



What Happens beyond the Screen? Uncovering Digital Technology Perception, Usage, and Parental Mediation among 3–6-year-old Turkish Children

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Abstract

This study aims to investigate digital technology (DT) perceptions and usage among 3–6-year-old Turkish children. Children ($N = 293$) were asked to imagine themselves using DT, draw pictures of what they imagine, and narrate their drawings. They then were interviewed about their DT use. Parents ($N = 293$) also participated via a questionnaire addressing the digital environment, screen time (ST), and parental mediation (PM) of children's technology use. Using a mixed-method approach, qualitative data were subjected to content analysis and converted to quantitative data. The quantitative analysis involved Kruskal–Wallis H , Mann–Whitney U , Spearman's ρ , and Chi-square tests. Findings indicated children may have limited perception regarding the usage alternatives of DTs, no significant difference between the purpose of DT use in drawings in terms of gender, an average ST of three hours among children, a moderate positive correlation between children's and parents' ST, and children primarily engaging in watching and playing activities. While children's ST did not differ according to age, it varied significantly according to the parents' educational levels. According to the rating systems, children are exposed to games and content that are not age-appropriate. Parents mainly mediate their children's DT usage by limiting ST and accompanying children's screen use. The study includes implications and suggestions for parents, educators and schools, community, content developers, digital platforms, and researchers working on this subject to work collaboratively to ensure that young children use digital technologies interactively, supporting development and education, and in age-appropriate, creative usage alternatives.

Keywords Digital technology · Draw-and-tell · Early childhood education · Parental mediation · Screen time

Digital technologies (DTs) transform how people live, work, think, learn, and communicate (Arnott, 2016; Robinson & Aronica, 2016). From virtual classrooms and remote work to on-demand entertainment and e-commerce, DTs are redefining the boundaries of time, space, and social interactions in people's personal and professional lives.

Indeed, people can access almost unlimited amounts of information at any time, produce, process, and store colossal amounts of data, and constantly interact and connect through digital devices and social media (Hoehe & Thibaut, 2020).

With the proliferation of DTs, young children have started interacting with these technologies early (Ihmeideh & Alkhawaldeh, 2017; Oliemat et al., 2018). DTs have often begun to replace traditional activities of young children, such as playing with toys and outdoor play (Slutsky et al., 2021). Studies have revealed that DTs could provide children with new and engaging ways to learn, play, interact with others, and address children with different learning needs (e.g., children with disabilities and bilingual children) (Al-Attiyah et al., 2022; Isikoglu-Erdogan et al., 2021; Kewalramani et al., 2020; Lee & Tu, 2016). However, the increasing presence of DTs in children's daily lives, plays, and learning processes raises concerns that they may cause

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negative reflections on children's development and education (Goodwin, 2016; Tay et al., 2021). Due to their propensity to be drawn quickly into the world of imagination and fiction and their ease of convincing of the accuracy of the content presented by the media, children under the age of six are particularly susceptible to the potential effects of media messages (Lieberman et al., 2009; Šramová & Pavelka, 2017). Besides, once young children learn to use DTs, they often become more independent about screen use and seek less adult guidance (Couse & Chen, 2010). This situation begs the inquiry of how young children's digital experiences appear through their eyes and how they engage with DTs from a broad perspective. The current study explored how 3–6-year-old Turkish children perceive DTs through their drawings and narratives. The study also investigated the DT usage habits of children and how parents mediate their children's usage of DTs. This study aims to provide a current picture of what is happening beyond the screen and to provide implications that can inform the design and implementation of policies and practices that support young children's healthy and responsible use of these tools.

Digital Technologies in Early Childhood Education

DTs can be defined as digital devices (e.g., smartphones, televisions, digital cameras, touch screen tablets, computers, e-book readers) and digital media (content) interacted through these devices (e.g., applications, websites, social media, e-books, videos) (Chaudron, 2015; Plowman et al., 2012). Research revealed that today's children use DTs with great mastery and fluency from a very early age (Palaiologou, 2016).

