The Role and Attitudes of Kindergarten Educators in ICT-Supported Early Childhood Education

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Abstract – **In this paper we analyze the role and attitudes of kindergarten educators in the early ICT education. Our kindergarten survey among educators in Croatia showed the positive attitude towards ICT literacy in general, but it also showed that more than one third of educators has neither positive nor negative attitude towards the issue of early ICT education. The research results are compared to the most recent findings for other countries – Turkey, Hawaii, Sweden, Belgium, China, Greece, Portugal, UK, Australia, Israel, Chile, Slovakia, Singapore and Malaysia. The conclusion is that educators in countries that are still not obliged to use ICT in the preschool classroom, generally understand the necessity of their own ICT education and motivation to transfer their knowledge to the youngest learners.**

Keywords – **Preschool Education, ICT Education, Kindergarten Educators, Preschool Teachers**

1. Introduction

The aim of this paper is to reveal the role and attitudes of kindergarten educators towards the early ICT-supported education in countries that are still not required or expected to use ICT in the early childhood education classroom (such as Croatia, Belgium, Greece, Turkey and many other non-EU countries).

In the present study, we aim at revealing educators' understanding of the information and communication technology (ICT) potential in creating innovative learning opportunities for children in controlled conditions.

Although the introduction of ICT in kindergartens is regarded as an out-of-date subject (and is a well-covered topic for over fifteen years), attitudes of preschool educators towards the use of ICT are currently a major topic of research [6, 11, 12, 14, 17, 18, 24].

The reason for such interest lies in the fact that, as Hoffman, Park, and Lin [6] suggest, today's question is not whether ICT should be used in kindergartens, but how to assist kindergarten and preschool educators with knowledge, tools and strategies required to respond to rapid changes in the digital environment.

In addition, some Eastern European countries (like Croatia that recently joined EU, or non-EU neighboring countries) are still struggling with the introduction of ICT into compulsory education (i.e., elementary and secondary schools) as well as with the low level of ICT education in their population. For the sake of comparison, United Kingdom has introduced a curriculum which aims for children to understand the use of ICT and programmable toys that support learning in the year 2000 [20]. On the other hand, results of the first international educational research of computer and information literacy (CIL) among students from 21 countries [3] have shown that the ICT use for school-related purposes (i.e., learning) of eight grade students in Croatia, Germany, Korea, Lithuania, Poland and Slovenia was significantly lower than the international average. These data prove the need for obligatory and more literacy-oriented ICT education that starts as early as kindergarten.

In order to successfully meet the challenges of the developing knowledge society and global markets, the European Union has set eight core competences for lifelong learning, including the digital competence. Digital competence refers to the

capacity for the safe and critical use of ICT in personal and social life and in communication. Its key elements are basic ICT skills and abilities: The use of computers to retrieve, assess, store, create, display and exchange information, and develop collaborative networks via the Internet.

Some environments have a clear vision and a plan for the development of the digital competence [8], proving that educators act as bearers of the educational process who meet the challenges and affect the level of acquired competences, and thus the level of a child's self-esteem. In other settings, however, educators have a sense of uncertainty about the potential of ICT for the early education [2].

Croatia and non-EU neighboring countries fall behind in the introduction of ICT in the early childhood education due to the lack of computer equipment, but also because of the fear of parents and educators, who have a limited knowledge and information about the advantages and disadvantages of the ICT use at this age. Most educators, as opposed to small children in their care, started to use ICT in their adulthood and often show resistance to the use of ICT in the early childhood education, since the foundation of their work lies in face-to- face interactions and tangible experience of learning.

However, the basic hypothesis of this paper is that modern educators in countries such as Croatia, Belgium or Greece (that are still not obliged to use ICT in the early childhood education classroom), are ICT literate and focused on a theory of child development. We claim that they recognize the importance of ICT at an early age to create opportunities for knowledge and skills acquisition and have experience in selection and use of educational software that fits the age and developmental differences of children.

But, since there is no systematic introduction of ICT into the early childhood curriculum, some educators use ICT to a great extent while others do not use it at all [11, 18].

2. Literature Review

The importance of ICT competencies of early childhood educators are publicly recognized and supported in most countries around the world. The latest research in Turkey [12] shows that kindergarten educators use ICT to prepare their daily plans, but they do not use ICT that often in children activities, and if they use it, it is mostly for music activities and as rare as one or two times a week. The research results from Sweden are in line with the above-mentioned issues [17], revealing that educators perceive ICT only as a supplement to existing activities and not as an integral part of the early childhood and preschool curriculum. Additionally, the recent study from Greece [18] suggest that, in order to successfully integrate ICT in educators' daily practices, ICT needs to be perceived as a mode of learning that should be embedded in the curriculum.

