



## ICT Use in Early Childhood Education from Parents' and Educators' Perspectives

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The study aimed to investigate the use of information and communication technology (ICT) by pre-school children as perceived by parents and educators. By analyzing the perceptions of both groups, we wanted to understand how frequently and in what context ICT is used in children's daily lives and in the educational process. The results showed that educators use ICT only occasionally, typically a few times a year, while parents reported a much higher average weekly use of ICT by children. Statistical analyses revealed significant differences in how parents and educators perceive the impact of ICT on children's development, particularly in the areas of knowledge, creativity, and originality, with educators rating the developmental potential of ICT higher. The most commonly used technology among preschool children was television, followed by smartphones, tablets and computers. The discussion also highlighted differences in the use of applications and emphasized the need for greater professional support in the selection and use of ICT for children's development.

**Keywords:** information and communication technology, preschool children, educators, parents, development, creativity, educational technology

### INTRODUCTION

International guidelines on recommended screen time for pre-school children (aged 2 to 5 years) are broadly comparable and consistently emphasise limiting use to no more than one hour per day. The recommendations of various organisations (e.g. the Council on Communications and Media, 2016; the World Health Organization, 2019) are aligned in stressing that reduced exposure yields additional benefits and that screen use should focus on high-quality, developmentally appropriate content. Particular emphasis is placed on co-use and active engagement with parents, as well as on balancing digital activities with other fundamental aspects of development, such as physical activity, outdoor play, face-to-face social interaction, and adequate sleep.

Despite these recommendations, research based on reports from parents of pre-school children indicates that screen time limits are frequently exceeded. Similar patterns have

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been observed across different countries: television and smartphones remain the most commonly used ICT devices, followed by tablets, while computers are used the least. In the European context, most children watch television on a daily basis, often for more than two hours per day, with even longer exposure periods at weekends (Monteiro et al., 2022). Based on parent reports, 74.4% of children in the Kosovo sample had access to a television, 50.5% to a smartphone, and 30% to a tablet. Parents most frequently reported that their children used digital devices for 30 minutes to two hours per day, while a smaller proportion used them for more than four hours daily (Gjelaj et al., 2020). In Turkey, parent reports likewise indicated high levels of access to technology, with 92% of households having a television and 100% having a computer. Most children watched television for about two hours on weekdays and three to four hours on weekends, while smartphones were typically used for up to half an hour per day (Genc, 2014).

Findings outside Europe reveal similar patterns. In Sri Lanka, almost all children use electronic devices, with more than 60% exceeding the recommended one hour per day (Rathnasiri et al., 2022). In China, a substantial proportion of children aged three to five also exceed the recommended screen time (Hua et al., 2022; Wang et al., 2022).

In the North American context, this trend is even more pronounced: In Canada, 63.8% of children exceeded two hours of screen time per day (Fitzpatrick et al., 2022), while in the United States, the average daily screen time among the youngest children (under two years old) is 49 minutes, increasing to 2 hours and 30 minutes for children aged two to four, and 3 hours per day for those aged five to eight (Rideout & Robb, 2020).

In addition to the duration of use, studies have also examined the types of content and applications children engage with. Monteiro et al. (2022) found that children primarily watch cartoons on television. In a Turkish study, parents reported that children primarily used smartphones for playing games—most commonly Talking Tom, Subway Surfers, Fruit Ninja, and Minecraft—as well as for educational programmes related to language learning and mathematics (Genc, 2014).

Canadian and Chinese studies further indicate that children often engage with digital content alongside their parents, which encourages shared family time and influences the selection of higher-quality materials (Fitzpatrick et al., 2022; Wang et al., 2022). Such co-use suggests that adults act as mediators between the child and the digital environment, which aligns with international recommendations emphasising the active involvement of adults in children's early use of technology (Council on Communications and Media, 2016; World Health Organization, 2019).

Digital tools are increasingly being integrated into pedagogical practices in early childhood settings, although the extent and purpose of their use vary considerably. Empirical studies describe the use of ICT in kindergartens as pedagogically oriented and professionally supported. In classrooms, computers and tablets are most commonly used, while smartphones and televisions are included less frequently; activities typically take place in teacher-structured contexts such as presentations and the reinforcement of learning content (Dore & Dynia, 2020).