Due to its widespread use, DTs in early childhood have become the focus of attention of researchers worldwide in recent years (Altun, 2019; Kewalramani et al., 2020). Some researchers have focused on integrating DTs into educational settings (Oliemat et al., 2018; Slutsky et al., 2021; Undheim, 2022). These studies have shown that the rich and engaging learning experiences offered by DTs may help children develop new skills and knowledge in an attractive, permanent, and interactive way (e.g., programming, technological and computational thinking, sequencing, technological thinking, and scientific concepts) (Gould et al., 2021; Lee & Tu, 2016; Papadakis et al., 2018; Yilmaz & Siğırtmaç, 2023; Zvieli-Girshin et al., 2020). Through these aspects, DTs have the potential to encourage children's 21st-century skills (Güneş, 2022; Lawrence, 2018; Marsh et al., 2016; Sullivan & Bers, 2018) and contribute to their digital literacy development (Maureen et al., 2018). Besides, DTs enable young children to express themselves

creatively (e.g., by creating new images through digital painting, photography, and video) (Haden et al., 2014; Marsh et al., 2016). Studies have also revealed that integrating DTs into ECE allows children's different learning styles and individual characteristics to be addressed (Gould et al., 2021; Morrison, 2018; Taylor, 2018).

Children's Use of Digital Technology

Types of DTs used by children and their screen time (ST) are topics researchers have focused on in recent years (Altun, 2019; Konca, 2022; McPake et al., 2013; Palaiologou, 2016). Researchers have obtained findings regarding the long-term use of screens in children's daily activities in the home environment from the first months of their lives (Hu et al., 2020; Tay et al., 2021). For example, a study conducted in four different European countries showed that more than 60 percent of children aged between 0–3 years actively use television, internet, and computer-based technologies and engage in mostly television-based activities for an average of 2.5 h daily (Palaiologou, 2016). Similar results were found in studies conducted in other countries. For example, Konca (2022) found that 3–6-year-old children in Türkiye spend about 3.7 h a day in front of a screen and mostly watch television. This time is 3.23 h per day for five-year-old children in China (Hu et al., 2020). These periods are too far from the recommendations to avoid ST for children under 1.5 years old except for video chatting and to limit ST to one hour per day for children up to 5 years old (American Academy of Pediatrics, 2016).

In addition to the ST, how this time is spent is also very important. ST can be classified into two categories: passive and active ST. Passive ST refers to screen use that is sedentary or in a way that requires minimal mental effort and with minimal or no interaction either with the technological device or with other individuals. Watching television, videos, or DVDs is an example of passive use (Donohue, 2015; Sweetser et al., 2012). In contrast, active ST refers to engagement in screen-oriented tasks that demand cognitive, social, or physical interaction (Sweetser et al., 2012), such as playing video games, doing homework on a computer, using interactive book applications, or video chatting with relatives living in another country (Goodwin, 2016).

Excessive screen use, whether passive or active, can lead to negative consequences for children (e.g., sleeping problems, obesity, limited improvement in motor skills, limited socialization, limited attention span, behavioral issues, exposure to cyberbullying and violence-related content, problems with eye health and musculoskeletal health) (Cadoret et al., 2018; Hale & Guan, 2015; Ma et al., 2022; Xie et al., 2020). However, active and passive participation

may affect child outcomes differently (Gottschalk, 2019). For example, a study conducted with five-year-old children found that passive ST was negatively and strongly associated with math and science performance and social skills. In contrast, active ST was positively associated with receptive vocabulary and science knowledge (Hu et al., 2020). Similarly, Altun (2022) found that executive function skills were negatively related to passive ST and positively related to active ST in early childhood. Hence, the activities offered to children through DTs should allow them to participate mentally and physically, providing interaction and feedback.

Factors Related to Children's Digital Technology Usage

The literature indicates that children's DT perceptions, DT use, and ST may be related to variables such as the home and family context, the education level of their parents and the mediation strategies they adopt, and the age and gender of the children (Nikken & Jansz, 2014; Oliemat et al., 2018; Zaman et al., 2016). Therefore, this study focused on these variables.