Another study from the other part of the world (Mainland China), showed that educators' educational level and ICT-related training were found the most important in determining whether they use ICT in their teaching [14].

According to the most recent findings [12], it is necessary not only to support educators' positive attitudes towards ICT, but also their suggestions on how to use ICT in kindergarten. These educators need to be encouraged to use ICT for educational activities [24], while in-service trainings (that involve technical knowledge and skills as well as the effective and appropriate use of ICT in specific teaching activities) might be an approach to link their own technical and pedagogical expertise with the ICT-supported curriculum [14, 24]. Also, the educators' professional development represents a crucial factor in stimulating the ICT use that surpasses teaching basic ICT skills [11].

The necessity of educators' own ICT education, lifelong learning and motivation to transfer their ICT knowledge to children was confirmed eight years ago in the UNESCO's project "ICT Competency Standards For Teachers" [25]. One of the project's aims was to improve the professional development of educators in the early childhood education institutions and boost the innovative development of education using ICT.

The educator's professional judgment and ICT competencies are necessary to determine whether and when to use technology that is age-appropriate for a child and suits his individual, linguistic and cultural needs. The educators of young children have experiences and knowledge about the children's development and their individual interests, as well as about the social and cultural context in which children live. The impact of technology in the early childhood education depends on educators and their use of the same developmentally appropriate policies and practices that guide their use of printed materials and all other tools and contents for teaching young children [19, 27].

The literature provides evidence that educators in some countries have been using ICT in the early education programs for over a decade. In Finland, 66% of kindergarteners use a computer on a daily basis as part of their regular program for already 13 years [10], while in Hong Kong [13] parents expect children to acquire the ICT skills in the kindergarten environment.

The resistance to the introduction of ICT in many kindergartens is caused by negative attitudes of educators who believe that the use of computers in institutions of the early childhood education is inappropriate and irrelevant, because they feel uncomfortable handling ICT [4].

The study by UNESCO [26] brings kindergarten reports from different parts of the world, showing that the concept of ICT education among kindergarten educators sometimes tends to be oversimplified and misinterpreted as learning about computers. Other researchers confirm this observation [21] and point out that the adoption of computer skills (e.g., mouse control) cannot be the most desirable outcome of ICT education in kindergartens. Smart boards can be used creatively to develop pre-writing skills, but they are interactive only if and when educators use them with the interactive pedagogy [21].

Although the lack of financial resources represents one of the main reasons for the underuse of ICT in the early education, researchers emphasize that the educators' professional development should be considered equally important [7].

The research conducted by Brito [1] analyzes the approach, methods and practices of educators and children in the early childhood education institutions in Portugal. The study used a questionnaire that was sent by e-mail to educators across the country. The sample consisted of 363 educators. The survey showed that 59% of educators believe that the use of ICT in early childhood education is very important and 86% of them reported the daily use of ICT. Furthermore, 64% of respondents had a computer in kindergarten group and used it to work with children, which shows that educators recognize the importance of a computer as a teaching tool. The educators who did not use a computer at work (36%) justified it by the fact that they did not have computers in the room. With regard to ICT training, 65% of them were self-taught ICT users, while only 8% of them received ICT training, which reflects the low priority that educational institutions give to ICT. Given the time that educators have spent on computer working with children, most of them used a computer five times a week (37%) at an average of 15 to 20 minutes (32%).

The research study published by Plowman and Stephen [19] brought results of the two-year project in United Kingdom which included eight early childhood education institutions.

The original aim of the research was to identify ways in which educators can provide young children with quality learning through ICT in the kindergarten. Analysis of the results showed that ICT skills, confidence and knowledge of children increased in relation to the increase in educators' confidence, knowledge and possession of ICT skills.

It has also led to a greater motivation of educators to acquire new ICT skills and knowledge, since they were encouraged to develop new approaches. This study showed that even small children (aged three and four years) perceive computers and other ICT equipment intuitively and use it with ease. It is also shown that children can use ICT in a completely inefficient way if they use it on their own, and that the educators' leadership represents a key to successful learning with ICT in the early childhood education.

