbringing of pre-school children. The results of the research obtained on a sample of 212 respondents show that pre-school teachers are aware of the insufficient use of ICT tools in the process of upbringing, as well as that there is a statistically significant difference in the attitudes of pre-school teachers with respect to the level of their education and years of service. The conclusions of the research point to the necessity of systemic changes, which would imply a better ICT equipment in kindergartens, as well as attendance of pre-school teacher training programs.

Keywords: ICT potentials; Pre-school teachers; Years of experience, Years of service

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1. Introduction

In a modern information society an individual is expected to actively use the tools of modern information technology (ICT), both at work and in one's spare time. Children are an integral part of the digital society in which information technologies are a part of their everyday lives and a part of the culture context in which they grow up. Accordingly, it is necessary to introduce the children with the world of digital technologies as early as possible, because it is the best preparation for a life in the future information society of knowledge and learning. In that context, it is necessary for an educational environment in pre-school institutions to be positive, encouraging, and well-equipped with the tools of information technologies (ICT). Besides, it is necessary that pre-school teachers who work with pre-school children actively use these tools in their work, which is conditioned by the competences of pre-school teachers in an adequate and purposeful utilisation of ICT tools in their daily work.

2. Theoretical framework

Modern societies and cultures are adapted to meet various new challenges introduced by the new age, including information technologies (Yusuf, 2005: 43 -50). The omnipresent ICT have induced rapid changes in the society, leading to social, political and global economic transformations. In the developing countries the use of computers and the Internet is still in its infancy due to limited infrastructure and high costs of access. (Nwosu & Ogbomo, 2011). In that respect, the use of modern technologies is significantly conditioned by the development of the society as a whole, and by specificities of every particular society (Mukherjee, 2014). The field of education is immensely affected by the penetrative influences of ICT, not only in the developed countries, but also in the developing countries. The tools of modern technologies have undoubtedly had impact on changes in education and traditional educational institutions, especially on the teaching and learning processes. (Siemens, 2004; Fojtika, 2014; Muresan, 2013). However, although it is generally understood that the introduction of ICT leads to positive changes, their utilisation very often encounters numerous impediments. In the field of pre-school education and upbringing in the Republic of Serbia those impediments are reflected in the lack of financial means, in a dysfunctional space, the routine of pre-school teachers, the fear of modern tools, insufficiently trained staff and a large number of children per educational group (Andelic & Milosavljevic, 2007; Miscevic Kadijevic, 2011; Jankovic & Dmitric 2011).

It is well-known that ICT tools play a significant role in the process of changes in a modern pre-school education and upbringing. In a wider context, ICT include all electronical and digital resources which are used in pre-school institutions, i.e. computer hardware and software, digital cameras and recorders, the Internet, telecommunication devices, programmes and digital toys, digital music boards, digital and android phones, cassette players, computer games, videoconferencing, fax machines, simulation environments, interactive boards, scanners, printers and so on. (Pavlovic Breneselovic, 2012). Accordingly, ICT in education can be perceived as a kind of learning resource, applicable to different activities realised in pre-school institutions.

ICT tools indubitably play a significant role in the process of modernisation of pre-school institutions; so much so that they affect the organisation and quality of pre-school activities, the development of pre-school institutions, the relationship of the society towards pre-school institutions and their position in the society. In many countries worldwide the efforts to improve the existing pre-school institutions and to make them more open and flexible for children and parents are reflected in the implementation of modern technological achievements (Arsenijevic & Andevski, 2011). Present-day children grow up in the era of modern digital media with various digital technologies at their grasp, so it can safely be asserted that these net generations of "digital natives" share characteristic

modes of thinking, communicating and learning (Prensky, 2001:1-6). From the earliest childhood technologically advanced toys introduce the children to the world of computers. Thus, it is understandable that pre-school children show early interest in entering the world of computers (Elston, 2007).