In environments with limited equipment and clearly defined organisational rules, ICT use tends to be more restricted. For example, in public kindergartens in Kosovo, teachers reported that typically only a shared television or projector was available, computers were absent from classrooms, children did not bring personal devices, and television was primarily used to calm the group (Gjelaj et al., 2020).

Such patterns are consistent with national frameworks that regulate ICT qualitatively—without specifying time quotas—and emphasise developmental appropriateness, purposeful use, and the non-dominant role of technology (Department for Education, 2025; Norwegian Directorate for Education and Training, 2017)

In international analyses, digital technologies are increasingly being examined from the perspective of their developmental potential. According to Kalaš (2010) and the OECD (2023), well-designed and adult-guided use of ICT can foster children's curiosity, creativity, and collaboration with others. In this context, digital tools serve as a means of exploration, expression, and problem-solving when integrated into play and authentic learning situations that stem from children's own interests.

Empirical findings from educators' perspectives indicate that structured and developmentally appropriate use of technology in early childhood settings can support children's linguistic, social, and cognitive development when aligned with learning objectives and accompanied by active adult participation (Dore & Dynia, 2020). From the parents' perspective, digital content is most commonly associated with positive effects on children's cognitive development and creativity, and to some extent on their social-emotional development, while approximately 43% of parents express concern about reduced levels of physical activity among children (Rideout & Robb, 2020).

Existing research points to a notable discrepancy between children's relatively frequent and largely home-based ICT use and the more limited, structured, and professionally mediated use of ICT in early childhood education settings. At the same time, studies rarely examine parents' and educators' perspectives simultaneously, particularly in smaller national contexts such as Slovenia. This gap limits a comprehensive understanding of how ICT is perceived, used, and evaluated across children's primary developmental environments.

Against this background, the research problem addressed in this study concerns the need to systematically compare parents' and educators' perceptions of ICT use in early childhood and to explore how these perceptions relate to the frequency, context, and perceived developmental impact of ICT use among pre-school children.

This study aims to analyse the use of information and communication technology (ICT) among pre-school children from the perspectives of parents and educators. By examining the perceptions of both groups, the study seeks to understand how frequently and in what contexts ICT is used in children's everyday lives and within the educational process. Based on this, the following research objectives were set:

- i. To investigate and compare the use of information and communication technology (ICT) among pre-school children as perceived by parents and educators.

- ii. To analyse the parents' and educators' perceptions regarding the impact of ICT on the development of different skills (cognitive, creative, social, and physical).
- iii. To examine the frequency of ICT use in the home and in educational settings and to identify which technologies and applications are most commonly used to support children's development.

## **METHOD**

This study employs a causal, non-experimental method of pedagogical research.

### **Participants**

A total of 233 respondents participated in the study, comprising 149 parents (63.9%) and 84 early childhood educators (36.1%). The sample was predominantly female, with 218 women (93.6%) and only 15 men (6.4%), all of whom were parents. No male educators took part in the study. Parents provided data regarding their youngest child aged between one and seven years.

The pronounced gender imbalance among early childhood educators reflects the gender structure of the profession, which is traditionally and structurally female-dominated in Slovenia, as in many other countries. This is consistent with the gender distribution of employees in Slovenian preschools, where men represent 2.6% of staff (Statistical Office of the Republic of Slovenia, 2025). With regard to parents, no deliberate sampling strategies were employed to increase male participation, as this would have implied controlling which family member completed the questionnaire.

An analysis of parents' educational backgrounds showed that the largest group (29.3%) had completed the first Bologna cycle (higher vocational or undergraduate education). A further 24.5% held a Master's degree (second Bologna cycle), 19.7% had completed primary or secondary education, and 4.1% held a doctorate (third Bologna cycle).

The educational structure among educators differed slightly. Nearly half (48.8%) had completed primary, vocational, or general secondary education, while 32.1% held a first-cycle degree and 8.3% a Master's degree. None of the educators had completed a doctorate. Overall, parents had, on average, a higher level of education than educators. This difference may influence their attitudes and practices regarding children's use of ICT.