Some of the earlier studies in Scotland [22] have shown that educators consider the introduction of ICT in the kindergarten playrooms a great challenge because of their lack of ICT knowledge and skills.

The research that investigated intentions of 50 early childhood post educated teachers from University of Athens, Greece [16] about using digital game-based learning revealed that kindergarten educators in Greece generally have very positive views about the ICT use in the kindergarten. The educators having less years of service, more experience with the ICT use and who owned a computer at home had more positive opinions. These educators perceive digital games as a useful educational tool that can help children to develop practical competencies and social practices. They also expressed intention to use computer games in their kindergarten. Furthermore, the study by Kalogiannakis and Zaranis [9] reported on the usefulness of ICT implementation in the Greek preschool education. In Greece, pre-school playrooms are organized as separate centers, including a science center, which is expected to be equipped for different activities. Since science is very attractive to children, it serves as an ideal content area for educators to support child's learning and development. The study points out that, compared to traditional methods, the most important advantage of the ICT use in education is the interactive learning environment. However, the authors warn that the introduction of ICT in each institution does not mean that educators are prepared to effectively incorporate ICT in teaching educational content of the scientific nature. They find it necessary for educators to be trained, to have the ability to use ICT in education and to be in continuous interaction with children during the learning process supported by ICT. The authors suggest that the inclusion of ICT in the early education in Greece should represent an important vehicle for the modernization of teaching and learning.

The conclusion of the research conducted in Australia [28] is that educators need to become aware of inequalities in access to new technologies between children from different families, which can create the potential for significant differences in the

development of skills and for very different learning opportunities. The use of ICT in the early childhood education institutions in Australia is relatively high. The authors point out that it is necessary to provide children who do not have access to ICT at home with equal opportunities for learning at the early childhood education institutions.

The research with preschool children in Chile [5] showed that preschoolers use computers in kindergartens more frequently than children in primary and secondary schools and brought very positive attitudes of educators in Chile regarding the ICT use in kindergartens. It also revealed that educators in Chile's kindergartens use ICT to develop children's key competencies and skills.

Another research among kindergarten educators in Singapore and Malaysia [23] proved the need to develop the relevant ICT educational courses for educators, since perceived usefulness of ICT and positive attitudes of educators towards computer use are crucial factors influencing educators' intention to use ICT in their work.

Also, the study in Israel [15], which involved 141 kindergarten educators who filled in online surveys, revealed that positive attitudes of educators towards ICT had crucial influence on the effective implementation of ICT in kindergartens in Israel.

Finally, the Slovak international project on ICT implementation in kindergartens which involved around three thousand kindergartens showed that educators who develop relevant ICT knowledge through the continuing professional development create more opportunities to integrate ICT into everyday activities and jointly develop activities which are aimed at the productive integration of ICT in the kindergarten [8].

3. Method

Our methodology is focused on personal ICT use by educators (the purpose of use and the context of ICT use) and the educators' attitude towards introducing ICT to children in the kindergarten.

In this study, we surveyed educators at one of the large early childhood education institutions in the capital city of Croatia. The survey instrument was developed to determine the attitudes of educators on the use of ICT by early and pre-school age children, both in the kindergarten and at home. An additional objective of the survey was to identify ways in which educators use ICT in their daily work.

The instrument was developed by coordination of both early childhood education experts and an ICT expert. It sought to determine whether educators use PC / smartphone / tablet and similar devices in their everyday life, to examine their preferences for using computers, the Internet and ICT in general and to determine their attitudes towards familiarizing children with ICT (e.g., camera, computer, mobile phone) in kindergartens at an early age.

The independent variables in this research were how often, for what purposes and where educators used computers and the Internet, while the dependent variable represented the attitude of educators on introducing ICT to children in the early age in relation to their own preferences for using computers, the Internet and ICT in general.

The survey instrument designed to measure educators' perceptions and attitudes was a questionnaire with 11 questions containing the independent and dependent variables. Eight questions were close-ended with unordered response categories, while three items were close-ended questions with ordered response categories (Likert scale questions).

The respondents of the survey (a total of 46 respondents) were educators from a public kindergarten which had 486 children enrolled and 85 educators in charge of those children in the school year 2014-15.

4. Results

This part of the paper presents results of the empirical research on educators from a large public early childhood educational institution in the capital of Croatia.

Regarding the demographic profile of educators, all of them were female. Analyzing the possession of computer, tablet or similar devices, we found out that a very high percentage of educators (86.67%) possess at least one of the devices.

