

A COMPARATIVE STUDY OF EARLY CHILDHOOD TEACHERS' DIGITAL PRACTICES DURING AND AFTER COVID-19

MARIJANA MIOČIĆ¹, MATILDA KARAMATIĆ BRČIĆ² & BERNARDA TOKIĆ²

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¹Department of Teachers and Preschool Teachers Education, University of Zadar, Zadar, Croatia

²Department of Pedagogy, University of Zadar, Zadar, Croatia

CORRESPONDING AUTHOR/KORESPONDENČNI AVTOR/

bptokic@gmail.com

Abstract/Izveček

This study investigates early childhood teachers' perceptions and use of digital media during and after the COVID-19 pandemic, addressing the need to understand evolving ICT practices in early education. Employing a longitudinal design, data were collected via structured questionnaires from the same kindergartens in 2020 and 2024. Quantitative analysis revealed stable self-assessed digital competence but changing pedagogical use and attitudes. The findings underscore the need for targeted digital training and systemic support. The study's novelty lies in its comparative longitudinal approach, offering insight into the sustained impact of a global crisis on digital integration in early childhood education.

Digitalne kompetence vzgojiteljev predšolskih otrok: primerjalna študija digitalnih praks predšolskih učiteljev med pandemijo COVID-19 in po njej

V študiji so predstavljene zaznave in uporaba digitalnih medijev med vzgojitelji v zgodnjem otroštvu med pandemijo COVID-19 in po njej, in sicer z namenom bolje razumeti spreminjajoče se prakse uporabe IKT v zgodnjem izobraževanju. Z uporabo longitudinalnega raziskovalnega načrta so bili podatki zbrani z uporabo strukturiranih vprašalnikov v istih vrtcih v letih 2020 in 2024. Kvantitativna analiza je pokazala stabilno samoevalvacijo digitalnih kompetenc, a spreminjajočo se pedagoško rabo in stališča. Ugotovitve kažejo na potrebo po ciljno usmerjenem digitalnem usposabljanju in sistemski podpori. Novost raziskave je v njeni primerjalni longitudinalni zasnovi, ki ponuja vpogled v dolgoročni vpliv globalne krize na digitalno integracijo v predšolsko vzgojo.

Keywords:

COVID-19 pandemic,
digital competences,
digital media, early
childhood, early
childhood teachers.

Ključne besede:

digitalne kompetence,
digitalni mediji,
pandemija Covid-19,
zgodnje otroštvo,
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Introduction

The processes of learning and upbringing have evolved, reflecting shifting societal expectations and the growing influence of digital media. In today's digital society, children are immersed in media-rich environments from an early age, necessitating updated educational approaches (Šimala, 2017, Renić, 2018).

Modern early childhood education emphasizes continuous teacher development, particularly in digital competences. Teachers must not only support children's development and moral values but also guide them in navigating digital environments safely and critically. As digital tools become integral to education, expectations for information and communication technology (ICT) use continue to grow. The pervasive integration of technology into daily life has significantly reshaped expectations for information and communication technology (ICT) in the educational process (Vrkić Dimić, 2013).

The teacher's beliefs and behaviours, professional competences, and pedagogical knowledge during the educational process all have a significant impact on the child's development, self-confidence and self-esteem, their future educational success and assumption of the role of competent, active citizen of the society in which he/she lives.

Professional competences of early childhood teachers

Ongoing societal changes necessitate the continuous development of teachers' professional competences, emphasizing the importance of lifelong learning. Through continuous education, early childhood teachers enhance their ability to adopt pedagogical strategies that support children's developmental needs (Mlinarević, 2000). Professional competence is commonly defined as a combination of the knowledge, skills, and attitudes essential for effective practice (Eraut, 2003, as cited in Višnjić Jevtić, 2018). Early childhood professionals are tasked with the complex role of tailoring digital and educational practices to the individual needs of each child, considering age, developmental stage, curriculum goals, and cultural contexts (OECD, 2023). This includes tracking developmental progress and fostering collaboration with families to support holistic learning. The profession also demands flexibility and responsiveness to the unpredictability of daily practice, challenging the notion of early education as a rigid, standardized field (Šagud and Jurčević-Lozančić, 2012). To navigate these demands, early childhood educators must engage in ongoing professional development, possess specialized knowledge,

and critically reflect on their practice. This includes cultivating self-awareness and the ability to adapt to evolving pedagogical and technological landscapes (Kisić, 2019).