Home and Family Context

The home and family context might have a decisive role in children's ST and what they engage with (Konca, 2022; Ozturk & Ohi, 2022). Children observe how family members (e.g., parents, grandparents, and siblings) use DTs from the first months of life and learn about their purpose and use in line with their observations (McPake et al., 2013). Research revealed that children's ST and experiences with DTs might be related to DTs available in their homes, parents' ST, and children's exposure to screen use by other family members (Brito et al., 2018; Daley, 2022; Konca, 2022; Xie et al., 2020; Zaman et al., 2016). Therefore, examining the home and family context is essential to understanding children's DT usage habits. This study examined children's home and family contexts within the scope of DTs in the home environment, parental ST, and where and with whom children use DTs.

Parental Mediation

In addition to being a model with their ST and use of DTs, parents can also influence which technologies their children have access to and how they will interact with them through the way they mediate their children's use of DTs (Chaudron, 2015; Ozturk & Ohi, 2022). Parental mediation (PM) is defined as "any strategy parents use to control, supervise or interpret media content for children" (Warren, 2001, p. 212).

PM strategies were first defined with a focus on the activity of television viewing (Nathanson, 1999; Valkenburg et al., 1999). With the proliferation of the Internet and a wide variety of DTs in homes, research has revealed that PM strategies focused on television viewing needed to be revised to explain PM for using different digital devices and online media. Thus, Livingston and Helsper (2008) redefined these strategies as active mediation, restrictive mediation, and co-using in a more general way that can be applied to all digital media. Then, focusing on PM in younger children's use of digital media, two new strategies were added: supervision and monitoring (Nikken & Jansz, 2014; Shin & Li, 2017). As Topić et al. (2023) stressed, contemporary DTs significantly differ from television viewing due to increased mobility, technological complication, and interactivity. These mediums also facilitate multitasking, and children often demonstrate more excellent proficiency in their utilization, mainly attributable to their exposure from an early age. Therefore, in this study, which examines children's interactions with different types of DT, this more comprehensive categorization was used as a framework to examine the strategies adopted by parents for mediating their children's DT use.

Active mediation includes instructive and evaluative dialoguing with the child about media content (e.g., explaining, discussing, criticizing the content) when s/he is actively interacting with media (e.g., watching, listening, playing, reading) (Livingston & Helsper, 2008). The instructive approach aims to give technical information to the child about the use of the medium (e.g., explain to the child about protecting personal information). In contrast, the evaluative approach strives for a normative outcome, such as conveying approval or disapproval (Zaman et al., 2016). *Restrictive mediation* involves imposing rules and restrictions on media use (ST, device, location, content, purchase, or activity) (Scott, 2022) without discussing the meaning or possible effects of the content with the child (e.g., saying which game is allowed/not allowed, limiting some activities like making phone calls or sending messages) (Nevski & Siibak, 2016; Nikken & Jansz, 2014). *Co-using/co-playing* denotes situations where the parent joins the child's engagement with media (e.g., surfing together on the internet) without commenting on the content or its impacts (Livingstone & Helsper, 2008). *Supervision* refers to the parental endeavors to permit children to use digital media autonomously yet under immediate parental oversight (Zaman et al., 2016). *Monitoring* pertains to checking the digital contents and communications a child engages with regardless of the child's presence in the environment (e.g., installing filtering software and checking the search history) (Shin & Li, 2017). Unlike active mediation, monitoring is less prone to incorporate dynamic dialogues regarding the media (Shin & Lwin, 2022).

Educational Levels of Parents

Parental education level may impact parents' perceptions of using DTs in early childhood and on PM strategies (Connell et al., 2015; Palaiologou, 2016; Rideout & Robb, 2020). Parents with higher educational levels may be more cognizant of the potential hazards and advantages of exposure to particular digital media. This heightened awareness may motivate parents to actively mediate their children's use of DTs (Notten et al., 2013). Research reveals that parents with lower education levels may be less accepting of new DTs (Nikken & Oprea, 2018) and more restrictive in their children's practices regarding DTs (Livingstone et al., 2015). Thus, parents' educational level may also indirectly impact which and how DTs their children interact with (Xie et al., 2020).

