

ATTITUDES AND EXPERIENCES OF THE PRESCHOOL TEACHERS IN THE APPLICATION OF DIGITAL TECHNOLOGIES IN ENVIRONMENTAL EDUCATION

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Abstract. This study was based on the experiences and attitudes of the preschool teachers in the application of digital technologies when teaching environmental contents. 180 preschool teachers from preschool institutions in the Republic of Serbia, with different work experience and different digital skills, participated in the research. The obtained results demonstrated that the preschool teachers' competencies decrease with the increase in the number of years of work experience, indicating that competencies for the application of digital tools were more developed in the preschool teachers with modest work experience. They also exhibited a greater level of experience in using digital technologies regarding environmental education. The results also showed that there was a significant connection between the application of digital technologies in different domains of the preschool teacher's work (such as: ideas search, research on the grounds and topics that initiate the project, project development, a portfolio design and evidence of one's own practice, publication of activities in digital format - in scientific publications, at congresses, on a personal blog and/or preschool institution's website). Thus in the mentioned domains of work, preschool teachers with significant work experience, applied digital technologies less often when compared to the colleagues with shorter employment history.

Keywords: digital competencies; environmental education; digital media technologies

Introduction

There is no doubt that the use of digital media changes the circumstances of application and realisation of pedagogical practice. The need and obligation to move more decisively towards the application and integration of digital media

in educational work with children, arises from the fact that children of preschool age have already taken a deep step into the use of information technology. Introduction of digital media into the educational work in kindergartens, especially with the youngest children, have to be carefully considered. Digital technologies enable the environment to be shaped in a way where learning could be carried out at any time and in any place, as well as, enable children to learn at their individual pace and style, what is crucial considering the age of children and the specifics of their development (Livingstone 2012). The digital environment and modern technologies are recognized in the new concept of reality and imply the development of an adequate relation and culture towards the use of digital technologies – Fundamentals of preschool education – Years of Ascent, 2018. At preschool age, digital competence is developed through the meaningful use of digital technologies as tools that enable children to access information, and express and present themselves through documentation of various activities. The use of digital technologies facilitates the development of a preschool program focused on key competences for lifelong learning - different types of early literacy, dispositions for learning and digital competences. In accordance with the Regulations on Competency Standards for the Preschool Teachers and their Professional Development (2018), digital competence is one of the key competencies for improving the professional practice. These competencies, within the teaching methodology, include: (1) ability to recognize the importance of multimedia content and to use modern information and communication technology in activities from a specific field; (2) awareness of pedagogical effects, its advantages and disadvantages, regarding modern information technologies application in a certain area and (3) creation of multimedia content for kindergarten activities within different areas. Digital media are learning tools that should integrate all areas of the curriculum, in order to achieve a holistic approach in the education process (Stanisavljević, Petrović 2014). In addition, digital technologies represent one of the decisive driving factors for the active participation of preschool teachers in the upgrading process of the preschool institutions (Veličković 2014). The introduction of digital technologies in the preschool education imposes demands on the preschool teachers to build and strengthen their digital competencies.

A significant role of adults, parents and preschool teachers, was observed in the implementation of media technologies in an early childhood. This is supported by a study which experimentally proved that the use of new media in educational activities delivered significant benefits in terms of better understanding of content, when adults were involved in the learning process through media (Strouse, O'Doherty, Troseth 2013). Educational video materials have great potential for the development of preschool children if adults (parents or educators) are actively involved and if they encourage children to express their thoughts about the observed material.

Rečicki and Girtner (2002) proved the connection between early computer use before and during the preschool period and the cognitive development of the preschool children. Based on the effects of computer use on the physical, cognitive and social development of children, it has been proven that children who had access to a computer, achieved better results in school preparation. Indicating that access to the computer, before or during the preschool period, was associated with the development of preschool concepts and knowledge.