The mean age of all participants was 36.19 years ( $SD = 7.441$ ), ranging from 20 to 60 years. Parents had an average age of 36.97 years ( $SD = 5.409$ ), compared with educators, who were slightly younger, averaging 34.81 years ( $SD = 9.947$ ) with an age range of 20 to 56 years.

### **Instruments**

Two measurement instruments were developed for this research: one questionnaire for parents of pre-school children and another for pre-school educators employed in kindergartens.

Before conducting the factor analysis, the adequacy of the data were verified using the Kaiser–Meyer–Olkin (KMO) index and Bartlett’s test of sphericity. The KMO coefficient of 0.664 indicated acceptable sample adequacy (Kaiser, 1974), while the Bartlett’s test was statistically significant ( $\chi^2(45) = 185.017$ ,  $p < 0.001$ ), confirming sufficient correlations among variables and the suitability of the data for factor analysis.

A Principal Component Analysis (PCA) was conducted to assess construct validity. Three factors with eigenvalues greater than 1.0 (Kaiser–Guttman rule) were extracted, explaining 61.1% of the total variance. After Varimax rotation, the cumulative variance remained the same, confirming factor stability. The total variance explained (61.1%) and the repeatability and reproducibility coefficient ( $rtt = 0.782$ ) (Ferligoj et al., 1995) indicate that the instrument is reliable.

The first factor explained 33.7% of the variance, exceeding the lower validity threshold of 20% (Čagran, 2004). Cronbach’s alpha coefficient ( $\alpha = 0.630$ ) further suggests moderate internal consistency.

In summary, the extracted three-factor structure, total explained variance above 60%, and acceptable reliability confirm that the instrument demonstrates satisfactory construct validity and internal consistency.

### **Procedure**

The data were collected by contacting selected kindergartens in Slovenia, which were asked to distribute the links to both questionnaires—one for teachers and one for parents of children enrolled in their institutions. The sample was non-random, as the participating kindergartens were selected based on their availability and willingness to take part in the study.

### **Data Analysis**

The data were processed using the SPSS statistical software package. Descriptive statistics were applied to examine the basic trends and frequencies of ICT use. To analyse the perceptions of the impact of ICT on children’s development, the non-parametric Mann–Whitney U test was employed, as the data did not follow a normal distribution. For each developmental domain (cognitive, creative, social, and physical skills), mean scores were calculated and compared between parents and educators. For ease of interpretation, arithmetic means were also reported to illustrate overall trends in the ratings.

## **FINDINGS**

### **Overview and analysis of the frequency of ICT use among pre-school children**

The following section presents a descriptive overview of the data regarding the use of information and communication technology (ICT) among pre-school children, as perceived by both parents and educators. The purpose of this overview is to outline general trends, characteristics, and differences in the perceived importance of ICT in early childhood before proceeding to the statistical comparison between the two groups.

Table 1

### Educators' Opinions on the Frequency of ICT Use in the Educational Process in Kindergartens

| Frequency of ICT Use in the Educational Process in Preschool | f  | f (%) |
|--|----|-------|
| never  | 11 | 13,3  |
| a few times per year   | 42 | 50,6  |
| a few times per month  | 17 | 20,5  |
| a few times per week   | 7  | 8,4   |
| daily  | 6  | 7,2   |
| total  | 83 | 100,0 |

The largest proportion of educators reported using ICT in the educational process only a few times per year (50.6%). A smaller proportion indicated frequent use – several times a week (8.4%) or daily (7.2%) – suggesting a relatively low level of digital technology integration in everyday pedagogical practice.

In contrast, parents were asked to estimate their child's average weekly use of ICT at home, where the reported values were considerably higher.

Table 2

### Statistical Presentation of the Average Weekly Use of ICT by Children in the Home Environment (in hours)

| Statistic | Value        |
|-----------|--------------|
| n         | 229          |
| Mean      | 4,07 hour(s) |
| Median    | 3,00 hour(s) |
| Minimum   | 0 hour       |
| Maximum   | 30 hour(s)   |

Based on the table, children spend an average of 4.07 hours per week using ICT. The median value of 3 hours indicates that half of the children use ICT for less than 3 hours per week, while the other half use it more. This difference also suggests that the mean is slightly higher, which may indicate the presence of a few individuals with exceptionally high usage levels (up to 30 hours per week).