ICT competences of teachers

As the age of media exposure has shifted, we must recognize that childhood today is a “media childhood” (Mikić, 2015), and that media plays a role as a secondary socialization factor. For children to successfully master media, their teachers must play a key role in the relationship between them and media. First and foremost, it is desirable for teachers to be media literate, so that they themselves can properly educate children about media in a socially appropriate way (Sindik and Veselinović, 2010) and thus match the modern child. As primary caregivers, it is the parents' responsibility to find a balance when selecting and using media content for children. Parents should be role models for their children by using information technology in a regulated way and explaining the possible positive or negative aspects of it (Đuran et al., 2019).

Early childhood experiences, especially through structured programs, are vital to individual and societal well-being. However, the rapid growth of digital technology presents a new challenge. While this technology holds promise, teachers lack the knowledge to fully exploit its benefits and mitigate potential risks within the context of early childhood education. Therefore, crafting policies to safeguard and empower children in this digital environment is crucial to prioritising human well-being in a world increasingly dominated by technology. Early childhood education programs must adapt to the digital age, prioritising children's development and well-being in a tech-driven world. This adaptation requires acknowledging how technology shapes children's experiences both locally and globally, ultimately preparing them for the future (OECD, 2023).

During formal and informal education, an individual acquires knowledge and competences that will help him live and work in the modern digital age, both of which will need to be further developed to keep up with the changes. The continuous development of information and communication technology (ICT) confronts teachers with the need for lifelong education. The use of the internet and digital technology during the educational process enables the digital literacy of the individual and encourages the creation of an active and creative attitude towards the application of modern technology (Sindik and Veselinović, 2010).

By developing digital competences, teachers, children, and their parents develop media and information literacy, acquire new knowledge and competences for the safe use of ICT technology.

Social changes and the growing use of ICT in daily life have transformed teaching and learning, promoting new forms of knowledge acquisition. Digital tools such as multimedia content, interactive books, and online resources enhance educational quality and foster children's active engagement. These tools also support the development of information literacy, an essential competence in modern society and consequently enabling individuals to locate, evaluate, and apply information effectively (Rogulj, 2011). To guide young children in this digital environment, early childhood educators must themselves be information literate, reinforcing the need for targeted teacher education.

The use of digital technologies proved especially vital during the COVID-19 lockdown, when teachers relied on applications like Viber and WhatsApp to share activities with parents. These tools helped mitigate the effects of social isolation and supported children's continued engagement during periods of remote learning.

The rapid digital transformation of education, accelerated by the COVID-19 pandemic, has raised significant questions about the preparedness and adaptability of early childhood teachers. While digital media offer new opportunities for enriching pedagogical practices and supporting collaboration with families, they also introduce challenges related to competence development, equity in access, and pedagogical appropriateness for young children. These complexities underline the importance of examining how early childhood educators perceive and implement ICT in their daily practice. Given this context, this study seeks to address the following question: How have early childhood teachers' digital competences, usage of ICT in educational work, and collaboration with parents changed between the periods during and after the COVID-19 pandemic?

By investigating variables in teachers' digital competence, ICT usage, and cooperation with parents across two critical time points, this study aims to contribute to the growing discourse on digital readiness in early childhood education and provide guidance for future policy and professional development initiatives.

Methodology

This is a longitudinal study with measurements taken at two different time points. Even though individual responses are anonymous and cannot be paired, the kindergarten-level responses can still be compared across the two time points.

This paper presents the results of a follow-up study conducted four years after an initial investigation. The study examines the perspectives of early childhood teachers on their own Information and Communication Technology (ICT) competences. It explores changes in the frequency of ICT application in their educational work, both during and after the COVID-19 pandemic. Additionally, the research investigates the perceived advantages of using ICT during the pandemic.

This study aimed to investigate potential changes in early childhood teachers' ICT competences and usage patterns following the COVID-19 pandemic. Three research hypotheses were formulated:

Hypothesis 1 (H1): No statistically significant difference exists in the ICT competences of teachers who participated in the research in 2020 compared to those who participated in 2024.

