Preschool teachers’ attitudes to the use of information and communication technology in preschool institutions

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The relevance of this paper refers to the importance of developing future teachers’ professional competences and ability to integrate the information and communication technology in their own work. The aim of this paper is to examine the preschool teachers’ attitudes of the use of information and communication technology (ICT) in preschool institutions. The research was based on quantitative (descriptive analysis and factor analysis) and qualitative research methodology which included the analysis of relevant literature and a survey conducted among the preschool teacher at the preschool institution in Pula (Croatia). The results have shown that there is no statistically significant difference in the positive attitude to the use of ICT in preschool institutions between preschool teachers younger and older than 35, i.e. both show a positive attitude to the application of ICT in preschool institutions. The paper materials may be useful in the preschool institution for integrating digital knowledge into teacher’s work to contribute to the quality of preschool children’s education.

Keywords: information and communication technology; quality of preschool children’s education; preschool institutions; teacher’s attitude.

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Introduction

Two centuries ago Hentig (1997), in his contemplations about educational reforms, pointed out that if we wanted to have an educational institution adequate to the time we lived in, it should deal with one of the important factors which introduced most changes in our culture, and that is the computer. By using information and communication technologies (ICT), a new language, new ways of organisation and new processes of development become affirmed. That is the reason why today's children represent a new level of human evolution. In this context, the question of how to teach children who are surrounded by technology from their birth is being raised. The application of ICT at the earliest age offers a possibility to the little „digital natives“ to approach various scientific discipline contents in an innovative and attractive way, using new methods of communication and a common language. The kindergarten context is constantly changing, so the introduction of ICT in working with children cannot be neglected. The efficiency and effectiveness of teaching through ICT makes possible for children to satisfy their curiosity, explore, choose and use information, solve problems adapted to their age and actively participate in the process of building knowledge. Using ICT children take over an active role in their own learning, become cognitively and emotionally involved, they constantly process their knowledge, explore and analyse new knowledge, develop critical thinking skills, as well as responsibility and individuality. In the process of learning and teaching ICT stimulates innovations and encourages communication and social interaction. Therefore, today's preschool teachers cannot ignore the new technology advantages, but have to find in them contemporary teaching tools and strategies answering to the requests of the quality of work improvement, emphasizing the growth of knowledge, research and innovations. Contemporary technology also contributes to the constructivist organisation of the environment, enables the active construction of knowledge, enriched with moments of individual and collective reflection. It answers questions which will greatly help children face the choice of their own path and methods of gaining knowledge, depending on their personal learning strategies, needs and interests. Contemporary technology and virtual communities represent a high-potential tool which should be available to all those who have the responsibility to organise and manage educational systems. Therefore, quality education cannot exist today without the implementation of ICT and the acquisition of the digital competence (Tatković, Močinić, 2012). Through computers, gaming consoles, tablets or smartphones, the digital world offers to children a wide range of learning possibilities in new conditions whose potentials have to be made use of.

1.1. ICT ergonomically adapted to preschool children

To be able to make full use of ICT possibilities, the relationship between the child and technology has to be properly established, respecting the ergonomic determinants. Ergonomics is the science studying the interaction between men and machines. Therefore, the use of the computer in the educational work with children has to be well-conceptualised and controlled. Today's children, as well as adults, spend more and more time sitting; they even spend their free time sitting in front of the computer. It is therefore important that all the equipment is adapted to the children's age and developmental characteristics. Moreover, the time spent using it should be carefully planned, controlled and, if necessary, limited. To bring ICT closer to children in preschool institutions, the suggested educational activities should stimulate children's active participation in games and various activities, simplify the organisation of group work, have a positive effect on the realisation of educational goals, but so as to avoid potential adverse consequences. Information and communication technology makes possible that “…some old, but also new ideas be shaped in a new way…” (Štefančić, 2000). It is extremely important to know how to properly organise, equip and use a space having a computer, so as to use the ICT potentials in the best possible way (Tatković, Močinić, 2012). This especially regards the choice of the size and height of the desk, with the possibility of adapting the desk and chair. It also regards the position of the arms, shoulders, neck and spine during working on the computer, then the distance and position of the screen and keyboard, the size and design of the mouse and keyboard, all in order to diminish health risks. Children's time spent working or gaming on the computer should also be made easier, as should their coping with the Windows environment full of various icons: shortcuts can be created, display properties increased, the mouse could be programmed for “one-click” operations, and partitions can be created (protect the C disc and create a new one to which children will be able to save documents and similar data). The use of ICT should be a funny and leisure activity, not something imposed on them or an obligation. Its use must not replace children's creative games, physical activity, doing research in the real world, social activities and external environment experience. During their use of the Internet, it is also necessary to filter contents which are not children-adequate.