The positive experiences of educators in Austria pointed out to the good sides of the electronic portfolio (Buzzetto-More 2010). The experience of the “Maurach Kindergarten” teachers, where children received a portfolio in the form of a Power Point presentation on a CD at the end of the year, revealed extremely positive reactions of children and parents. In these kindergartens, they actively work on greater use of Web 2.0 tools, especially blogs, that have the possibility of limited access for selected users.

Methodology

The aim of the study was to examine the experiences and attitudes of preschool teachers regarding the use of digital technologies in teaching the environmental contents.

The sample of this research was composed of preschool teachers working in Serbian cities: Novi Sad, Belgrade, Smederevo, Sombor, Mladenovac, Novi Bečej, Kikinda and Pančevo. The survey was conducted in a written form, individually and anonymously. A total of 180 preschool teachers were surveyed.

The instrument used in this research was a survey questionnaire with closed and open-ended questions designed for the purpose of this study. The attitude scale was used to examine teachers' attitudes towards the application of digital technologies in educational work with children when dealing with environmental topics.

For the purposes of the research, the sample was divided into four categories: the first category consisted of 37.2% participants who had up to 10 years of work experience; the second category consisted of 34.4% participants whose work experience was in a range from 11 to 20 years; in the third category were teachers with work experience of 20 to 30 years, which comprised 17.8% of the examined sample, and the fourth category consisted of teachers with work experience of over 30 years – 10.6%.

Results and Discussion

Participants in the study had different experience in use of digital technologies. Table 1 shows durations of digital technologies' application by preschool teachers, while teaching the environmental content.

Table 1. Years of digital technologies application in environmental education

Question	How long have you been using digital technologies in environmental education?							
Answers	The last year		The last two years		The last five years		The last ten years	
Work experience	No.	%	No.	%	No.	%	No.	%
<i>up to 10 years</i>	19	28,4	19	28,4	19	28,4	10	14,9
<i>from 11 to 20 years</i>	13	21	12	19,4	19	30,6	18	29
<i>from 21 to 30 years</i>	4	12,5	8	25	14	43,8	6	18,8
<i>over 30 years</i>	6	31,6	7	36,8	2	10,5	4	21,1
IN TOTAL	42	23,3	46	25,6	54	30	38	19,4

Based on the obtained results shown in Table 1, it can be concluded that preschool teachers who have been working for 11 to 20 or 21 to 30 years were the most experienced in digital technology application while educating environmental topics, since two thirds of them use digital technologies for the last five to ten years. The majority of teachers with ten years of experience in digital technologies application are in the group with 11 to 20 years of work experience. However, teachers with the most extensive work experience have the least experience in employment of digital technologies.

Preschool teachers' ability to apply digital technologies in the environmental education

Previous research of the teachers' digital competencies revealed unsatisfactory situations regarding a poor usage of these tools in the kindergartens (Chen & Chang, 2006; Lindahl & Folkesson 2012). Data from a survey conducted in 2007 have shown that 39% of were unfamiliar with the usage of computers, 44% had only a basic knowledge, while only 17% actively used computers. In the same study, it was stated that 88% of participants were familiar with Internet, while 11% of them, all belonging to the group over 50 years of age, were not used to it (Anđelić & Milosavljević 2007). Bearing in mind that a decade and a half has passed and many changes have taken place, primarily in the part of teacher education for the application of digital technologies, we were interested in the level of teachers' digital competences exhibited while working with children on environmental topics. The results of the self-assessment of competences for the use of digital technologies are shown in Table 2.

Table 2. Preschool teachers' preparedness for the application of digital technologies in environmental education

Question	In the application of digital technologies in teaching environmental content, you are							
Answers	Excellently prepared		Well prepared		Partially prepared		I'm not prepared	
Work experience	No.	%	No.	%	No.	%	No.	%
<i>up to 10 years</i>	18	26,9	30	44,8	17	25,4	2	3,0

from 11 to 20 years	13	20,9	23	37,1	24	38,7	2	3,2
from 21 to 30 years	1	3,1	14	43,8	16	50	1	3,1
over 30 years	1	5,3	5	26,3	6	31,6	7	36,9
IN TOTAL	33	18,3	72	40,0	63	35,0	12	6,7

When analysing the distribution of self-assessment by years of service, it can be noted that with the increase in years of employment, the level of preparedness for the application of digital technologies decreases.