Various researches point to significant positive aspects of the computer use in pre-school institutions, especially with respect to the adoption of new words and terms related to objects, to a drill in using presented objects or symbols which describe them, to an easier adoption of new and consolidation of the acquired knowledge, and to a development of abilities to generate knowledge and process information (Castells, 2003; Tomic & Dukovic, 2008). A large number of researches indicate that the use of ICT in education contributes to the development of children, as well as the development of pre-school education practice (Siraj-Blatchford, 2003; Bolsta, 2004; Yelland, 2005: 201-232). It is considered that an appropriate use of computers at an early age plays a motivational role and makes educational activities more interesting, creative, high-quality and available (Elston, 2007). The use of ICT tools is important for the further development of children. It affects all aspects of their development, including the socio-emotional, cognitive and physical (Stanisavljevic-Petrovic, 2009). There are attitudes expressing a negative impact of ICT tools, especially with respect to computer games and the length of time that children spend at the computer, but also with respect to the content of the games. (Anderson & Bushman, 2001; Ilicin, Marinovic Bobinac & Radin, 2001; Anderson, Carnagey, & Eubanks, 2003). However, in essence, the information technology is neither positive nor negative, but depends on the manner in which it is used. Hence, it can affect all aspects of children's development in either positive or negative fashion (Andelkovic, 2008). Pre-school teachers play a significant role in the application of ICT tools, because they can directly decide when and how these tools are to be applied in activities with children. In that respect, the media competence of pre-school teachers is of the utmost importance, i.e. their preparedness to apply ICT tools (Zgrabljic Rotar, 2005; Stankovic, 2014). For the purposes of examining the current situation in the concrete pre-school practice we believe that it is necessary to examine and ascertain the attitudes of pre-school teachers towards the use of ICT, as well as the reasons for their insufficient use. Thus, this research is dedicated to the aforementioned aims and purposes.

3. Research Methodology

3.1. Research Aims and Hypotheses

The main aim of the research is to examine the attitudes of pre-school teachers regarding the use of ICT potentials in the process of pre-school education and upbringing. Accordingly, the following hypotheses have been formulated: General hypothesis – the use of ICT tools and the reasons of their insufficient use are conditioned by the level of education and years of work experience of pre-school teachers. Specific hypotheses: (1) It is the attitude of pre-school teachers that ICT tools are not sufficiently used in educational activities with pre-school children; (2) There is a statistically significant difference in the attitudes of pre-school teachers in view of their level of education and years of work experience; (3) There is a statistically significant difference in the attitudes of pre-school teachers regarding the reasons of an insufficient use of ICT tools in view of the level of education and years of work experience.

3.2. Research Methods, Samples and Instruments

In accordance with the set aims and hypotheses the author used the descriptive method and correlative procedures in the research, bearing in mind that the aim was to ascertain the connection between independent variables (the level of education and years of work experience), and dependent variables dealing with the attitudes of pre-school teachers regarding the use of ICT tools. The research was conducted during the school year of 2013/2014.

The sample of the research is intentional and comprises 212 respondents, i.e. pre-school teachers, employed in pre-school institutions in Serbia. The structure of the sample in view of the level of education is comprised of 45 (21.2 percent) pre-school teachers trained in health care who graduated from high school, 90 (42.5 percent) pre-school teachers with a college degree and 77 (36.3 percent) pre-school teachers with a faculty diploma. With respect to the years of work experience gained in pre-school institutions the sample was divided into three categories: the first category was comprised 94 (44.4 percent) pre-school teachers with up to five years of work experience, the second category was comprised of 43 (20.3 percent) pre-school teachers with 6 to 15 years of work experience, while the third category was comprised of 75 (35.4 percent) pre-school teachers with over 15 years of work experience. The main research instrument was a tailor-made questionnaire containing 32 questions. For the purposes of this paper the author used only the respondents' answers regarding the use of ICT tools in pre-school education. The reliability of the instrument was established by the Cronbach's Alpha coefficient of internal consistency, which is acceptable, considering that the measured value of this instrument was $\alpha = 0,896$.