1.2. ICT in the context of the culture of a preschool institution as an organisation which teaches and of the preschool teacher’s professional development

A quality application of ICT in preschool institutions requires continuous changes in terms of the preschool institution’s culture and the effort which enables participants to learn in an environment to which the changes are introduced. To manage the changes effectively one needs a high level of motivation, but also the support of those overtaken by the changes (Potts, 2005). To answer to the turbulent educational, technological and scientific changes, preschool institutions have to change their activities’ contents, rhythm, style, position, role and character (Stoll and Fink, 2000), as well as build upon the institution’s culture. The kindergarten’s culture is represented by people and their interactions, as well as by the physical and organisational environment and the way the institution is managed. All the employees participate in it: preschool teachers, professional associates, administrative and technical staff, the director and children's families. This is a
system which continually changes and makes an institution recognisable (Ljubetić, 2009). The kindergarten's culture is in a direct correlation with the building of a preschool institution as an organisation which learns, introduces innovations in the educational work and consequently improves the preschool teachers' competences (Slunjski, 2006). As organisations which learn, preschool institutions have to be understood as communities ready for change, and the preschool teachers' professional development has to be seen as an imperative of our present time (Tatković, 2016).

To develop a community which learns it is necessary to weaken the power of fragmentation in the teaching curriculum and encourage the dialogue among parents, teachers and students (Slunjski, 2006). In the transition from the traditional kindergarten to a community which learns it is necessary to build up open and unambiguous communication with a final goal – the realisation of a common vision (Ljubetić, 2009).

The preschool teachers' professional development and the acquisition of digital competences for the application of ICT in their own work, as well as in their educational work with children are the key determinants of the advancement of the educational process imposed by today's time. The preschool teachers' professionalism arises from a set of cognitive, affective, social and instrumental competences. Therefore, in the last few decades, the need for life-long education and employees', and thus preschool teachers', professional development is emphasized in European educational documents and many countries' reforms. However, it has to be emphasized that the integration of ICT into the preschool teacher's professional activity and their work with children is a phenomenon which is still developing. Today we need preschool teachers and teachers who will understand learning at least as well as teaching, who will be able to recognise children's needs and who will be able to build bridges between students' experience and curricular goals (Wei et al., 2009). In line with the postmodernist paradigm of a critical teacher, preschool teachers have to be active constructors of their own knowledge about learning and teaching, characterised by their professional autonomy, enrichment of their professional work's area of responsibility, orientation toward development and professional training (Mušanović, 2001). The complexity of the context in which preschool teachers work today implies the need to upgrade various and transversal competences: the ability to master situations by activating methodologies and developing projects in line with educational interventions (Milani, 2000). The organisation of a stimulating environment enriched with contemporary information and communication technology enables preschool teachers to make a professional advancement for the children's well-being and their positioning in the centre of the educational process (Meyer, 2002).

1.3. ICT as part of a stimulating environment

Today's children have to be directly involved into the shaping and construction of an educational curriculum in the preschool institution and follow their own formative path which mostly suits their needs and learning methods. The educational environment should motivate children to change from a passive listener to an “active author of contents.” It is important to create the environment and didactic scenarios which are stimulating for various activities (Matjević, 2017) which will enable children/students to build up their own knowledge, enrich their cognizance, form their attitudes, knowledge and values and to (according to psychological and didactic understanding of constructivism) learn interacting with the environment and create their own construction of knowledge (Topolovčan, 2016, Reich, 2006). When it comes to the environment enriched with new technology, it needs to be child motivating and stimulating in order for children to optimally develop their potentials in all areas of development: cognitive, emotional, social, motor... Today's world has radically changed in comparison to the past, it strives for restored teaching methods, didactic aids and organisation which ICT can, in fact, offer.

Introductory research

The research started by a questionnaire survey which consisted of a total of 21 questions. Regarding the fact that the largest number of preschool teachers does not have access to the Internet and a computer on the job, the questionnaires were distributed to preschool teachers in paper form. To process the results of the introductory part of the questionnaire as easily as possible, the 21 questions of the questionnaire survey were grouped in four groups, as follows.