When asked how they acquired digital competences (multiple choice question), every preschool teacher could opt for several categories of answers: independent research, professional training provided by the institution, independent professional training, exchange of experiences with colleagues, or that they had not acquired digital competence at all (Table 3).

Table 3. Methods used by preschool teachers to acquire digital competencies

Question	How did you acquire your digital competences?									
Answers	Independent research		Vocational training provided by your institution		Independent professional training		Exchange of experiences with colleagues		I have not acquired digital competences	
Work experience	No.	%	No.	%	No.	%	No.	%	No.	%
up to 10 years	37	55,2	9	13,4	22	32,8	21	31,3	1	1,5
from 11 to 20 years	39	62,9	12	19,4	11	17,7	23	37,1	1	1,6
from 21 to 30 years	26	81,3	11	34,4	3	9,4	13	40,6	0	0,0
over 30 years	8	42,1	2	10,5	2	10,5	10	52,6	2	10,5
IN TOTAL	110	61,1	34	18,9	38	21,1	67	37,2	4	2,2

Over 60% of all answers were in the category of acquired digital competences through independent research, while less than 40% in the group of acquired digital competences through sharing experiences with colleagues. Some of the respondents believed that they had not acquired digital competences at all, and two of them were the most experienced. A total of 18.9% of all answers were in the category of acquired digital competences facilitated by the preschool institution, and 21.1% at independent professional trainings. Based on the above, it was concluded that, in previous period, preschool institutions were not prominent in organizing sufficient training in digital technologies application. Moreover, acquisition of digital competences was left to the preschool teachers themselves.

Some of the preschool teachers' comments, regarding this issue, are listed below.

“I am at a very low level of using digital technology, but I want to improve in that direction.”

(Preschool teacher, 10 years of experience, Belgrade)

“My experiences are rich – when it comes to the help of colleagues; personally I am not familiar enough with digital tools, I only own a smartphone for a short time – I still need a lot of help.”

(Preschool teacher, 31 years of experience, Novi Sad)

It is known that the means of media technologies in preschool institutions can be applied in different ways and in different domains of work. We were particularly interested in how many educators use a camera (including on a mobile phone) to create a digital archive of work with children and project portfolios (Table 4).

Table 4. Usage of camera and photo camera by preschool teachers

Question	Have you used a camera phone / photo camera to create a digital archive of work with children and project portfolios?			
Answers	YES		NO	
Work experience	No.	%	No.	%
up to 10 years	56	83,6	11	16,4
from 11 to 20 years	52	83,8	10	16,2
from 21 to 30 years	24	75	5	15,6
over 30 years	14	73,7	4	21,1
IN TOTAL	146	81,1	31	17,2

According to the obtained results, a large number of the participants recorded their practice using a camera phone/photo camera. The highest percentage of those who did not use a camera phone/photo camera to create a digital archive of their work with children, belonged to the participants with the longest employment history.

The preschool teachers then gave examples of environmental topics (content) throughout they made audio recordings (Table 5). The teachers' answers were categorized according to the duration of their employment.

Table 5. Contents of environmental education within the preschool teachers made audio recordings

Preschool teachers with up to 10 years of work experience	<i>Children's statements, sounds from nature (recording and reproduction), learning processes, cooperation with parents, digital stories, and horizontal exchange of work within the institution.</i>
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Preschool teachers from 11 to 20 years of work experience	<i>Children's statements, sounds from nature (recording and reproduction), cooperation with parents, digital stories, and horizontal exchange of work within the institution.</i>
Preschool teachers from 21 to 30 years of work experience	<i>Children's statements, recording of different sounds and communication with parents</i>
Preschool teachers with over 30 years of work experience	<i>No use of audio tracks</i>

It can be concluded that the spectrum of audio recordings in educational work decreased with the increase of participants' years of employment. Additionally, audio recordings were not used by any teacher with over 30 years of work experience. It can be stated that audio recordings were not sufficiently represented when dealing with topics from the field of environment. Given that the most commonly used digital tool in this process was the mobile phone, it was assumed that teachers were not sufficiently familiar either with the instructions for audio recordings or the possibilities of audio recordings device. The aforementioned was also influenced by the teachers' partial ability to use digital technology, which, on the other hand, was the most pronounced skill, when they assessed their digital competences.