As for the frequency of the ICT use by early childhood educators, 42 out of 46 educators use a computer several times a week (57.14%), while only one uses a computer on a daily basis (2.38 %). Furthermore, educators mostly use computers at home (82.6%), while a smaller number of them also uses computers at work (26.1%). These results indicate that educators are generally computer-literate.

In examining the purposes for which educators use computers, various responses were collected (Table 1.), showing that they primarily use computers for carrying out their work.

Table 1. Purposes for which educators use computers

	N	%
Documenting learning processes of children	23	56
Information retrieval (e.g., for a group project)	38	82.6
E-mail communication	20	43.5
Supporting children's learning	16	34.8
Using educational software for the realization of the curriculum tasks	15	32.6
Using software and computers for fun	12	26.1
Something else	3	6.50

The educators were able to choose more than one answer, i.e., all answers that they thought were related to them. The largest number of educators have chosen looking for information (e.g., for a project carried out in the kindergarten group) as the main purpose for using a computer (82.6%), while more than half of them also use it to document the learning process of children in their group (56%).

When asked about the strategies their institution can use to ensure that computer use completes learning in all areas of child's development, 71.7% of them pointed out the necessity of ICT training of kindergarten educators. In expressing their opinions on the presence of information and communication technologies in their work, 75.6% of educators answered that the technology proved to be a mitigating factor, while one educator expressed the opposite opinion, stating that the use of ICT complicates the educator's work. Also, 22.2% of educators expressed the neutral opinion regarding this issue, considering ICT neither mitigating nor aggravating factor at work.

The educators have also provided information about the frequency of their Internet use for specific activities.

Table 2. The activities for which educators use the Internet ((1= never or hardly and 4 = often)

	1	2	3	4
I'm looking for personal entertainment (music, movies, games).	30.2	16.3	14	39.5
I'm looking for children's entertainment (music, movies, games).	19	7.1	35.7	38.1
I e-mail my friends and colleagues.	35	5	15	45
I visit social networks (e.g., Facebook, MySpace, etc.) .	40.5	11.9	7.1	40.5
I play online games.	77.8	16.7	0	5.6
I surf the Internet and read the news.	16.7	9.5	28.6	45.2
I'm looking for the content that can help me in children's upbringing.	9.1	13.6	18.2	59.1
I visit and read other people's blogs.	56.8	15.9	13.6	13.6
I write my own blog.	87.2	10.3	2.6	0

According to the data collected (Table 2.), educators are most often looking for content that can help them in the children's upbringing, they surf the Internet and read the news and they very often look for personal entertainment or children's entertainment (movies, music, games, etc.). Very interesting data were obtained for visiting social networks, where an equal number of educators (40.5%) engage in this activity often and almost never. Similar results were obtained for e-correspondence with friends, where 35% of educators almost never engage in this activity, while 45% of them do it often. Our assumption is that such polarization arises from the polarization of educators according to their age. Among the rarest activities are visiting other people's blogs (56.8% of educators almost never engage in this activity), as well as writing their own blog (87.2% of educators never wrote a blog post). Finally, educators play online games very rarely (77.8% of them almost never play an online game).

Table 3. The educators' attitudes towards the advantages and disadvantages of computer use (1= strongly disagree and 5 = strongly agree)

	1	2	3	4	5
It would be hard to live without computers.	13	13	21.7	17.4	34.8
Internet is a global evil.	41.9	20.9	27.9	2.3	7
I am thrilled with the ease of Internet communication with anyone in the world.	4.3	10.9	17.4	17.4	50
Frequent use of PCs makes people stupid.	23.9	17.4	32.6	23.9	2.2
I consider using the Internet as joining pleasure with usefulness.	2.4	4.9	26.8	31.7	34.1
Due to aggressive video games, more and more people have problems with aggression restraint.	2.2	2.2	32.6	15.2	47.8
Computer and cell phone have significantly speeded up and facilitated the work of busy people.	2.3	4.5	18.2	22.7	52.3
The development of ICT leads to alienation and the collapse of society.	15.2	10.9	21.7	45.7	6.5
I can meet new people on the Internet.	33.3	19	26.2	11.9	9.5
I rarely use computer in my free time.	30.4	21.7	30.4	6.5	10.9
Internet leads to excessive isolation of children and adults because they spend too much time using it.	2.2	15.2	23.9	28.3	30.4
Searching the internet is fun.	2.2	8.9	22.2	35.6	31.1
Internet helps me to be informed.	0	7.1	14.3	14.3	64.3
Cell phone should be used for emergency calls only.	34.8	10.9	23.9	13	17.4
Modern technologies have significantly improved people's lives.	0	6.7	40	37.8	15.6
There is more dangerous than useful content on the Internet.	13.3	31.1	44.4	8.9	2.2
Computers facilitate learning.	4.7	9.3	32.6	25.6	27.9
Social interaction among people reduced with the development of modern technologies.	0	13	34.8	17.4	34.8
Despite all dangers, children should be taught how to use the Internet.	2.2	4.3	21.7	39.1	32.6
Use of modern technologies gradually leads to the impoverishment of the vocabulary.	10.9	26.1	37	13	13