Hypothesis 2 (H2): There is no difference in the self-reported frequency and patterns of ICT use for educational work with children and parents between teachers who participated in the study in 2020 and 2024.

Hypothesis 3 (H3): Teachers' perceptions of the advantages of ICT use in their work do not differ significantly between the pre-pandemic period (2020) and the post-pandemic period (2024).

This study aimed to investigate whether there was a significant difference in early childhood teachers' knowledge of and skill in using ICT after a four-year period, and how the application of digital technology in teachers' educational work with children and their parents differed during and after the COVID-19 pandemic.

Instrument

For the purpose of the research, the same Questionnaire was used as in the 2020 study. The Questionnaire included an explanation of the research purpose, independent variables (gender, age, years of experience in the profession, professional title, level of education), and scales for self-assessment of teachers' ICT competences and the application of ICT technology in everyday educational work with children and their parents during and after the COVID-19 pandemic.

The self-assessment scale consisted of 26 items, split into 4 subscales: Early childhood teachers' knowledge of and skill in using ICT ($k=5$), Using ICT in everyday work with children and parents ($k=9$), Previous experience with ICT ($k=3$) and the advantages of using ICT during COVID-19 ($k=9$). Preschool teachers expressed their level of agreement with the statement about their ICT competences on a five-point Likert scale (ranging from "I completely disagree" = 1 to "I completely agree" = 5).

Factor analysis was used to identify 4 sub-scales in the first point of time, and CFA confirmed the same factor structure for the second point of time. The reliability of the instrument was confirmed by applying the Cronbach alpha test:

1. Early childhood teachers' knowledge of and skill in using ICT ($k=5$; $\alpha_1=0,816$, $\alpha_2=0,783$, $\alpha=0,757$) (α_1 – first sample; α_2 – second sample; α – total)
2. Using ICT in everyday work with children and parents ($k=9$; $\alpha_1=0,888$; $\alpha_2=0,873$; $\alpha=0,883$)
3. Previous experience with ICT ($k=3$; $\alpha_1=0,825$, $\alpha_2=0,834$, $\alpha=0,836$)
4. The advantages of using ICT during COVID-19 ($k=9$; $\alpha_1=0,912$, $\alpha_2=0,912$, $\alpha=0,910$)

The table below outlines the number of items and key indicators used within each subscale.

Table 1.

Instrument Indicators

Subscale	Number of Items (k)	Indicators
Early Childhood Teachers' Knowledge of and Skill in Using ICT	5	- Use of basic digital tools - Confidence in integrating ICT - Use of ICT to support development - Understanding digital safety - Troubleshooting ICT issues
Using ICT in Everyday Work with Children and Parents	9	- ICT use in instruction - Use of multimedia content - Child engagement via ICT - Communication with parents - Sharing digital materials - Individualized ICT adaptation - ICT in curriculum - Collaborative digital learning - Monitoring digital use

Previous Experience with ICT	3	- Prior ICT training - Pre-pandemic ICT use - Participation in digital projects
Perceived Advantages of Using ICT During COVID-19	9	- Continuity of learning - Digital communication with parents - Child engagement via digital tools - Organizing remote learning - Collaborative support via ICT - Motivation for skill improvement - Awareness of ICT role - Benefit to child development - ICT for crisis preparedness

Procedure

The data for this study were collected in two cycles. The first cycle was conducted in March 2020, and a sample of 178 early childhood teachers working in kindergartens located in Zadar County participated in the research. In January 2024, a sample of 78 early childhood teachers working in kindergartens located in Zadar County participated in the research. Data was collected from the same 18 kindergartens at both measurement points. Research was conducted using electronic questionnaires created using the 1Ka (One Click Survey) tool. Consent for the participation of educational staff in the research was requested from the directors and counsellors in kindergartens. Links to the questionnaires were sent to teachers, and the purpose and goal of the research were indicated. Participants anonymously filled out the questionnaire. Research results were analysed using SPSS software.

Sample

In the first cycle, most participants were female (N=177, 99.4%). Regarding professional titles, the majority of these were working as early childhood teachers (N=167, 93.8%). A smaller percentage held mentor (N=9, 5.1%) or advisor (N=2, 1.1%) positions. Most early childhood teachers participating in the research had 11-20 years of experience in early childhood practice (N=69, 38.8%). Other experience levels included 0-5 years (N=39, 21.9%), 6 – 10 years (N=26, 14.6%), 21 – 25 years (N=23, 12.9%), and 26 and more years (N=20, 11.2%). Most teachers had bachelor's degrees (N=166, 82%), while N=32 (18%) had master's degrees.