Furthermore, it was also important what type of mobile applications were used when working on environmental topics. The teachers' responses were categorized according to the length of their employment (Table 6).

Table 6. Mobile applications used in environmental education

Preschool teachers with up to 10 years of work experience	<i>Tinkerlob, Artfulparent, Film Maker, Video Show, Green Classroom, Bunjara, Puzzles, Jigsaw, Viber, Messenger, E-mail, Collage, Google classroom, Voice recorder, Youtube, Camera, and Google map, Animal sounds, Monkey preschool lunchbox, Pinterest, Sago mini road trip, Lego app4t. Baby, Augmented reality.</i>
Preschool teachers from 11 to 20 years of work experience	<i>Pinterest, Youtube, Incolage. Solar walk free, Puzzles Jigsaw, Junior adventures, Filmmaker, Audio lab, You-cut-video, Qn code reader, Qr scener, Viva video, Inshot, Google, Google Classroom, Bliba, Krokotak, Photocollage.</i>
Preschool teachers from 21 to 30 years of work experience	<i>Youtube, Epic Jigsaw, Puzzles, Animal puzzles for kids, Memory games, Facebook, and Viber groups. Educational puzzles and games with animals, Pinterest, http://nadarenadeca.com/edukativne-igrice-za-decu, Google Earth, Application for merging images.</i>

Preschool teachers with over 30 years of work experience	<i>Youtube, Pinterest, Google, Viber, Facebook.</i>
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Preschool teachers with up to 10 years of experience most frequently use mobile applications. Only half of them used the mobile applications, whereas 27.27% did not use them at all and 22.73% of them did not write an answer. In a group with work experience from 11 to 20 years only every fifth teacher used mobile applications specified in Table 6, while only a quarter of teachers with a work experience from 21 to 30 years used some mobile applications. Finally, participants with over 30 years of experience used the least number of applications.

The use of mobile applications was inversely proportional to the number of years of work experience. This can be justified by the partial ability of teachers to apply digital technologies when teaching about environment. It can be connected to the obvious tendency of younger teachers to explore and use mobile applications in their work more often in comparison to older colleagues who have expressed resistance and their use of mobile applications during the pandemic was reduced to only those necessary for remote work (Viber, Facebook). The survey revealed an absence of the training in digital technologies organized by the institution, although they are a large part of everyday life and work.

The preschool teachers who used mobile applications when teaching about environment, expressed their experiences (Table 7). The answers were categorized according to the work experience.

Table 7. Experiences in using the mobile applications in environmental education

Preschool teachers with up to 10 years of work experience	<i>Implication, correspondence to the new tendencies of educational work, usefulness, practicality, source of ideas, encourage children's ideas, creativity and interest, motivate children.</i>
Preschool teachers from 11 to 20 years of work experience	<i>Usefulness, faster access to the necessary content, plenty of useful material, practicality, the possibility of cooperation with parents, documentation of work process, creative examples, a source of ideas.</i>
Preschool teachers from 21 to 30 years of work experience	<i>The source of many topics, some contents brought closer to the children, ease of use, simple way to introduce children to an activity, a source of ideas, concrete examples, motivation for further work.</i>
Preschool teachers with over 30 years of work experience	<i>Had no experience</i>

Preschool teachers with the least work experience recognized the importance of mobile applications and pointed out that mobile applications were very useful, stimulated children's interest and creativity, represented an inexhaustible source of ideas and helped in work according to the Years of Ascent. They also stated that the use of mobile applications requires the institution to be equipped with digital tools, as well as, more developed digital competencies of the users.