The lowest recorded value is 0 hours, indicating that some children do not use ICT at all, while the upper limit of 30 hours may point to substantial or regular daily use. These data provide a basic overview of the range and intensity of ICT use during the preschool period, which can be further examined in relation to other factors or the types of technology children use most frequently. For this reason, we were particularly interested in identifying which types of ICT are most frequently used in the home environment.

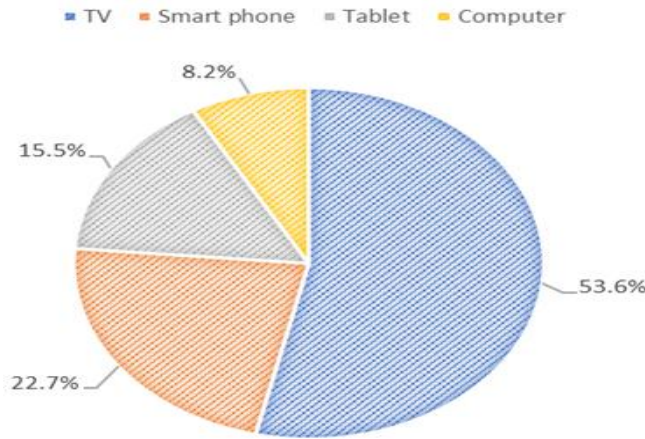


Figure 1  
Use of technology by preschool children at home

The most frequently used technology among preschool children in the home environment is television, used by 53.6% (118) of children. This is followed by smartphones, used by 22.7% (50), tablets by 15.5% (34), and computers—the least used device—with only 8.2% (18) of children using them.

Findings from other empirical studies similarly indicate that preschool children most often use television and smartphones at home, followed by tablets (Rideout & Robb, 2020; Genc, 2014; Gjelaj et al., 2020). Furthermore, the literature emphasises that computer use is less common and not typically part of children’s daily engagement with digital devices in the home environment (Gjelaj et al., 2020; Rideout & Robb, 2020).

**Differences between Parents' and Educators' Views on the Use of ICT for Developing Children's Skills**

Within the framework of this study, particular attention was given to the differences in opinions between kindergarten professionals and parents of preschool children regarding the use and usefulness of ICT among preschoolers. Parents and kindergarten professionals were asked to indicate the extent to which, in their opinion, children acquire the following skills through the use of ICT: knowledge, creativity, social skills, and physical skills.

Table 3  
Descriptive statistics

| Skill           | n   | $\bar{X}$ | SD   | SE   | Skewness | Kurtosis |
|-----------------|-----|-----------|------|------|----------|----------|
| Knowledge       | 197 | 2.97      | 1.11 | 0.08 | -0.40    | -1.24    |
| Creativity      | 197 | 2.29      | 1.10 | 0.08 | 0.36     | -1.08    |
| Social skills   | 194 | 1.91      | 1.06 | 0.08 | 0.94     | -0.19    |
| Physical skills | 197 | 1.54      | 0.84 | 0.06 | 1.56     | 1.70     |

Notes: n – numerus,  $\bar{X}$  – arithmetic mean, SD – standard deviation, SE – standard error

Descriptive statistics indicate that participants assigned the highest mean ratings to the impact of ICT on knowledge development ( $\bar{X} = 2.97$ ), followed by creativity ( $\bar{X} = 2.29$ ), social skills ( $\bar{X} = 1.91$ ), and physical activity ( $\bar{X} = 1.54$ ). Standard deviations indicate moderate variability across all variables, suggesting a diversity of participants' perspectives.

Values of skewness and kurtosis indicate deviations from a normal distribution, which are most pronounced for the physical activity variable, where a marked positive skew is observed. These distributional characteristics justify the use of non-parametric statistical tests.

Since the data in all four subsequent cases did not show a normal distribution (Shapiro–Wilk and Kolmogorov–Smirnov tests:  $p < 0.001$ ), a non-parametric Mann–Whitney U test was used for comparison. To facilitate the interpretation of the ratings for individual skills by both groups, arithmetic means were also included alongside the non-parametric analysis. These indicate the general trend of assessments and support a clearer interpretation of the results.