In the second research cycle, the great majority of teachers were female (N=75, 96.2%). As for the previous measurement point, most of the participants worked as early childhood teachers (N=72, 92.3%), there were N=4 (5.1%) teachers with the

title of mentor, and $N=2$ (2.6%) with the title of advisor. The results from 2024 show that the teachers participating in the study had been working in the profession for 0 – 5 years ($N=21$, 27%), 6 – 10 years ($N=11$, 14.1%), 11 – 20 years ($N=17$, 21.8%), 21 – 25 years ($N=15$, 19.2%), and 26 years and more ($N=14$, 17.9%). There were $N=51$ (65.4%) teachers with bachelor's degrees, while $N=27$ (34.6%) had master's degrees.

Results

For the processing of data obtained from the research, frequency analysis of data, descriptive analysis of data, and a t-test were used to determine if there was a difference in the percentage of opinions among early childhood teachers in relation to each statement. The data in Table 1 show that for all the variables used, the full ranges of responses was obtained, and the skewness indexes did not exceed the values of ± 2 ; it is therefore justified to apply parametric statistics.

Table 2.

Descriptive statistics for subscales

	N	Min	Max	M	SD	Skewness	Kurtosis
Teachers' knowledge of and skill in using ICT	256	1.00	5.00	3.1339	.99323	-.321	-.786
Using ICT in everyday work with children and parents	256	1.33	5.00	3.0271	.94390	-.245	-.955
Previous experience with ICT	256	1.00	5.00	3.0319	.92894	-.211	-.531
The advantages of using ICT during COVID-19	256	1.00	5.00	2.9583	1.11034	-.153	-1.171
Valid N (listwise)	256						

According to the descriptive analysis (Table 1), it was determined that teachers believe they have average knowledge and skills, for each of the competences, for using ICT ($M=3.1339$; $SD=0.993$), and that they use ICT on average ($M=3.027$; $SD=0.943$) in everyday work with children and parents. This is also consistent with

their opinion on the average previous experience of using ICT ($M=3.0319$; $SD=0.9289$). The research results also show that teachers rate the advantages of using ICT during the COVID-19 pandemic as average ($M=2.958$; $SD=1.110$).

Table 3

Comparison of Subscales between participants in 2020 and 2024: Independent Samples t-Test Results

		N	M	SD	Min	Max	t-test	p
Teachers' knowledge of and skill in using ICT	2020	178	3.1755	1.09696	1.00	5.00	1.011	0.313
	2024	78	3.0391	.69845	1.60	4.40		
	Total	256	3.1339	.99323	1.00	5.00		
Using ICT in everyday work with children and parents	2020	178	2.8178	.99829	1.33	5.00	5.677	0.000
	2024	78	3.5046	.57221	1.78	4.67		
	Total	256	3.0271	.94390	1.33	5.00		
Previous experience with ICT	2020	178	2.8549	.92568	1.00	5.00	4.081	0.000
	2024	78	3.4359	.80637	1.00	5.00		
	Total	256	3.0319	.92894	1.00	5.00		
The advantages of using ICT during COVID-19	2020	178	2.6860	1.13919	1.00	4.89	6.372	0.000
	2024	78	3.5798	.73281	1.33	5.00		
	Total	256	2.9583	1.11034	1.00	5.00		

In accordance with the first hypothesis, the differences in self-assessed competences were tested between teachers who participated in the research in 2020 and 2024. From the results shown in Table 2, there is no statistically significant difference ($t = 1.001$, $p < 0.05$) in the self-assessment of teachers in both studies in terms of their knowledge of and skill in using ICT in everyday work with children and parents. Both groups assess their competences equally, i.e., as average. Therefore, we can accept the first hypothesis because we found no statistically significant differences. In accordance with the second hypothesis, the differences in the previous and regular frequency of using ICT technology in educational work with children and their parents were tested between teachers who participated in the research in 2020 and 2024. From the results shown in Table 2, teachers participating in the 2020 study emphasize that they use ICT more often in their work, i.e., they express a more positive attitude towards the use of ICT in their work ($t= 5.677$, $p<0.01$) compared to participating teachers in 2024.