Preschool teachers who were the most experienced in using digital technologies and with work experience from 11 to 20 years, also demonstrated positive experiences in using mobile applications. They believed that the use of mobile applications facilitated faster and easier access to different contents, they recognized the importance of mobile applications during the pandemic, as well as, the practical importance of digital media while teaching about environment.

Preschool teachers with 21 to 30 years of work experience emphasised their positive experiences and confirmed that digital technologies were the source of many topics.

"Digital tools bring some content closer to the children - you can mimic life situations or stop ambient learning several times. You can more easily introduce children to the activity or fulfil the activity itself."

(Preschool teacher, 24 years of experience, Belgrade)

The evidence suggested that the digital competences of the preschool teachers were an important factor in the use of mobile applications, therefore it is necessary to by the institution to upgrade the digital competencies of the teaching staff.

Preschool teachers' attitudes about the application of digital technologies in the environmental education

In the field of early education, integrating digital technology into classrooms for young children has not received positive views from teachers. Lack of training and support may make teachers feel unprepared (Chen & Chang 2006). Tradition has been found to be interpreted in different ways to justify or reject the embedding of digital technology into preschool practice (Lindahl & Folkesson 2012).

Table 8. Preschool teachers' attitudes about the application of digital technologies in environmental education

Answers Statements	Yes		Mostly		No	
	No.	%	No.	%	No.	%
Digital technologies are necessary for project work with children on environmental topics.	94	82.5	13	11.4	7	6.1

Environmental topics are very suitable for application of digital technologies.	96	80.7	19	16.0	4	3.4
I use digital technologies in activities related to environment only when it's necessary.	84	48.6	47	27.2	42	24.3
The importance of digital technologies in educational work with children of preschool age is overestimated.	30	26.8	44	39.3	38	33.9
Digital technologies in environmental education reduce the development of creativity in children.	36	31	43	37.1	37	31.9
Digital technologies limit the personal contact between the teacher and the child.	33	29.2	30	26.6	50	44.2
Digital technologies are complex or difficult to handle.	38	34.5	31	28.2	41	37.3
Most often, I use a mobile phone for educational work.	99	56.6	48	27.4	28	16
The use of digital technologies has improved my educational work on the topics about environment.	90	54.2	59	35.5	17	10.2
The use of digital technologies in environmental education has positive effects on children's development.	64	59.3	33	30.6	11	10.2
It is necessary for preschool teachers to be comprehensively informed about the applications of digital technologies in environmental education.	63	57.3	31	28.2	16	14.5
Exposure to life-practical situations and ambient learning in preschool environmental education is more effective approach than use of digital technologies.	67	59.8	35	31.3	10	8.9
Life-practical situations, ambient learning and use of digital technologies in environmental education complement each other.	78	70.3	31	27.9	2	1.8
Use of digital technologies during the pandemic has facilitated my work with children on environmental topics.	133	77.3	31	18	8	4.7
Use of digital technologies during the pandemic has facilitated and improved my communication with parents when dealing with topics related to environment.	125	71.8	27	15.5	22	12.6

The vast majority of teachers was aware of their importance and that digital tools are very suitable for processing environmental topics. However, this is in contrast to the fact that three-quarters of respondents used digital technologies in environmental education only in cases when necessary. Thoughts about the overestimation of the

importance of digital technologies in educational work were divided, as well as, the opinion that digital technologies reduce creativity in children. Moreover, attitudes about the limitation of personal contact between preschool teacher and children, due to the use of digital technologies, were also sharply divided as well as the opinions of the complexity of use of digital technologies. More than four-fifths of the preschool teachers most often used the mobile phones in their work, and, significantly, 90% of them considered that digital technologies have improved their work. A total of 85% of the preschool teachers assumed that it was necessary to get more instructions about the applications of digital technologies in environmental education. Almost all respondents agreed about positive impact of digital technologies on children's development but combined with life-practical situations and ambient learning in environmental education. A large majority of preschool teachers believed that the use of digital technologies facilitated their work with children and improved their communication with parents during the pandemic.