Table 4  
Mann-Whitney U test

| Skill           | Group                      | n   | $\bar{R}$ | $\bar{X}$ | Overall $\bar{X}$ | Z      | U      | p (2-tailed) |
|-----------------|----------------------------|-----|-----------|-----------|-------------------|--------|--------|--------------|
| Knowledge       | Parents                    | 113 | 82,40     | 2,64      | 2,97              | -5.048 | 2870,5 | < 0.001      |
|                 | Kindergarten professionals | 84  | 121,33    | 3,42      |                   |        |        |              |
| Creativity      | Parents                    | 113 | 90,84     | 2,13      | 2,29              | -2.419 | 3824,0 | 0.016        |
|                 | Kindergarten professionals | 84  | 109,98    | 2,51      |                   |        |        |              |
| Social skills   | Parents                    | 111 | 94,42     | 1,86      | 1,91              | -0.947 | 4265,0 | 0.344        |
|                 | Kindergarten professionals | 83  | 101,61    | 1,98      |                   |        |        |              |
| Physical skills | Parents                    | 113 | 95,01     | 1,48      | 1,54              | -1.328 | 4295,5 | 0.184        |
|                 | Kindergarten professionals | 84  | 104,36    | 1,63      |                   |        |        |              |

Notes: n – numerus,  $\bar{R}$  – average rank,  $\bar{X}$  – arithmetic mean, Overall  $\bar{X}$  – Overall mean, Z – standardized test statistic of the Mann–Whitney U test, U – Mann-Whitney U test value, p – statistical significance

The results indicate a statistically significant difference in the perception of the contribution of ICT to knowledge development between parents ( $\bar{X} = 2.64$ ;  $\bar{R} = 82.40$ ) and kindergarten professionals ( $\bar{X} = 3.42$ ;  $\bar{R} = 121.33$ ),  $U = 2870.50$ ,  $Z = -5.05$ ,  $p < 0.001$ , with a medium effect size ( $r = 0.36$ ). Kindergarten professionals more frequently perceive ICT as a tool that contributes to the development of children's knowledge, which is consistent with the findings of Monteiro et al. (2022), who found that educators were more likely than parents to emphasise the educational potential of digital media.

A statistically significant difference was also observed for creativity,  $U = 3824.00$ ,  $Z = -2.42$ ,  $p = 0.016$ , with a small to medium effect size ( $r = 0.17$ ). Kindergarten professionals ( $\bar{X} = 2.51$ ;  $\bar{R} = 109.98$ ) rated the impact of ICT higher than parents ( $\bar{X} = 2.13$ ;  $\bar{R} = 90.84$ ). These findings align with the Framework Plan for Kindergartens, which stipulates that digital tools should be integrated into pedagogical practice as a means of play, creativity, and learning (Norwegian Directorate for Education and Training, 2017).

No statistically significant differences were found in the assessment of the impact of ICT on the development of social skills ( $p = 0.344$ ) and physical skills ( $p = 0.184$ ). This indicates that both groups hold similar views regarding the influence of ICT on these two aspects of children's development.

In addition, we examined whether perceptions of ICT's contribution to children's development differed according to educational attainment within the parent group and within the early childhood educator group. Due to the non-normal distribution of the variables, subgroup analyses were conducted using the non-parametric Kruskal–Wallis test.

Among parents, no statistically significant differences were found across educational levels in perceptions of ICT's contribution to children's knowledge, creativity, social skills, or physical activity (all  $p > .05$ ). Mean rank values across educational groups were relatively similar within each developmental domain, indicating comparable evaluations regardless of educational background. For example, in the domain of knowledge, mean ranks ranged approximately from 49 to 71 across educational levels. The lowest p-value among parents was observed for creativity ( $p = .200$ ), however, this result did not reach statistical significance.

A similar pattern was observed among early childhood educators. Subgroup analyses revealed no statistically significant differences between educators with different levels of education in their assessments of ICT's contribution to children's knowledge, creativity, social skills, or physical activity (all  $p > .05$ ). Mean rank values within the educator group were likewise relatively homogeneous across educational categories. The smallest p-value among educators was observed for creativity ( $p = .139$ ), again indicating no statistically significant effect of educational attainment.

Overall, the results show that kindergarten professionals hold a more optimistic view of the contribution of ICT, particularly in areas related to knowledge and creative development, while both groups provided lower and more reserved evaluations regarding the influence of ICT on children's physical and social development.