Genders and Ages of Children

Another possible relevant factor in children's ST and interaction with DTs (e.g., game or video preferences) may be their age and gender (Isikoglu-Erdogan et al., 2021; Kucirkova et al., 2018; Oliemat et al., 2018). Research shows that boys prefer to play digital games more often than girls (Zheng & Sun, 2022), and girls mostly prefer dress-up games, while boys prefer driving, wrestling, and war games (Oliemat et al., 2018). Besides, the literature reveals that boys may have longer ST (Isikoglu-Erdogan et al., 2021; Ma et al., 2022; Xie et al., 2020), and ST may also increase as the child's age increases (Kalman-Halevi et al., 2022).

Children's Perceptions of Digital Technologies

Perception can be defined as the mental interpretation and understanding of sensory information (Oxford Learner's Dictionaries, n.d.). This study explores the children's perceptions of DTs through their drawings. In this context, it was examined which DTs children used in their drawings, in which context, and for what use. Since the source of perceptions of children is the information obtained through the senses (Berk, 2019), children's perceptions of DTs may also be shaped by the fact that they have obtained indirect information about DTs (e.g., seeing them in a TV commercial, hearing from a friend, witnessing their use by their parents), even if they do not use them directly. Therefore, in this study, it was thought that children's perceptions of DTs might differ from their use, and perceptions were considered worth investigating in addition to the uses.

Children's perceptions of DTs may affect their preferences for using them (Dijksterhuis & Van Knippenberg, 1998). For example, a young child who perceives DTs with educational purposes as childish may prefer digital content

prepared for older children or adults (Chaudron, 2015). On the other hand, children who view DTs as opportunities for learning and exploration are more likely to utilize them to access educational resources and positively interact with others (Gould et al., 2021). Isikoglu-Erdogan et al. (2021) found that preschool children prefer digital games to traditional games for reasons such as getting immediate feedback and offering multiple game alternatives and describe digital games as fun and instructive. Children's perception of DTs as tools for entertainment, discovery, creative expression, communication, and interactive and collaborative learning may increase their possibility of using DTs for these purposes and support their digital and technological literacy (Kleeman & Wilder, 2015; Lawrence, 2018).

Studies in the literature have mainly focused on parents' and teachers' perceptions of DTs and their usage in early childhood (Dong & Mertala, 2021; Fotakopoulou et al., 2020; Ihmeideh & Alkhawaldeh, 2017). However, limited studies focus on how children perceive DTs, and most have been conducted with children older than preschoolers (Bond, 2010; Brito et al., 2018; Oliemat et al., 2018). Young children are born into a world surrounded by DT tools and start using them very early (Bruto et al., 2018; Ihmeideh & Alkhawaldeh, 2017). Therefore, more research on children's experiences with DTs and how DT seems through their eyes is needed to shed light on early childhood education literature and practices (Palaiologou, 2016).

Uncovering how preschool children perceive and use DTs is significant for two reasons. First, this is a crucial developmental period when children lay the foundations of their perceptions of objects, concepts, and situations that can significantly impact their learning processes (Trawick-Smith, 2018). Therefore, the data obtained on young children's digital habits and perceptions of DTs can contribute to literature focusing on developing educational approaches to effectively improve their perceptions and experiences of DTs from an early age. For example, such information can help identify children's digital literacy needs and design developmentally appropriate interventions to address their needs. Second, children today are active users of DTs from these early years of life (Shapiro, 2018), and their perceptions and usage may influence how they will use these tools in the future (Bond, 2010; Segal-Drori & Shabat, 2021). Hence, findings about children's current perceptions and usage of DTs may provide essential insights into shaping more effective educational strategies and promoting the safe, responsible use of DTs among young children. Such insights can guide educators to incorporate DTs into their curricula from early childhood years in ways that support learning and healthy digital habits and intersect with children's inclinations for digital activities. This knowledge can also encourage parents to learn how to guide their children in developing healthy digital habits.