Moreover, participating teachers from 2020 have more previous experience in using

ICT ($t= 4.081$, $p<0.01$) than teachers participating in the research conducted in 2024. The research results show that we can completely reject the second hypothesis, i.e., statistically significant differences were obtained for both measures.

In accordance with the third hypothesis, the differences in the opinions of teachers about the advantages of using ICT during and after COVID-19 were tested. From the results shown in Table 2, teachers participating in the 2020 study, during COVID-19, estimate there are more advantages in using ICT ($t=6.372$, $p<0.01$) than teachers participating in the study conducted in 2024 after COVID-19. According to these results, there is a statistically significant difference, and we can reject the third hypothesis.

The patterns of ICT use among early childhood teachers during and after the COVID-19 pandemic reveal key shifts. During the pandemic, digital tools were widely adopted, particularly for parent communication and remote learning as a necessary response to unprecedented conditions. In this context, ICT was not only functional but essential, fostering more favourable attitudes toward its use. Post-pandemic, however, ICT usage and perceived benefits declined. This likely reflects a return to traditional, hands-on practices better suited to early childhood education, along with the view that digital reliance was a temporary adaptation rather than a lasting pedagogical change. It can be observed that younger, less experienced teachers reported greater digital competence and use, likely due to greater familiarity and comfort with technology. Institutional barriers such as inadequate infrastructure, limited support, and unclear digital guidelines may have further discouraged continued ICT integration. Additionally, some teachers questioned the developmental appropriateness of digital tools, especially concerning social-emotional growth and physical activity. Overall, ICT use was shaped by a mix of urgency, generational readiness, structural capacity, and pedagogical belief. While crises can accelerate digital adoption, sustained integration requires long-term investment in teacher training, infrastructure, and educational culture.

However, it is important to note that the difference in sample sizes has implications for interpreting the findings. Although both samples were drawn from the same kindergartens, the smaller 2024 sample may reduce representativeness and increase the risk of sampling and nonresponse bias, particularly if non-participants held different attitudes toward ICT. The reduced sample also lowers statistical power, potentially obscuring subtle but meaningful changes. Factors such as post-pandemic fatigue, shifting priorities, or workforce turnover may have influenced participation and introduced generational variation, with newer teachers potentially more digitally

fluent. These limitations suggest that observed differences may reflect both actual changes in practice and variations in sample composition, warranting cautious interpretation.

Discussion

The COVID-19 pandemic posed significant challenges for early childhood teachers, requiring a sudden shift to online environments and demanding rapid adaptation to digital tools. This transition presupposed a baseline of digital competence that many educators lacked (Visnjic-Jevtic et al., 2021). Both novice and experienced teachers reported feeling unprepared in areas such as inclusive education and digital literacy, highlighting the inadequacy of current training programs (Miočić and Tokić, 2021). Many teachers lacked the digital competence required for effective teaching during the pandemic, thus emphasizing the importance of structured, ongoing professional development and institutional support to build digital readiness across all levels of education (Perifanou et al., 2021). Similar findings were reported by Velki and Miočić (2025), who emphasized that although teachers are expected to mentor and guide children in safe internet practices, many report lacking adequate preparation to address the specific risks and benefits associated with children's digital engagement. Prior ICT experience and foundational digital skills were essential for effectively delivering remote education, underscoring the importance of integrating practical digital training into teacher preparation (Velki and Miočić, 2023).

Although pre-service teachers in Norway expressed scepticism about the emphasis on digital skills in university curricula, they still reported confidence in their own ICT abilities (Instefjord and Munthe, 2017). This reflects a broader trend: early childhood teachers recognize the importance of ICT for professional growth but often remain self-critical of their competence, showing strong motivation for further learning (Rogulj, 2011). Teachers' digital literacy is crucial, not only for their own professional development but also for supporting young children in a media-saturated world.

Research confirms that self-efficacy plays a significant role in teachers' effective use of ICT in the classroom (Ismail, 2023). Studies also show that less experienced teachers tend to report higher ICT competence and more frequent use, likely due to recent exposure and training (Miočić and Tokić, 2021). However, low levels of digital competence and inadequate infrastructure in kindergartens remain significant barriers to effective ICT integration (Celizić and Zovko, 2021).