To examine the general attitudes and experiences of preschool teachers about the advantages and disadvantages of the digital technologies' application, open-ended questions were asked. The respondents were expected to list the advantages and disadvantages according to their own experience (Tables 9 and 10).

Table 9. Advantages of digital technologies application in environmental education

Preschool teachers with up to 10 years of work experience	<i>Maintains children's attention; more attractive and stimulating contents; availability of all topics (familiarization with places, animals, people, customs of distant regions) in any period and any surroundings; quick and easy access; easy to use; facilitates work; complements and upgrades work; improves educational work; displays a wide range of ideas; possibility of using interesting didactic tools; additional development of imagination and creativity; processing of various multimedia contents.</i>
Preschool teachers from 11 to 20 years of work experience	<i>Easier and faster access to information and knowledge; new ideas, teaching materials, and games; enrich educational work; children can get familiar with the teaching content more easily, because preschool teachers are not always able to provide real circumstances; stimulate interest in children; ideas for making various items; faster communication with the family members.</i>
Preschool teachers from 21 to 30 years of work experience	<i>Encourage reflection, communication and formation of certain cognitive skills; accessibility of various contents; follow the course of modern development and interests of children; offer multiple angles in the topic's observation; supplement to practical work.</i>

Preschool teachers with over 30 years of work experience	<i>Easy access to information and easier work with children.</i>
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The most prominent answers are listed:

“Digital technologies offer a lot of different and useful content that can complement and improve educational work. Combining life-practical situations and digital technologies in environmental education is excellent for children’s development.”

(Preschool teacher, 6 years of experience, Smederevo)

“The advantages are that children can more easily familiarize themselves with the environmental topics because we are not always able to provide obvious and real circumstances.”

(Preschool teacher, 14 years of experience, Sombor)

“During the pandemic, it made my work with children easier and improved my communication with parents.”

(Preschool teacher, 16 years of experience, Belgrade)

“Digital technologies explain more vividly what we want to do in that area, and children are more motivated. Also, encourage children’s interest, keep children’s attention, and enable children to study with their parents.”

(Preschool teacher, 8 years of experience, Belgrade)

“Interactive media encourage reflection, communication and shaping of certain cognitive skills.” For example: educational applications and interactive books in electronic format.”

(Preschool teacher, 24 years of experience, Pancevo)

The most frequent answer of the preschool teachers with over 30 years of experience, was “I don’t use digital technologies”. Nevertheless, among the few affirmative responses, advantages such as easy access to information and easier work with children, were emphasized.

The analysis of the responses showed that the respondents recognized the essential features of modern technologies as advantages, primarily speed and accessibility. Preschool teachers stated that, with the help of digital technologies, and above all the Internet, they could easily and quickly access a variety of information that is important for their work in kindergarten or professional development. A large number of them recognized the advantage of digital technologies application, in terms of its potential for activities preparation, generation of new ideas and topics, as well as the facilitation of a large selection of diverse contents that could be applied in environmental education. In this context, they stated that the means of digital technologies enabled them to prepare for work more easily. A small

number of surveyed preschool teachers also noticed an advantage in the fact that digital technologies provided significant opportunities for exchanging ideas and collaboration with colleagues. Moreover, they mentioned the other advantages of new media application: greater motivation of children, interesting content and method of work due to the attractiveness of digital tools. Just a few participants singled out more effective communication with parents as an advantage.

Table 10. Limitations of digital technologies application in environmental education

Preschool teachers with up to 10 years of work experience	<i>Limited contacts; the preschool institution is not equipped with digital technologies; insufficient information and training of preschool teachers; bad replacement for spontaneous, interactive play; a large amount of information, excessive use; reduced creativity in children; obstruct direct contact with nature.</i>
Preschool teachers from 11 to 20 years of work experience	<i>Excessive use; more detailed information and training of preschool teachers cannot replace learning through experience or manipulation; inactivity, physical distance; reduced interaction.</i>
Preschool teachers from 21 to 30 years of work experience	<i>Limit motor skills and speech development in children; poor equipment in the institutions; lack of children's experience with objects manipulation.</i>
Preschool teachers with over 30 years of work experience	<i>It takes a lot of time to find materials and prepare for a demonstration; digital tools deny opportunities for children to touch, smell, make, stir... explore, experiment, walk... genuinely.</i>

The most prominent answers are listed:

“The more digital technology we have, the less we turn to real situations and possibilities, because we can see and hear everything on the Internet.”