The variation in these values is clearly illustrated in the graph below.

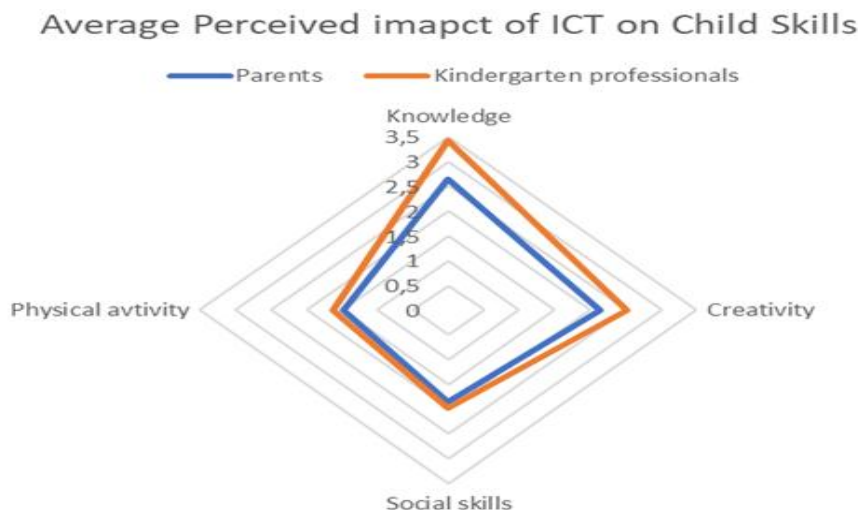


Figure 2

Perceptions of the Contribution of ICT to Children's Development among Parents and Kindergarten Professionals

The radar chart illustrates the average ratings of the perceived impact of information and communication technology (ICT) on the development of various children's skills as assessed by parents and kindergarten professionals. The results show that, compared to parents, kindergarten professionals consistently rate the contribution of ICT higher across all analysed domains – knowledge, creativity, social skills, and physical skills. The most notable difference appears in the knowledge domain, where kindergarten professionals attribute the highest average value to ICT's impact, while parents tend to rate it more conservatively. A similar pattern is observed for creativity, where kindergarten professionals recognise more development opportunities supported by technology.

In contrast, both social and physical skills received the lowest ratings from both groups, indicating that parents and kindergarten professionals alike recognise the limited impact of ICT in these areas. The observed differences suggest that kindergarten professionals have greater confidence in the potential of ICT, which may be linked to their professional experience, hands on work with children, and possibly greater exposure to educational digital content.

Both kindergarten professionals and parents were subsequently given the opportunity to provide open-ended responses by listing applications that, in their opinion, contribute to the development of children's potential. Based on their open-ended responses, the entries were thematically organised, conceptually unified, and categorised.

Participants identified a total of 19 different applications that contribute to children's knowledge development. The most frequently mentioned platform was YouTube ( $n = 12$ ), described as the main source of educational and instructional video content. Parents

most often mentioned media and language applications (e.g., Helen Doron, Number and Math, Anton, Da Vinci), whereas kindergarten professionals more frequently highlighted tools for structured and goal-oriented learning (e.g., Duolingo, Kahoot, Quizzes, BeeBot, učim.se, Abc Igralnica). Some kindergarten professionals also referred to applications that combine learning with exploration and creative expression (e.g., MachineLearningForKids, H5P, Activ Floor, Dandelin).

Monteiro et al. (2022) similarly found that kindergarten professionals are more likely than parents to recognise the educational potential of digital media, while the OECD (2023) emphasises the importance of intentional and structured use of digital applications that encourage curiosity, problem-solving, and early learning. In relation to creativity, participants mentioned 62 different applications or types of content, with parents providing slightly more responses ( $n = 33$ ) than kindergarten professionals ( $n = 29$ ). The most frequently mentioned platform was YouTube ( $n = 10$ ), which respondents identified as a source of ideas and visual stimuli for creative expression. Drawing applications (e.g., Slikar, Canva, Stop Motion Studio) and thematic tools (e.g., Experiments with Google) were also mentioned more often. Parents more frequently listed content that indirectly inspires children's creativity (e.g., cartoons, series, instructional videos), while kindergarten professionals highlighted specific tools for creative production.