Examining the attitudes of educators about the advantages and disadvantages of computer use (Table 3.), we discovered that educators are generally thrilled with the ease of Internet communication (50% of them strongly agreed, while 17.4% generally agreed with the statement), they recognize the significance of computers and cell phones in busy people's lives (52,3% of them strongly agreed that these devices speed up and facilitate the work) and they perceive Internet as a tool that helps them to stay informed (64.3% of them strongly agreed, while 14.3% of educators generally agreed with the statement).

They also recognize the danger of playing aggressive video games which cause problems with aggression restraint (47.8% of educators strongly agreed with the statement).

Analyzing educators' opinions about the advantages and disadvantages of computer usage among children (Table 4.), we detected that they are extremely positive regarding the benefits of computers for children, when it comes to learning new and useful information and skills (39.5% of them strongly agreed, while 28.9% generally agreed with the statement).

Table 4. The educators' attitudes towards the advantages and disadvantages of children's computer use (1= strongly disagree and 5=strongly agree)

	1	2	3	4	5
Children learn new and useful things on computer.	2.2	8.9	20.5	28.9	39.5
Children who regularly use computer might develop dependence.	0	8.7	28.3	26.1	37
When using computers, children gain valuable IT skills.	0	6.5	28.3	30.4	34.8
Computers can have only negative influence on children's development.	42.2	6.7	40	8.9	2.2
Instead of playing with peers, children spend their time on the computer.	2.3	9.1	25	31.8	31.8
Children can better develop their skills playing computer games.	17.4	13	37	10.9	21.7
Children engage in sport less frequently due to the increased computer usage.	2.2	11.1	31.1	20	35.6
Excessive use of computers separates children from their parents and friends.	4.4	9.9	20	28.9	36.8
Thanks to computers, children's intellectual development is enhanced.	4.7	7	41.9	34.9	11.6
Children spend more quality time on the computer than watching TV.	6.8	15.9	50	15.9	11.4

Although they do recognize the potential dangers of the regular computer use in the early childhood (37% of them strongly agreed that those children might develop dependence, 26.1% generally agreed, while there were no educators who strongly disagreed with the statement), they are perfectly aware of the fact that computers do not have an exclusively negative influence on children's development (42.2% of educators strongly disagreed with the statement about an exclusively negative influence of computers).

Also, educators are concerned about the excessive use of computers in the early age and recognize the negative consequences resulting from such use (36.8% of educators strongly agreed, and 28.9% of them generally agreed with the statement that the excessive use of computers separates children from their parents and friends).

The educators maintained the most neutral stand towards the following statement "Children spend more quality time on the computer than watching TV" (50% of them neither agreed nor disagreed with the statement).

Analyzing the statements that educators mostly disagreed with, we found out that they do not have negative attitudes towards Internet or cell phones (41.9% of educators strongly disagreed, while 20.9% of them generally disagreed with the statement about Internet being a global evil and 34.8% of educators strongly disagreed with the statement that cell phones should be used for emergency calls only). On the other hand, the majority of them does not perceive Internet as a space for socializing (33.3% of educators strongly disagreed, while 19% of them generally disagreed with the statement about Internet being a space to meet new people).

The educators maintained the most neutral stand towards the following statement "There is more dangerous than useful content on the Internet" (44.4% of them neither agreed nor disagreed with the statement), indicating their recognition of both the useful and dangerous Internet content and about the educator's role in cautious selection of the educational or entertaining content.