1. The availability of ICT to preschool teachers

This part of the questionnaire wanted to examine the preschool teachers’ attitudes to the technologies available to them, i.e. what they have at disposal in their educational groups: do they have a computer, printer (colour or black-and-white), Internet access, do they have certain technologies in the institution which they do not have in the educational group. Answers to these questions are extremely relevant for further research. It can be seen that only 30.77 per cent of preschool teachers have a computer at disposal in the educational group. A very small percentage of preschool teachers (1.92%) have a smart phone, while 1.9 per cent of preschool teachers do not have any kind of new technologies at disposal in their educational group. Out of the preschool teachers who have a computer at disposal, 36.54 per cent of them do not have Internet access. It is worrying that over a half of preschool teachers (55.77%) does not have Internet access at all, while 7.69 per cent of preschool teachers have a partial Internet access. Regarding the possibility to print documents, almost half of preschool teachers (45.19%) have access to the printer at any time, not only in the educational group, but also at the level of the institution. A smaller part of preschool teachers (4.81%) have a partial access to the printer. The printers available are black-and-white to a larger extent (30.77%), while there are 25.96 per cent colour printers.

2. ICT used by preschool teachers in their work

The research on the preschool teachers’ attitudes shows that to the largest extent (28.85%) preschool teachers use a smartphone as a support to their work. Former answers show that only a small number of preschool teachers (1.92%) have an available smartphone in the educational group, so they use their private smartphone. Former questionnaire questions have determined that preschool teachers do not have tablets at disposal. However, 10.58 per
percent of teachers have declared to make use of a tablet as a support for their work because they use their private tablet. Only a smaller number of preschool teachers (6.73%) do not use any kind of technology. A total of 2 per cent of preschool teachers have declared to use a microcomputer in their work, and this relates only to younger preschool teachers. Although only 36.54 per cent of preschool teachers have declared to have a computer at disposal in the educational group, the largest part of them (63.46%) use the computer for work purposes, while 45 per cent use it on a daily basis because they use their own computer. A large number of preschool teachers (80.77%) have declared to use their private computer for work purposes. What arises from the questionnaire is that the largest part of preschool teachers use contemporary technology (computer, tablet, smartphone, microcomputer), i.e. they keep up with contemporary technological trends. It can be assumed that this fact is contributed by the informatics and information education which preschool teachers acquire during their initial education at the University of Pula (Croatia). Although we are surrounded by contemporary communication means, the largest number of preschool teachers (96.08 %) have declared to communicate with parents only in person or via the notice board, i.e. they do not use contemporary information and communication technologies (e-mail and social networks).

3. ICT available to children and ergonomic adaptation of equipment

This group of questions aimed to research the preschool teachers’ attitudes to the technology which is actually available to children in educational groups. The fact that even 34.29 per cent of children, according to preschool teachers’ declarations, do not have any type of ICT at disposal is something that causes apprehension. When asked about the reason of the non-availability of ICT in the group, most preschool teachers (54.49%) do not have an answer, whereas 38.61 per cent of them think that the reason is a matter of finances. It is important to highlight that only 6.93 per cent of them have declared that the reason is in the its harmful effect on preschool children. The ergonomic adaptation of ICT for preschool children is extremely important, so the fact that only one computer (0.9%) is ergonomically adapted to children is also something that worries a large number of teachers.

4. Preschool teachers’ attitudes to the benefits or harms, as well as purpose of ICT use in working with children

Preschool teachers’ attitudes to the need of a computer to be found in a preschool institution were studied in the introduction of the research, along with their opinion about the fact of the computer’s harfarness or benefit for children. The preschool teachers’ attitude to the need of additional education for the use of ICT in their work was also explored. It is very interesting that the largest part of preschool teachers (74.04%) think that children should have access to the computer in preschool institutions, whereas only 9.62 per cent of them oppose this point of view. The largest part of examinees (42.1%) think that children should start using the computer at the age of six, while a smaller part of preschool teachers (25.49%) think it should start to be used at the age of five. A small number of examinees (9.8%) have declared that children should start using the computer at the age of seven, 7.84 per cent say the age of four is the right age to start, and 7.84 per cent say that it is the age of three.

When asked about the purposes of a child’s use of the computer, almost half of preschool teachers (47.00%) think it should be for educational purposes (to search contents 23 per cent, to widen children's knowledge 21 per cent, to draw/colour/write 35 per cent, and to play various games 5 per cent).

Preschool teachers’ attitudes to the harmful effects of the computer on the youngest population are interesting. There is only a small number of preschool teachers (9.62%) who think that the computer is harmful for children. The largest part of them (51.96%) is convinced that it is not. More than half of the preschool teachers (59.62%) believe that it is only partly harmful, whereas 30.77 per cent of them do not see any harm for the children.