While teachers acknowledge the value of ICT, especially in communicating with parents, they face obstacles such as large group sizes, lack of equipment, and underdeveloped digital systems. Both educators and parents have expressed the need for clearer communication protocols when using digital platforms (Rogulj, 2019). Similar patterns emerged globally: for instance, teachers in China also reported low confidence in applying digital tools during the pandemic (Hong et al., 2021). Educators generally agree that formal training alone is insufficient, and many express a willingness to continue professional development to meet modern educational demands (Soleša and Soleša-Grižak, 2011).

Continued exposure to digital tools has been shown to support the development of ICT competences (Chen and Aklikokou, 2020; Cigdem and Ozturk, 2016; Marangunić and Granić, 2015; Rafique et al., 2018). When effectively implemented, ICT fosters child development, expands teaching possibilities, and enables integration across educational activities (Bolstad, 2004). Digital media also enhances communication between teachers and parents by improving the flexibility, access, and frequency of interactions (Scully et al., 2015; Gestwicki, 2015; Özdamlı and Yıldız, 2014; Olsen and Fuller, 2008). Many modern parents prefer ICT for staying informed about their child's learning (Katyal and Eversa, 2007).

Nonetheless, successful ICT integration depends on institutional support. Research shows that many kindergartens lack the infrastructure needed to support daily digital use. For example, in Russia, only 62% of early childhood teachers reported having internet access at work (Kosaretskii and Chernyshova, 2013). Improving ICT infrastructure is therefore essential for enabling digital communication and giving parents meaningful insight into their child's early learning experience.

Today's education systems require digitally skilled educators who can integrate emerging technologies into teaching and respond to the needs of children. Continuous professional development is essential to keep teachers aligned with evolving educational trends and ICT opportunities. Additionally, higher education should emphasize ICT training, particularly in digital content creation, to prepare future professionals for innovative practice (Garzón-Artacho et.al., 2021).

Conclusion

This study highlights that while early childhood teachers perceive themselves as moderately competent in using ICT, their actual use of digital tools and their perceptions of its benefits have evolved over time. Greater engagement was reported

during the COVID-19 pandemic, particularly in relation to communication with parents and support for the learning process. However, this use declined post-pandemic, reflecting both a return to traditional practices and lingering limitations in digital infrastructure and training. Notably, less experienced teachers reported higher levels of confidence and engagement, suggesting a generational trend in digital readiness.

The findings expose a persistent disconnect between the digital demands of modern early childhood education and the preparation offered by formal teacher training. This highlights the need to modernise pre-service education by embedding structured, practice-oriented modules in digital pedagogy, tailored specifically to the developmental needs of young children. To address varying competence levels among current educators, continuous professional development must be strengthened, offering hands-on experience with commonly used tools and fostering mentorship from digitally proficient peers.

At the policy level, the study underscores the importance of investing in equitable digital infrastructure, including hardware, internet access, and technical support, as well as establishing clear, developmentally appropriate guidelines for ICT use in early childhood settings. Furthermore, effective digital transformation requires collaboration with families; thus, efforts must also enhance parental digital literacy and promote transparent, accessible communication channels.

The novelty of this research lies in its longitudinal comparative design, offering insights into how a global crisis catalysed changes in digital practices and revealing both progress and regression over time. These findings provide a valuable foundation for shaping future digital strategies in early education and for guiding sustainable, inclusive transformation efforts.

References

- Bolstad, R. (2004). *The role and potential of ICT in early childhood education: A review of New Zealand and international literature*. Wellington, NZ: Ministry of Education.
- Celizić, M., and Zovko, A. (2021). Stavovi odgojitelja rane i predškolske dobi prema online stručnom usavršavanju. *Metodički obzori: časopis za odgojno-obrazovnu teoriju i praksu*, 16 (2(31)), 47-69.
- Chen, L., and Aklikokou, A. K. (2020). Determinants of E-government adoption: testing the mediating effects of perceived usefulness and perceived ease of use. *International Journal of Public Administration*, 43(10), 850-865. <https://doi.org/10.1080/01900692.2019.1660989>
- Cigdem, H., and Ozturk, M. (2016). Factors affecting students' behavioral intention to use LMS at a Turkish post-secondary vocational school. *International Review of Research in Open and Distributed Learning*, 17(3), 276-295. DOI:10.19173/irrodl.v17i3.2253
- Đuran, A., Koprivnjak, D., and Maček, N. (2019). Utjecaj medija i uloga odraslih na odgoj i obrazovanje djece predškolske i rane školske dobi. *Communication Management Review*, 4(1), 270-283.