Statistical data processing of the empirical research was performed by means of the SPSS (ver, 20.0) statistical analysis software. By using the standard statistical apparatus, the author calculated the frequencies, percentages, the arithmetic means (AM) and standard deviations (SD), the χ^2 - square, the p coefficient, the ϕ coefficient, the contingency coefficient, the Cramer's coefficient, and the degree of freedom by applying the logical-statistical form of reasoning.

3.3. Interpretation of the Research Results

In accordance with the formulated aims of the research the obtained data are presented in three categories: the attitudes of pre-school teachers towards the utilization level of ICT tools in pre-school education; the attitudes of pre-school teachers towards the usability of ICT potentials in pre-school education in view of the level of education and years of experience of pre-school teachers; the attitudes of pre-school teachers towards the reasons of underutilisation of ICT potentials in kindergartens in view of the level of education of pre-school teachers and their years of experience.

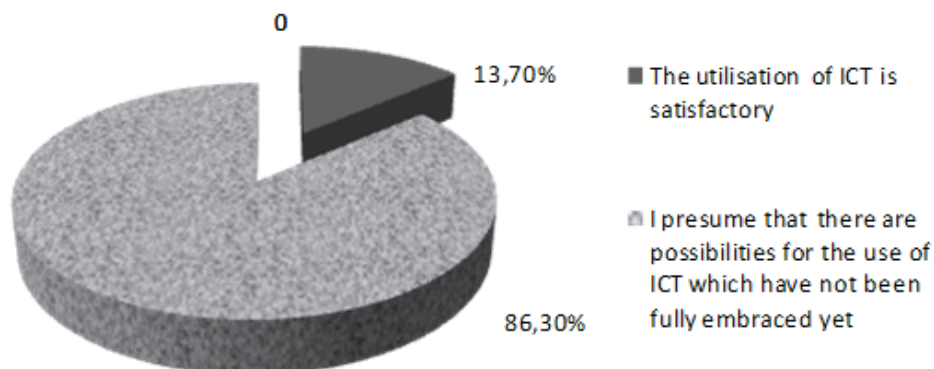


Figure 1. The attitudes of pre-school teachers towards the utilisation of ICT tools in kindergartens

The results presented in Figure 1 show that the largest percentage of the respondents (86.3 percent) believe that there are possibilities for the application of ICT which have not been fully embraced yet, while only 29 (13.7 percent) pre-school teachers believe that the utilization of ICT tools in pre-school practice is satisfactory. The arithmetic means value (AM) is 1.86, while the standard deviation value (SD) is 0.34. The obtained results can be considered expected and they indicate that the largest number of pre-school teachers are aware of the high ICT potentials, as well as that they

agree with the standpoint that these potentials have not been used sufficiently in the activities realised with pre-school children.

On the basis of the data presented in Table 1 one can infer that there is a statistically significant difference in the attitudes between pre-school teachers as a result of difference in their level of education. The respondents who mostly agree (97.8 percent of them) that the potentials of ICT have not been sufficiently utilized in pre-school institutions belong to the category of pre-school teachers with a college degree. Pre-school teachers with a high school diploma believe that the potentials of ICT have not been sufficiently utilized, but to a much lesser extent, since only 35 (77.8 percent) pre-school teachers expressed their agreement with this statement. Pre-school teachers with a faculty diploma, 60 (78 percent) of them, believe that the potentials of modern technologies have not been utilized in a satisfactory manner. Although there are statistically significant differences as a result of different levels of education, one can infer that the largest number of pre-school teachers believe that the potentials of modern technologies have not sufficiently been utilised in work with pre-school children. A smaller number of the respondents in all categories believe that the utilization of ICT is satisfactory.