Generally, we can conclude that educators have a moderately positive attitude towards the young children's computer use. The most positive attitudes of educators are indicated by their high level of agreement with the following statements: "When using computers, children gain valuable IT skills" (M = 3. 93, SD = .95), and "Computers can have only negative influence on children's development" (M = 3.78, SD = 1.17). The last statement is inversely coded, proving that educators disprove an exclusively negative impact of ICT on children's development, pointing to the positive effects of children's computer use.

The most negative opinions of educators are revealed through their high level of agreement with the following statements: "Children who regularly use a computer might develop dependence" (M = 2.87, 1.01), "Children engage in sport less frequently due to the increased computer usage" (M = 2.24, SD = 1.13) and "Excessive use of computers separates children from their parents and friends" (M = 2.53, SD = 1.24). All three statements are inversely coded

and educators expressed a high level of agreement with their original form, which is in line with messages communicated by media regarding this issue.

The educators' opinions regarding familiarizing children with information and communication technologies in an early age were also measured on a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. A very small number of educators expressed extreme opinions on this issue - a total of 2.17% of educators had a strongly positive attitude towards this issue, and the same number of educators had a strongly negative attitude. The relatively small number of educators expressed a generally negative attitude (6.52%), while a relatively large number of educators (54.35% of them) had a generally positive attitude towards familiarizing young children with ICT. A total of 34.78% of educators expressed neither positive nor negative attitudes towards this issue.

In expressing their views on the use of ICT by young children, a very small number of educators had a negative attitude (2.17% of them reported an extremely negative, and 2.17% expressed a generally negative attitude on this issue). A total of 15.22% of educators were neutral on this issue, while a large number of educators had a generally positive (26.09%) and an extremely positive attitude on this issue (54.17%).

Generally, we found a moderate positive correlation between the educators' positive attitudes towards familiarizing children with the ICT (e.g., camera, computer, mobile phone) at an early age and their e-correspondence as an activity for which they use the Internet (r = .325, p <.05). We also discovered a moderate positive correlation between the educators' positive attitudes towards familiarizing children with the ICT and their affinity to search the Internet for the content that can help them in the child's upbringing (r = .453, p <.01).

Therefore, the more positive attitude educators have towards familiarizing children with the ICT at an early age, the more likely they are to conduct the following activities on the Internet: E-correspondence with friends and searching for the content that can help them in the upbringing of the child.

5. Discussion

The main aim of this study was to investigate perceptions and attitudes of educators toward ICT in general, towards its use in the early childhood and towards ICT education in the early childhood institutions in Croatia.

The main conclusion is that educators in countries such as Croatia, Belgium or Greece (that are still not obliged to use ICT in the early childhood education classroom) generally understand the necessity of their own ICT education. They recognize the importance of ICT at an early age to create opportunities for knowledge and skills development.

Despite the contributions of the study, it is not free from limitations. The small sample size does not allow broad generalizations from the available data. Although taken from one of the largest kindergartens in the capital of Croatia, our sample may not be representative of the kindergarten educators in the whole country.

Yet, our results suggest that kindergarten educators in Croatia generally support the use of ICT by young children, they frequently use computers and the Internet to find information for projects carried out in the kindergarten group and they point out the necessity of ICT education for kindergarten educators. Most educators understand the importance of documenting information that a child wants to share with his parents. Using e-mail or other communication tools, educators demonstrate the concept of communication and at the same time help the development of the child's information literacy.

Also, our initial results, although on a small sample, confirm the results of previous studies that educators' beliefs affect their classroom practice and that their ICT use depends, to a large degree, on their existing values, technical expertise and pedagogical experience [11, 17, 18].

Authors who wrote about necessary ICT competencies of educators [21] have defined four significant recommendations: To include early learning in the national ICT education strategy, to provide ICT training and professional development for all educators, to support the involvement of parents in the development of ICT education strategy and to support the collaboration between all educators, law makers and parents.

Compared to these recommendations and results of countries mentioned in the literature review, our survey (although collected on a small sample) confirms common opinions regarding the need for the structured development of ICT competencies of educators and aspirations for the national curriculum that will introduce ICT in kindergartens as a tool to create more opportunities for the development of children's key competencies and skills.

The results of our survey are in line with other recent studies [11, 12, 14] which claim that educators have positive attitudes towards the possibilities of ICT for kindergarteners, despite the rather limited use of ICT in the early childhood education.

Furthermore, our study and the above mentioned studies reveal that educators do not perceive ICT as a threat to a child's development, and that educators

who are willing to integrate ICT in their practice need to be supported in their efforts.