(Preschool teacher, 6 years of experience, Sombor)

“There are no concrete disadvantages, I just think that it is the best to combine ambient learning, practical situations, books and encyclopedias and digital technologies. That way, the children benefit from everything.”

(Preschool teacher, 14 years of experience, Belgrade)

“Too many digital technologies lead to a lack of personal experience and direct contact, sensory experiences – smell, taste, touch.”

(Preschool teacher, 25 years of experience, Belgrade)

Only two out of six respondents with more than 30 years of experience, mentioned disadvantages, pointing out time-consuming preparations and the fact that children prefer direct contact:

“Children still prefer to touch, smell, make, mix... explore, experiment, walk... genuinely.”

(Preschool teacher, 31 years of experience, Belgrade)

The answers about the disadvantages of the digital technologies application in environmental education could be classified into several categories: lack of personal contact and reduced communication, lack of physical activity and increase of time spent indoors, complexity to handle, negative impact on children's development, reduction of creative potential. However, it seems that the basis for such attitudes should be sought in insufficient knowledge about digital technologies, their use and handling. Namely, regarding the answers which refer to the lack of personal contacts and reduced communication, there is a large body of evidence indicating positive effects of digital technologies on the social development of children, including socialization, collaborative learning, strengthening children's cooperation skills and friendly relations (Veličković 2014; Livingstone 2012; Žiropadja 2007). Similarly, a previous study confirmed the positive effect of developmentally appropriate educational software on the growth of children's creativity (Davis, Shade 1999). However, the respondents in this study, linked the application of digital technologies with reduction of creativity. Disadvantages related to overload or long time spent in front of the screen, as well as the issue of safety, also emphasized the role of adults in developing an adequate relations between children and the media. Closely related to that is the category of weaknesses, which included answers related to the loss of a preschool teacher's role, especially a role model, model of behaviour. The application of digital technologies in an early education presupposes the involvement of adults who choose media and contents that are developmentally appropriate, and, in this respect, adults should not be afraid of replacing the preschool teacher's role with the modern media tools. On the contrary, adults, preschool teachers and parents seem to be taking on more complex roles based on new competencies.

The obtained results indicated that preschool teachers with modest work experience expressed more positive attitudes and confirmed appropriate experience in the application of digital technologies in environmental education.

Conclusion

This study demonstrated that learning via digital technologies was necessary in the education of preschool children and that environmental topics were suitable for the digital technologies application. However, analysis of the preschool teachers' attitudes and experiences, revealed that a large number of them used digital technologies in their work with children only when it was necessary. The participants also believed that digital technologies could have a positive impact on children's development, as well as, that they could reduce the development of creativity in children. The preschool teachers' experiences in digital technologies application during the pandemic (work with children on environmental topics, communication with parents) were positive, and almost all of them believed that digital technologies have made their work easier and improved communication. However, the study determined that, in the previous period, preschool institutions have not organized appropriate training in the application of digital technologies regarding the vocation related to the children of preschool age. Additionally, the acquisition of digital competences was left to the preschool teachers themselves. For those with the longest employment history, even mobile phone applications were demanding enough to put them away from their application in environmental education. Pre-school teachers can create new meaning and possibilities of learning and development new tools, digital technologies, with the potential to change the practice can be allowed.