Table 1. The attitudes of pre-school teachers regarding the utilisation of ICT tools conditioned by the level of education

		The utilisation of ICT is satisfactory	I presume that there are possibilities for the use of ICT which have not been fully embraced yet	Total
The level of education	High school	10 21.2%	35 77.8%	45 100%
	College	2 2.2%	88 97.8%	90 100%
	Faculty	17 22%	60 78%	77 100%
Total		29 13.7%	183 86.3%	212 100%

The value $\chi^2 = 8.196$ at the level of significance $p < 0.05$ and with the degree of freedom $df = 2$ shows that there is a statistically significant difference between the answers of the respondents as a result of differences in their level of education. The value of the $\phi = 0.281$ coefficient indicates a positive correlation, and the values of the Cramer's coefficient $V = 0.281$ and contingency coefficient $C = 0.270$ indicate a weak connectivity and slight correlation.

From the data presented in Table 2 one can infer that there is a statistically significant difference in the attitudes of pre-school teachers as a result of their years of experience. Pre-school teachers with the shortest work experience, 23 (24.5 percent) of them, are satisfied with the level of ICT utilisation in comparison with pre-school teachers with more years of service. The reasons for these results can be traced in the tendencies of the young to seek employment in private kindergartens which are better equipped, so there are more possibilities for ICT utilisation. Likewise, young pre-school teachers are more aware of ICT potentials, because they do not use them only at work, but also in everyday life. However, it is interesting to notice that even pre-school teachers with over 15 years of work experience, 97.3 percent of them, recognise that the potentials of ICT tools have not been used sufficiently, which is the statement welcomed by a large number of pre-school teachers, 90.7 percent of them, from the second category of 6 to 15 years of work experience. These data show that middle-aged pre-school teachers, as well as elder teachers, acknowledge the fact that ICT tools are very important for the further development and improvement of a pre-school education practice, and that they represent the future of pre-school education.

Table 2. The attitudes of pre-school teachers regarding the utilisation of ICT tools in view of the years of work experience

		The utilisation of ICT is satisfactory	I presume that there are possibilities for the use of ICT which have not been fully embraced yet	Total
Years of work experience	Up to 5 years	23 24.5%	71 75.5%	94 100%
	6 to 15 years	4 9.3%	39 90.7%	43 100%
	over 15 years	2 2.7%	73 97.3%	75 100%
Total		29 13.7%	183 86.3%	212 100%

The values of the $\chi^2 = 8.269$ at the level of significance $p < 0.05$ with the degree of freedom of $df = 2$ show that there is a statistically significant difference between the answers of the respondents as a result of difference in their years of service. The value of the $\phi = 0.282$ coefficient indicates a positive correlation, and the values of the Cramer's coefficient $V = 0.282$ and the contingency coefficient $C = 0.271$ show a weak connectivity and slight correlation.

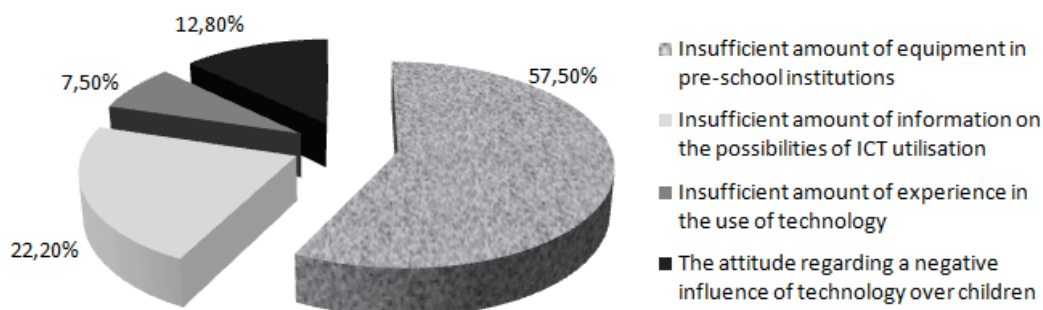


Figure 2. The reasons for the insufficient utilisation of ICT tools in pre-school teachers' practice