Regarding the need for education, the largest part of preschool teachers (74.04%) think that in the future there should be educations for preschool teachers about the use of ICT in preschool institutions. Only 9.62 per cent consider that completely unnecessary, whereas 16.35 per cent of preschool teachers think they should be occasionally educated, which leads to the conclusion that they are ready to improve their digital competence.

The results of the introductory part of the research show that preschool teachers think that they do not have a sufficient number of computers at disposal in the educational group, a small number has Internet access and the possibility to print documents. The second part of the introductory research shows that, due to not having a computer, a huge number of preschool teachers use their own computers for work purposes (or a smartphone, or tablet) and that a very small number of them never use ICT in their everyday work. From the aspect of the use of ICT in their communication with parents, it has been determined that the largest part of preschool teachers communicate with parents only in direct contact or via the notice board, and do not use contemporary technology or social networks.

The third part of the introductory research shows that a very small number of children have a computer at disposal in the educational group, and that most of them have access to only outdated technology. The small amount of technology children have access to is not ergonomically adapted, which leads to the conclusion that it is potentially harmful for their psycho-physical development.

In the last, fourth part of the introductory research it has been determined that the largest part of preschool teachers think that computers should have a place in the educational group in a kindergarten and that children should start using them from the age of five, for educational purposes. More than a half of the surveyed preschool teachers consider it partly harmful or do not see any danger in it, while a very low percentage of preschool teachers consider it dangerous to be used in their work with preschool children. The research conducted by Matijević (2011) reveals that about ten years ago all educational institutions were overflown with prohibitions and warnings about the dangers behind the use of new communication media, and the life and upbringing going on with new video and information media. Contrary to that, it can be concluded that in this research contemporary information technologies are not considered harmful for preschool children.
2. Materials and Methods

2.1. Goals

Pursuant to the introductory results about preschool teachers' attitudes, this paper's aim is to determine the difference in attitudes of preschool teachers working in preschool institutions of the City of Pula to the use of ICT, namely attitudes of preschool teachers who are younger and older than 35.

2.2. Sample

The research sample is represented by preschool children teachers working in preschool institutions of the City of Pula (Croatia), and they form two independent samples. The first one is represented by 30 preschool teachers younger than 35, while the second sample consists of 74 preschool teachers older than 35.

The sample is representative, consisting of a total of 104 preschool teachers, which represents 60 per cent of preschool teachers working in the aforementioned preschool institutions. The share of the female population is 100 per cent, presented according to their age and years of work experience. Of the total of 104 preschool teachers, the most numerous are those who are between 46 and 50 years old (20.2%), while there is the smallest number of those between 51 and 55, and 61 and 65 years of age (3.8%).

Regarding work experience, the most numerous are preschool teachers having up to 5 and from 5 to 10 years of work experience (18.3%), while the least numerous (2.9%) are those who have between 31 and 35 years of work experience. Preschool teachers having between 31 and 35 years of experience represent 2.9 per cent of the total number of preschool teachers.

The research was conducted in June 2019 on two independent samples. The first sample (30 preschool teachers) is represented by preschool teachers younger than 35, while the second sample (74 preschool teachers) is made by preschool teachers older than 35.

2.3. Methods

The Likert scale of positive attitudes to the need of using information and communication technology was used in the research (from 1 – I completely agree to 3 – I completely disagree).

First, the descriptive analysis of frequencies was done. Then the scale reliability was checked. The Cronbach Alpha coefficient is 0.812 which means that the scale is reliable and that there is an internal consent scale. Next, the adequacy of the scale for factor analysis was established. The KMO test was conducted and its indicator was 0.640. The Bartlett's test of sphericity was 0.000, i.e. p<0.05 which means that data are adequate for factor analysis. The Correlation matrix shows that most coefficients have a correlation higher than 0.3. The table Total Variance Explained, in the paragraph Initial Eigenvalue, shows that the two components have the value above 1 and that it explains 74.185 per cent of the variance.

The factor analysis determined that all the four items in the scale (1. Do you think that preschool institutions should have a computer?; 2. Do you think that the computer is harmful for working with preschool children?; 3. Do you think that preschool teachers pay enough attention to children’s technological education?; 4. Do you think that future preschool teachers should be educated for the use of ICT?) could be correlated in two factors, as shown by SCREE PLOT.