- Garzón-Artacho, E., Sola-Martínez, T., Romero-Rodríguez, J. M., and Gómez-García, G. (2021). Teachers' perceptions of digital competence at the lifelong learning stage. *Heliyon*, 7(7). Article e08567. <https://doi.org/10.1016/j.heliyon.2021.e08567>
- Gestwicki, C. (2015). Home, school, and community relations. South-Western.
- Hong, X., Zhang, M., and Liu, Q. (2021). Preschool Teachers Technology Acceptance During the COVID-19: An Adapted Technology Acceptance Model. *Frontiers in Psychology*, 12, 691492. <https://doi.org/10.3389/fpsyg.2021.691492>
- Instefjord, E. J., and Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education*, 67, 37-45.
- Ismail, R. (2023). The Preschool Teachers' Perspective of Digital Technology Use in Classrooms: A Case Study of North Maluku Province, Indonesia. *Journal of Education and e-Learning Research*, 10(2), 223-232.
- Katyal, K. R., and Evers, C. W. (2007). Parents—partners or clients? A reconceptualization of home-school interactions. *Teaching Education*, 18(1), 61-76.
- Kisić, I. (2019). *Zajedništvo odgojitelja i kvaliteta ustanove ranog i predškolskog odgoja i obrazovanja* (Doctoral dissertation, University of Zagreb. Faculty of Teacher Education).
- Kosaretskii, S. G., and Chernyshova, D. V. (2013). Electronic communication between the school and the home. *Russian Education & Society*, 55(10), 81-89.
- Marangunic, N., and Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1), 81-95.
- Mikić, K. (2013). Medijska pismenost, mediji kao prijenosnici humanih poruka, ideja, vrijednosti. In D. Smajić, and V. Majdenić (Eds.), *Dijete i jezik danas-dijete i mediji [Children and Language Today – Children and Media]*, (pp. 13-49). Osijek, Croatia
- Miočić, M., and Tokić, B. (2021). Early Childhood Teacher Professional Development: The Need for Continuing Lifelong Education. *INTED2021 - 15th International Technology, Education and Development Conference, Proceedings* (pp. 810-818). IATED.
- Mlinarević, V. (2000). Kompetencija odgojitelja i autonomija djeteta. *Interakcija odrasli-dijete i autonomija djeteta: zbornik radova sa znanstvenog kolokvija s međunarodnim sudjelovanjem [Adults-Children Interaction and Child's Autonomy: Proceedings of the Scientific Colloquium with International Participation]*, (pp. 143-150). Osijek, Croatia
- OECD (2023). *Empowering Young Children in the Digital Age*, Starting Strong, OECD Publishing <https://doi.org/10.1787/50967622-en>.
- Olsen, G. W., and Fuller, M. L. (2008). *Home-school relations: Working successfully with parents and families*. Pearson Education.
- Özdamlı, F., and Yıldız, E. P. (2014). Parents' views towards improve parent-school collaboration with mobile technologies. *Procedia-Social and Behavioral Sciences*, 131, 361-366.
- Perifanou, M., Economides, A. A., and Tzafilkou, K. (2021). Teachers' digital skills readiness during COVID-19 pandemic. *International Journal of Emerging Technologies in Learning (IJET)*, 16(8), 238–251. <https://doi.org/10.3991/ijet.v16i08.21011>
- Rafique, H., Almagrabi, A. O., Shamim, A., Anwar, F., and Bashir, A. K. (2020). Investigating the acceptance of mobile library applications with an extended technology acceptance model (TAM). *Computers & Education*, 145, 103732.
- Renić, M. (2018). *Korištenje medija kod djece predškolske dobi i njihovih roditelja* (Doctoral dissertation, University of Zagreb. The Faculty of Political Science).
- Rogulj, E. (2011). ICT kompetencije odgajatelja. *5th International Conference on Advanced and Systematic Research, Proceedings* (pp. 321-329). Zagreb, Croatia.
- Rogulj, E. (2014). Novi mediji u dječjem okruženju. *14th Days of Mate Demarin: Contemporary Challenges to educational theory and practice, Proceedings* (pp. 243-252). Topusko, Croatia.
- Rogulj, E. (2019). *Digitalne tehnologije u komunikaciji odgojitelja i roditelja* (Doctoral dissertation). Faculty of Humanities and Social Sciences. University of Zagreb.