NOTES

1. KARANOVIC, S., 2022. Stavovi i iskustva vaspitača u primeni digitalnih tehnologija u oblasti upoznavanja okoline , master rad odbranjen na Pedagoškom fakultetu u Somboru.
2. KUZMANOVIĆ, D.; ZLATAROVIĆ, V.; ANĐELKOVIĆ, N.; CICVARIĆ - ŽUNIĆ, J. 2019. Deca u digitalnom dobu. Dostupno na: https://www.unicef.org/serbia/media/10366/file/Deca_u_digitalnom_dobu.pdf (13. 2. 2021.) [In Serbian].

REFERENCES

- BROOKER, L., 2003. Integrating New Technologies in UK Classrooms – Lessons for Teachers From Early Years Practitioners. *Childhood Education*, vol. 75, no. 5, pp. 261 – 267. Doi: 10.1080/00094056.2003.10521210.
- BUZZETTO-MORE, N., 2010. *The E-Portfolio Paradigm: Informing, Educating, Assessing, and Managing with E-Portfolios*. Santa Rosa, CA: Informing Science.

- CHEN, J.; CHANG, C., 2006. Using Computers in Early Childhood Classrooms: Teachers' Attitudes, Skills and Practices. *Journal of Early Childhood Research*, vol. 4, no. 2, pp. 169 – 188.
- DAVIS, B. C.; SHADE, D. D., 1999. Integrating technology into the early childhood classroom: The case of literacy learning. *Information Technology in Childhood Education Annual*, vol. 1, pp. 221 – 254. US: Association for the Advancement of Computing in Education.
- JANKOVIĆ, M.; DMITRIĆ, Lj., 2011. Primena računara u pripremnom predškolskom programu. Čačak: Tehnički fakultet. pp. 288 – 291 [In Serbian].
- KLJAKIC, D., 2007. E-learning: Učenje za Net-generaciju. *Naša škola. Časopis za teoriju i praksu odgoja i obrazovanja*, no. 39, pp. 3 – 17 [In Serbian].
- LIVINGSTONE, S., 2012. Critical reflections on the benefits of ICT in education. *Oxford Review of Education*, vol. 38, no. 1, pp. 9 – 24. Available from: doi: 10.1080/0305 4985.2011.577938.
- MESAROŠ ŽIVKOV, A.; MIĆEVIĆ KARANOVIC, J.; PAVLOV, S.; BRKLJAČ, T., 2019. Digitalni mediji i didaktičke inovacije u radu vaspitača. *Pedagoška stvarnost*, vol. LXV, no. 1 [In Serbian].
- LINDAHL, M. G.; FOLKESSON, A. M., 2012. ICT in preschool: friend or foe? The significance of norms in a changing practice. *International Journal of Early Years Education*, vol. 20, no. 4, pp. 422 – 436.
- PAVLOVIĆ BRENESELOVIĆ, D., 2012. Ne(postojeći) digitalni prostor u predškolskom vaspitanju Srbije. *Tehnika i Informatika u obrazovanju*. Čačak: Tehnički fakultet. [In Serbian]
- RADLOVIĆ-ČUBRILO, D.; KUKUČKA-STOJANOVIĆ, N., 2015. Primena računara u aktivnostima upoznavanja predškolske dece sa okolinom. *Zbornik VŠSSOV u Kikindi*, vol. X, no. 1, pp. 21 – 39. [In Serbian]
- REČICKI, Ž.; GIRTNER, Ž., 2002. *Dete i kompjuter*. Beograd: Zavod za udžbenike i nastavna sredstva [In Serbian].
- STROUSE, G. A.; O'DOHERTY, K.; TROSETH, G. L., 2013. Effective coviewing: Preschoolers' learning from video after a dialogic questioning intervention. *Dev Psychol.* vol. 49, no. 12, pp. 2368 – 2382. Doi: 10.1037/a0032463.
- VELIČKOVIĆ, S., 2014. *Edukacija vaspitača za primenu IKT u vrtiću*. Beograd: Univerzitet Singidunum [In Serbian].
- ŽIROPAĐA, Lj., 2007. Dete i kompjuter – očekivanja i strepnje roditelja. *Nastava i vaspitanje*, no. 1, pp. 66 – 75 [In Serbian].

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