The possibility to observe the positive results in their own work with children and sharing of success stories among themselves might represent a mode for improving the educators' attitudes [6].

As for the role of educators, they need to understand that ICT equipment can greatly vary in terms of quality, and they must be able to effectively identify products that help rather than hinder the early education. For them, it means having knowledge and experience of critical thinking when it comes to selection, analysis, use and evaluation of technology for children, in order to assess its impact on a child's learning and development. They should possess the understanding, skills and ability to use technology and interactive media to participate in the child's early education to prepare them for a lifetime of use of technology. Using technology to support practices and to foster education requires the professional judgment about what is developmentally and culturally appropriate. The informed educators use ICT and interactive media as well as additional tools for enriching the educational environment. ICT should help them in reaching their objectives and to satisfy child's educational needs. They coordinate their use of ICT with children's play, through practical research and the creation of relationships. They ensure the accessibility of ICT to children, recognizing the value of ICT tools for communication with parents and families. Also, technology and interactive media are being used by educators as professional resources in order to connect with colleagues, and to continue their own education and professional development.

ICT competencies of educators are critical in the decision to integrate any form of technology in the early childhood education, because of the detailed planning, reflection and evaluation required. Selection of suitable ICT tools for the early childhood education institution is similar to choosing any other learning materials.

The educators should constantly make appropriate judgments, promoting positive outcomes for every child. It is essential that educators dedicate enough time to evaluate and select ICT tools for learning, carefully observing how different children use the same materials to be able to identify potential problems and to adequately adapt the material. They must be willing to learn and become acquainted with new technologies.

The educators need opportunities for the professional development and examples of good practice in the development of knowledge, skills and experience related to ICT. It is desirable to provide them with professional development which will include practical ICT training, continuing support

and access to the latest ICT tools and interactive media. Also, since educators possess diversity of backgrounds and skills, a serious consideration needs to be given to accommodate their learning preferences and ranges of knowledge about teaching and the ICT use [6].

There is enough space for the integration of ICT in the children's playing environment. The possibilities are endless and learning potential is significant. While there is an obvious need for the development of language-specific ICT software and programmable toys, a great deal can be achieved thanks to innovative educators who work with children in shaping of their own improvisations.

6. Conclusion

Most of the early childhood educators, in contrast to the young children in their care, started to use ICT in the adult age and therefore present a certain degree of resistance to the use of computers in the early childhood education. Also, face-to-face interactions as well as a tangible experience of learning and building relationships have for many years represented the basic foundation of their work in the early childhood institutions.

But, research shows that more and more educators start to use ICT equipment like digital cameras, tablets, scanners, printers and CD media for documentation of activities in their kindergarten. They send digital photos to parents via e-mail and use them to create electronic portfolios for children and their parents. The educators also use the Internet as a source of ideas for the curriculum and research, bringing children on virtual tours and excursions and using ICT as a powerful tool to explore ideas and find relevant information together with children. ICT tools can help educators to strengthen the link between child's home and early education institutions. Since ICT becomes more common as a way of exchanging information and communication, educators in the early childhood institutions have the opportunity to build stronger relationships with parents and enrich the participation and involvement of the family in education of their children through ICT. The educators also have a responsibility to support parents and families by sharing knowledge of a child's development and learning and by using ICT tools in a safe, harmless, healthy and ethical way.

The educators are carriers of the educational process who meet the challenges and make the impact on the confidence and competences acquired by children in the early childhood institutions. As educational experts, they generally understand the necessity of the additional ICT training as part of their professional development (which is a lifelong process), as well as the importance of their

motivation to acquire new skills. Such a development cannot be successful without a large amount of intrinsic enthusiasm. Our findings show that educators in Croatia do not lack enthusiasm in developing opportunities for healthy and safe learning through ICT.

Yet, educators need guidance to make decisions on how to support education through ICT, which tools are acceptable, when to integrate ICT in children's lives, how to use these tools to improve communication with parents and families, and how to support computer and information literacy of parents and their young children.

In this paper, we have provided new insights in support to the recent studies which suggest that the educators' professional development should take into account their competence level and their actual use of ICT [11].

Lastly, we can conclude that modern educators are computer literates focused on the theory of child development, who recognize the importance of ICT at an early age to create opportunities for knowledge acquisition and who have experience in the selection and use of the educational software that fits the age and developmental differences of children.

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