- Šagud, M., and Jurčević-Lozančić, A. (2012). Autonomy of preschool teachers and strengthening their competencies. In I. Pehlić, E., Vejo, and A. Hasanagić (Eds.), *Suvremeni tokovi u ranom odgoju [Contemporary Trends in Early Education]*, 464-475. Zenica
- Scully, P. A., Barbour, C., and Roberts-King, H. (2014). *Families, schools, and communities: Building partnerships for educating children*. Pearson.
- Šimala, T. (2017). *Utjecaj medija na djecu predškolske dobi* (Doctoral dissertation, University of Zagreb. Faculty of Teacher Education.
- Sindik, J., and Veselinović, Z. (2010). Kako odgojiteljice percipiraju utjecaj medija na predškolsku djecu? *Medijska istraživanja: znanstveno-stručni časopis za novinarstvo i medije*, 16(2), 107-133.
- Soleša, D., and Soleša-Grijak, Đ. (2011). ICT kompetencije učitelja i odgojitelja. *Croatian Journal of Education*, 13(2), 8-37.
- Velki, T., and Miočić, M. (2025). Adaptation and Validation of a Questionnaire on Perceived Benefits and Risks of Children's Internet Use. *48th MIPRO ICT and Electronics Convention (MIPRO), Proceedings*, (pp. 651-656). Opatija, Croatia.
- Velki, T., and Miočić, M. (2023). Applying TAM (Technology Acceptance Model) to Predict Effective ICT Use of Preschool Teachers during the COVID-19 Pandemic. *46th MIPRO ICT and Electronics Convention (MIPRO), Proceedings*, (pp. 527-532). Opatija, Croatia.
- Višnjić Jevtić, A. (2018). *Odgojiteljska samoprocjena kompetencije za suradnju s roditeljima* (Doctoral dissertation). Faculty of Humanities and Social Sciences. University of Zagreb.
- Visnjic-Jevtic, A., Paz-Albo, J., Sahin-Sak, I. T., Varga Nagy, A., Sánchez-Pérez, N., Ozturk, G., and Toran, M. (2021). Policies and practices of early childhood education and care during the COVID-19 pandemic: Perspectives from five countries. *Journal of Childhood Education and Society*, 2(2), 200-216.
- Vrkić Dimić, J. (2013). Kompetencije učenika i nastavnika za 21. stoljeće. *Acta Iadertina*, 10(1), 49-60.

Authors:

Marijana Miočić, PhD

Assistant professor, Department of Teachers and Preschool Teachers Education, University of Zadar, Ulica dr. Franje Tuđmana 24 i, 23000 Zadar Croatia, e-mail: marijanamiočić@yahoo.com
Docentka, Oddelek za izobražavanje učiteljev in vzgojiteljev, Univerza v Zadru, Ulica dr. Franje Tuđmana 24 i, 23000 Zadar, Hrvatska, e-pošta: marijanamiočić@yahoo.com

Matilda Karamatić Brčić, PhD

Associate professor, Department of Pedagogy, University of Zadar, Obala kralja Petra Krešimira IV./2, 23000 Zadar, Croatia, e-mail: mkarama@unizd.hr
Izredna profesorica, Oddelek za pedagogiko, Univerza v Zadru, Obala kralja Petra Krešimira IV./2, 23000 Zadar, Hrvatska, e-pošta: mkarama@unizd.hr

Bernarda Tokić, PhD Student,

Department of Pedagogy, University of Zadar, Obala kralja Petra Krešimira IV./2, 23000 Zadar, Croatia, e-mail: bptokic@gmail.com
Oddelek za pedagogiko, Univerza v Zadru, Obala kralja Petra Krešimira IV./2, 23000 Zadar, e-pošta: bptokic@gmail.com