Figure 1

Normal distribution was established (Kolmogorov-Smirnov test, p=2.746) and it was concluded that the independent variable t-test could be conducted. The arithmetic mean of all the items of the scale was calculated and the independent variable t-test was conducted.

2.4. Research hypothesis

The hypothesis was set that there was no statistically significant difference between the positive attitude to the use of ICT in preschool groups among preschool teachers who are younger and older than 35.

H0: There is no statistically significant difference between the positive attitude to the use of ICT in preschool groups among preschool teachers who are younger and older than 35.

3. Results

The independent group t-test was conducted to determine if the preschool teacher's attitude (those younger and older than 35) to the use of ICT with children was positive. It can be seen that in terms of statistics, younger (under 35 years of age) preschool teachers (M=2.667, SD=0.52904) do not have a significantly different attitude than older (those older than 35) preschool teachers (M=2.2196, SD=0.33350) when it comes to the positive attitude to the use of ICT with children (t=0.545, p=0.587>0.05, df=102). Data processing was done with the SPSS for Windows 20.0.0 software.

4. Discussion

Thanks to new technologies preschool teachers can do all that was unimaginable until recently, thus creating flexible paths of entertainment and learning for children. They can build necessary knowledge and skills not only for the present, but for the future, too. Similarly to ours, other Croatian, but also foreign research about educators’ attitudes show that they have a prevalently positive perception of the role of ICT in various forms of learning (PlojVirtič, Pšunder, 2009; Tatković, Močinić, 2012), and that the use of computers qualitatively enriches both the
communication and cooperation with parents (Bakić, Tomić, 2012). This research shows that preschool teachers, regardless of their age, do not differ in their positive attitude to the use of ICT in working with children. A reason for this can lie in the year-long education attended by all educators in Croatia about the application of ICT conducted by the Ministry of Education, but also in the acquisition of the digital competence during preschool teachers’ initial education realised at the University of Pula, Croatia. In his research Matijević (2017) highlights the importance of education in line with the needs of the modern net-generations, in order for them to have the education they deserve. Although recent research studies have shown that everyday life includes classical media such as the television, radio and newspaper (Barbieri, 2016), they show that the traditional media cannot be considered as sufficient for today’s generations and the future awaiting them because they are the new generation (Ferri, 2014) or net-generation (Velički, Topolovčan, 2019). A high percentage of our respondents show a positive attitude to additional education, and such results can be found in similar research on the importance of the digital competence in the context of life-long education (Špernjak, Sorgo, 2009; Cartelli, 2010; Perić, 2011; Rončević, 2011). In the atmosphere of new trends in the metamorphosis undergone by educational institutions, that is something to be praised, because the employees’ personal and professional development is the main criteria and basic aim of the institutions’ development and business existence (Pivac, 2009; Tatković, 2016).

5. Conclusions

This research shows that there is no statistically significant difference in the positive attitude to the use of ICT in preschool institutions among preschool teachers who are younger and older than 35. The results lead to the conclusion that both of them have a positive attitude to the use of ICT in preschool institutions: with the younger generations the result equals \( M=2.2667, SD=0.52904 \), whereas with the older generation it is \( M=2.2196 \) and \( SD=0.33350 \).

6. Recommendations

It is not enough to put preschool teachers in front of a device (computer, tablet...), but it is necessary to have and educate preschool teachers who will be able to use all the contemporary technology potentials in the best possible way, taking into consideration the children’s different ages and needs. By a higher implementation of ICT into preschool institutions, children’s great curiosity can be used and their many potentials developed (intellectual, emotional, communicational, social, and others). Therefore, preschool institutions should be equipped with state-of-the-art information and communication technology, so as to bring the preschool teachers’ competences to the fullest and to contribute to the quality of preschool children’s education and communication with parents (Bakić-Tomić, 2012). Combined with traditional methodology, they can be a powerful aid in the preschool teachers’ work, as well as build new interactive and dynamic environments. If an environment is insufficiently equipped with information and communication technology, it is questionable if its positive potentials will be able to be used. Therefore, if preschool teachers wish to keep up with the dazzling rhythm of changes, they have to change themselves, continually learning and improving their own, but also the children’s future.

7. Limitation

The validation of the questionnaire was conducted on a relatively representative sample. Although it was conducted for the needs of this research, the herein used Likert’s scale is of a satisfactory reliability. It was expected, in terms of statistics, that younger preschool teachers would have a significantly positive attitude to the use of ICT than older preschool teachers, but this research did not confirm that. Therefore, further research should be conducted in another city, or on another sample.

References