On the basis of the data presented in Figure 2 one can infer that the largest impediment to using the ICT tools in pre-school institutions is the lack of adequate equipment in pre-school institutions, which is considered by 122 (57.5 percent) respondents. The second important reason, according to pre-school teachers, is an insufficient amount of information regarding the possibilities of ICT, which was confirmed by 47 (22.2 percent) respondents. A slightly smaller percentage of pre-school teachers, 27 (12.8 percent) of them, believe that the greatest impediment lies in the belief that technology negatively influences children, while the smallest number (7.5 percent) believe that the insufficient amount of experience in the use of ICT creates resistance towards their application. The arithmetic means value is (AM) 1.75, while the standard deviation value is (SD) 1.04.

On the basis of the data presented in Table 3 one can infer that there is a statistically significant difference in the attitude of pre-school teachers towards the reasons for the insufficient utilisation of ICT tools in view of the level of education of pre-school teachers. Although the largest percentage of respondents believe that the main reason for the insufficient utilisation of ICT tools is the insufficient amount of equipment in pre-school institutions, 28 (31.1 percent) of the respondents with a college

degree believe that the main reason lies in the insufficient amount of information on the possibilities of ICT utilisation. This opinion is supported by 15 (19.5 percent) respondents with a faculty diploma. A number of respondents with a high school diploma, 12 (26.7 percent) of them, believe that the greatest impediment to the utilisation of ICT tools is the belief that technology has a negative influence over children. It is interesting that the smallest number of respondents in all categories chose the reason which is related to the insufficient experience in using modern technology, which can be the cause of resistance towards these tools.

Table 3 The reasons for an insufficient utilisation of ICT tools regarding the level of education of pre-school teachers

		Insufficient amount of equipment in pre-school institutions	Insufficient amount of information on the possibilities of ICT utilisation	Insufficient amount of experience in the use of technology	The attitude regarding a negative influence of technology over children	Total
Level of education	High school	29 64.4%	4 8.9%	0 0%	12 26.7%	45 100%
	College	48 53.4%	28 31.1%	12 13.3%	2 2.2%	90 100%
	Faculty	45 58.4%	15 19.5%	4 5.2%	13 16.9%	77 100%
Total		122 57.5%	47 22.2%	16 7.5%	27 12.8%	212 100%

The value $\chi^2 = 15.916$ at the level of significance $p < 0,05$ with the degree of freedom $df = 6$, indicate that there is a statistically significant difference between the answers of the respondents in view of their level of education. The value of the $\phi = 0.391$ coefficient shows a positive correlation, and the values of the Cramer's coefficient $V = 0.277$ and the coefficient of contingency $C = 0.364$ point to a weak connectivity and moderate correlation.

The data presented in Table 4 point to a statistically significant differences in the attitudes of pre-school teachers towards the reasons of the insufficient utilisation of ICT tools in view of the years of experience. The respondents with fewer years of work experience, 63 (67 percent) of them, believe that the biggest impediment is the lack of suitable equipment in kindergartens, as well as the stance regarding the negative influence of technology over children, which is considered by 20 (21.3 percent) respondents. Aside from the lack of suitable equipment in kindergartens, a significant number of respondents with more years of experience chose the insufficient amount of information on the possibilities of ICT utilisation, as much as 18 (41.9 percent) of them, along with 22 (29.3 percent) respondents who belong in the category of pre-school teachers with over 15 years of work experience.

Table 4. The attitudes of pre-school teachers towards the reasons of an insufficient use of ICT tools in view of the years of work experience

		Insufficient amount of equipment in pre-school institutions	Insufficient amount of information on the possibilities of ICT utilisation	Insufficient amount of experience in the use of technology	The attitude regarding a negative influence of technology over children	Total
Years of work experience	Up to 5 years	63 67%	6 6.4%	5 5.3%	20 21.3%	94 100%
	From 6 to 15 years	18 41.9%	18 41.9%	2 4.7%	5 11.5%	43 100%
	Over 15 years	47	22	5	1	75

	58.6%	29.3%	10.1%	2%	100%
Total	128	46	12	26	212
	60.4%	21.7%	5.6%	12.3%	100%

The value of $\chi^2 = 20.414$ at the level of significance $p < 0.01$ with the degree of freedom $df = 6$ indicates that there is a statistically significant difference between the answers of the respondents in view of their years of experience. The value of the $\phi = 0.443$ coefficient shows a positive correlation, and the values of the Cramer's coefficient $V = 0.313$ and the contingency coefficient $C = 0.405$ point to a medium connectivity and strong correlation.