The analysis of responses regarding applications aimed at social skills indicates a low frequency of mentions and a high degree of diversity. Most applications were mentioned only once, suggesting that parents and kindergarten professionals lack a well-defined understanding of digital tools that could systematically promote social competences. The most frequently mentioned platform was again YouTube ( $n = 4$ ), which respondents recognised primarily as a source of social content rather than as a purposeful tool for developing social skills.

Other responses included communication applications such as WhatsApp, Messenger, and Snapchat, which enable interaction but are not intended for preschool children. Both groups expressed reservations about the idea that social skills could be developed through digital content, which is consistent with existing literature linking social learning in early childhood primarily to direct contact, cooperative play, and emotional exchange (Monteiro et al., 2022; OECD, 2023).

In the area of physical activity, participants mentioned relatively few applications, with most responses referring to widely accessible and visually appealing content. The most frequently mentioned platform was YouTube ( $n = 14$ ), where children watch dance or exercise videos. Applications designed with a specific physical activity focus (e.g., Just Dance, Activ Floor, Yoga applications, Home Court) were less frequently mentioned. Parents more often referred to home use and video content, while kindergarten professionals tended to mention more structured forms of physical activity support.

Despite the differences between the two groups, it is important to emphasise that both parents and kindergarten professionals share a common belief that children in the preschool period develop their skills – such as knowledge, creativity, social, and physical abilities – primarily through direct experiences, play, and exploration of their

environment. Both groups highlight the importance of genuine contact with others, play in nature, listening to stories, reading books, and other activities based on personal interaction and physical engagement with the world.

## **DISCUSSION**

The present study provides a comprehensive interpretation of how information and communication technologies (ICT) are perceived and used in early childhood, highlighting both the scope and the limitations of their integration into learning environments. By contrasting the perspectives of parents and educators, the findings point out the varying exposure of children to digital experiences and the pedagogical implications that emerge from this dual context.

Children were found to be considerably more exposed to ICT at home than in educational institutions. This aligns with Rideout and Robb (2020), which reported that screen-based activities dominate young children's daily routines, with television and videos accounting for nearly three-quarters of total screen time, followed by mobile device use. In contrast, more than half of the educators in this study reported using ICT only a few times per year, suggesting that institutional implementation remains occasional and lacks systemic integration. This discrepancy illustrates the coexistence of two environments – a domestic and an educational digital culture—which may shape children's emerging digital literacy and equitable access to learning opportunities (Monteiro et al., 2022).

Perceptions of developmental impact revealed significant divergence between groups. Educators consistently evaluated ICT as more beneficial for learning and creativity than parents did, indicating a stronger pedagogical orientation towards structured digital engagement. These findings corroborate OECD (2023), which emphasizes that the educational potential of digital media depends on intentional and developmentally appropriate use under adult guidance. Previous studies indicate that digital tools are most effective when applied to support early literacy or problem-solving in guided, purposeful contexts rather than in unstructured use (Dore & Dynia, 2020). Parents frequently use digital tools at home, and their effectiveness increases when parents are actively involved in the learning process (Kurnia, Ramdha & Putra, 2022). Rideout and Robb (2020) report that 72% of parents believe digital media contribute to children's learning, with YouTube content and language- and numeracy-learning applications being the most commonly used. At the institutional level, teachers' intention to use e-books for promoting reading skills is influenced by perceived usefulness, perceived ease of use, social influence, and facilitating conditions (Barakat & Elmaghraby, 2025), highlighting the key factors that shape the adoption of digital learning tools in preschool settings.

Digital tools also play a role in fostering creativity. The OECD (2023) and Dore and Dynia (2020) emphasise that digital tools can foster children's creativity and curiosity when integrated into pedagogically planned activities. Rideout and Robb (2020) report that 60% of parents believe that media support children's creativity, however, Booton et al. (2023) note that commercial applications often provide limited opportunities for creative thinking. In contrast, Xiong, Liu, and Huang (2022) found that specially

designed digital games, such as *Thinking Paradise*, significantly enhance indicators of creative thinking among preschool children.

Both parents and educators express reservations regarding the role of ICT in social development, reflecting the view that digital technologies cannot substitute for interpersonal interaction in early childhood. Monteiro et al. (2022) and OECD (2023) note that social competence during the preschool years develops primarily through direct play, cooperation, and emotional reciprocity rather than through mediated communication. Rideout and Robb (2020) report that 45% of parents believe that digital media help children maintain contact with family and friends, indicating a perceived but limited social dimension of digital use. At the same time, Monteiro et al. (2022) found that both parents and educators agree that excessive screen use may restrict children's social contact and opportunities for social development, as children tend to choose screens over social play.

Regarding physical development, digital tools are most often used for imitative physical activities or dance through online videos rather than for structured motor learning. This pattern aligns with the recommendations of the World Health Organization (2019) and Tremblay et al. (2017), which emphasise that physical play and movement should primarily take place in real environments. Rideout and Robb (2020) report that only 14% of parents believe that digital media contribute to children's physical activity, indicating a low perceived impact of ICT on physical development. Similarly, the World Health Organization (2019) and Tremblay et al. (2017) stress the importance of reducing screen time and promoting physical activity during early childhood. At the same time, recent empirical evidence suggests that well-designed, movement-based digital applications can support physical activity. Zeng et al. (2025) demonstrate that interactive applications incorporating physical movement tasks can achieve physical activity outcomes comparable to those of traditional physical education activities. OECD (2023) likewise highlights the importance of a balanced integration of digital and analogue experiences in early learning contexts.

Overall, the findings reinforce that digital technologies, when appropriately guided, can complement but not substitute experiential, social, and physical learning in early childhood. Both parents and educators acknowledge the developmental relevance of ICT while maintaining a cautious stance toward its excessive or unstructured use. This perspective supports a balanced pedagogical model in which technology functions as an enabling tool embedded within play, discovery, and authentic interaction.

In Slovenia, professional guidelines emphasise a thoughtful, developmentally appropriate, and pedagogically justified use of ICT in preschools (Usar & Jerše, 2021), and scholarly literature provides a theoretical framework for digital technologies in the education of preschool children (Lepičnik Vodopivec & Hmelak, 2022). Despite this, empirical research on ICT use in the preschool period remains limited, particularly regarding the simultaneous involvement of parents and early childhood educators. By employing two measurement instruments specifically designed for parents and educators, this study provides a uniquely comprehensive and directly comparable

insight into ICT use in the Slovenian preschool context, making a substantive contribution to addressing an existing research gap.

The study is not without limitations. The use of a convenience, non-randomly selected and predominantly female sample limits the representativeness and generalisability of the findings and calls for cautious interpretation of the results. The pronounced gender imbalance reflects the gender structure of early childhood education as well as the tendency for women to respond to survey-based research more frequently than men, particularly on topics related to parenting; nevertheless, this imbalance constitutes a limitation of the study. In addition, the exclusive reliance on self-report data may introduce response bias.

Future research should therefore include larger, randomly selected samples and employ a combination of quantitative and qualitative methods, as well as longitudinal research designs that integrate self-report data with observational or other qualitative techniques. Such approaches would enhance methodological rigour and enable a more comprehensive understanding of children's use of information and communication technologies (ICT) and its developmental implications.

## **CONCLUSION**

This study examined ICT use in early childhood from the perspectives of parents and kindergarten professionals. The findings indicate that children are more frequently exposed to ICT in the home environment, while kindergarten professionals attribute greater developmental value to ICT, particularly in the areas of knowledge and creativity. In contrast, both groups expressed more reserved views regarding ICT's contribution to children's social and physical development.

Based on these findings, several practical suggestions can be outlined. First, targeted professional development for early childhood educators should focus on the meaningful integration of ICT into play-based and experiential learning, rather than on increasing the frequency of technology use. Second, parents would benefit from accessible and practical guidance on the selection and joint use of high-quality, developmentally appropriate digital content. Such guidance should emphasise the importance of balancing ICT use with physical activity, social interaction, and creative play.

Overall, the study highlights the importance of intentional, balanced, and developmentally appropriate use of ICT in early childhood, supported by adult mediation in both family and educational contexts. The findings should be interpreted with caution in light of the study's methodological limitations.

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## **DECLARATION OF INTEREST STATEMENT**

No potential conflict of interest was reported by the author(s).

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