4. Conclusion and Recommendations

The data obtained through this research confirm the general research hypothesis that the application of ICT tools and reasons for their insufficient utilisation are conditioned by pre-school teachers' level of education and years of work experience gained in kindergartens. Namely, by examining the attitudes of pre-school teachers regarding the utilisation of ICT tools in work with pre-school children it has been established that these tools are not utilised sufficiently and this is considered by the largest number of respondents, as much as 86.3 percent of the responding pre-school teachers. This confirms the first specific hypothesis of the research. Bearing in mind that ICT technology is a part of everyday life of a modern man, as well as the part of children's development and upbringing, the obtained data can be considered worrisome. If one acknowledges the fact that modernisation of pre-school institutions cannot be imagined without modern technologies, then one can rightfully expect a larger utilisation of these tools in the pre-school practice. The obtained data indicate that when planning and realising pre-school activities a much larger attention should be paid to modern technology tools in order to utilise them more frequently, which would be a significant step towards modernisation and improvement of the pre-school practice.

The results of the research show that there is a statistically significant difference in the attitudes of pre-school teachers in view of their level of education and years of work experience, which confirms the second specific hypothesis. The data obtained through the research indicate that those respondents who largely consider that ICT potentials are not sufficiently used in pre-school teachers' practice, as much as 97.8 percent of them, belong to the category of pre-school teachers with a college degree. One can infer that the attitudes of pre-school teachers towards the utilisation of ICT tools change with the level of education. Hence, pre-school teachers with a higher level of education (those with college degrees and faculty diplomas) acquire more knowledge in this field, and thus gain more insight into the possibilities of application of modern technologies in education. The years of work experience are also important with respect to teachers' attitudes towards ICT potentials. Namely, the data presented in Table 2 show that pre-school teachers with the shortest experience, 23 (24.5 percent) of them, are satisfied with the degree of utilisation of ICT potentials in comparison with teachers with longer experience. The data can be considered expected because younger pre-school teachers have better knowledge of modern technologies and use them more frequently in their work.

The data on the reasons of the insufficient use of ICT potentials confirmed the third specific hypothesis that there is a statistically significant difference in the attitudes of pre-school teachers regarding the reasons of an insufficient utilisation of ICT tools in view of their level of education and years of experience. According to pre-school teachers, the reasons for the insufficient utilisation of ICT tools lie in the insufficient amount of equipment in pre-school institutions, which is considered by 122 (57.5 percent) respondents. A smaller number of pre-school teachers, 47 (22.2 percent) of them, believe that the reasons lie in the insufficient amount of information on the possibilities of ICT utilisation, while a very small number of responding pre-school teachers state that the reasons lie in the belief in a negative influence of technology over children and in the insufficient amount of experience in the use of technology. The data relating to the reasons of the insufficient utilisation of

ICT tools are certainly very indicative, especially the fact that more than half of responding pre-school teachers state that the main impediments lie in the insufficient amount of equipment in pre-school institutions. The presence of a proper modern technology equipment is the basic precondition for their adequate utilisation. Hence, in accordance with the conclusions reached, the author recommends a systemic solution of this issue and a better provision of pre-school institutions with suitable equipment, especially in less developed environment. The obtained data also point to a need for different programmes for the purposes of a systematic improvement of pre-school teachers and for the purposes of increasing competences regarding the utilisation of ICT tools, especially when it comes to those with a lower level of education and a longer experience.

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