The Current Study

The current study explored how 3–6-year-old Turkish children perceive DTs and their DT usage habits. Unlike previous studies in the relevant literature, which rely on only data collected from parents, caregivers, or teachers (Edwards et al., 2017; Konca, 2022; Ozturk & Ohi, 2022), this study gathered data from both the children themselves and their parents. The main feature that makes this study significant is that it directly reflects children's interactions with DT based on their drawings and reports. In this regard, the answers to the following research questions were sought in this study;

1. How do 3–6-year-old Turkish children include DTs in their drawings (which technologies, in what context, and for what use)?
 - a. Do the portrayals of DTs in drawings differ according to gender?
2. How do 3–6-year-old Turkish children use DTs (which technologies, for how long, for what purposes, and in what context)?
 - a. Do children's STs differ regarding various variables (age, gender, and parental education level)?
 - b. Is there a relationship between the ST of parents and children?
 - c. Are the contents with which children interact during their digital activities age-appropriate?
 - d. Do children's digital activities differ in terms of gender?
3. How do Turkish parents mediate their 3–6-year-old children's experiences with DT?

Method

This study used the triangulation design, one of the mixed method approaches. In the triangulation design, researchers use quantitative and qualitative methods to investigate the same phenomenon and to determine whether the two approaches converge toward a unified understanding of the research problem under investigation (Fraenkel et al., 2022). This study blended and analyzed qualitative and quantitative data to investigate children's perceptions and usage of DTs.

Participants

This research was carried out in the fall semester of the 2021–2022 academic year. The study participants

Table 1 Demographic Information about Participants

Children	Gender	<i>n</i>	<i>f (%)</i>
	Girls	139	47.4
	Boys	154	52.6
	Age		
	36–48 months	31	10.6
	49–60 months	72	24.6
	61–72 months	168	57.3
	73+ months	22	7.5
Parents	Gender		
	Female	236	80.5
	Male	57	19.5
	Educational level		
	Primary school	13	4.4
	Secondary school	23	7.8
	High school	61	20.8
	Associate degree	52	17.7
	Bachelor's degree	115	39.2
	Master's or doctoral degree	29	9.9
	Total	293	100

comprised 293 children and their parents ($N = 293$) from eight public kindergartens in a province in the Black Sea region of Türkiye (see Table 1).

The questionnaires and parental consent forms were delivered to all parents in all eight participant kindergartens through teachers. Of the 500 forms sent, 391 parents consented to their children participating in the study. The primary criterion for including participants in the study was that parents allowed their children to participate and fill out the questionnaires. The other criterion was that the child drew a picture and answered the interview questions. Accordingly, the data of 8 participants (2.04%) were removed from the study to prevent missing data from affecting the results for various reasons (e.g., missing data points more than 5% in parent questionnaires, missing drawings due to the child's absence in the classroom when the data were collected, and missing child interviews) (Tabachnick & Fidell, 2019). Thus, 293 parents and their children were included in the study.

Ethical Considerations

Before conducting the study, permission was obtained from the Directorate of National Education in the province where the study was to be conducted. Subsequently, parental consent was obtained through a detailed consent form outlining the study's specifics. No children were forced to draw or participate in an interview to ensure that participating children did not experience physical or psychological harm and felt at ease throughout the study (Fraenkel et al., 2022).

While consent was obtained from their parents, some children declined to participate, and their data were excluded from the study (Sargeant & Harcourt, 2012). Each participant was assigned a nickname (e.g., C1, C2...) to maintain confidentiality (Patton, 2015).

Data Collection

Children's drawings and interviews

The current study collected data from children and parents using multiple methods. Data on children's perceptions and usage of DTs were collected from themselves through drawings and interviews after drawing. The draw-and-tell technique (Klepsch & Logie, 1982) was utilized in this study to gain a more comprehensive perspective on how children perceive and use DTs. This approach enables children to narrate their drawings and express their thoughts, resulting in a rich source of data that incorporates both visual and verbal elements (Clark, 2005; Salmon & Lucas, 2011). The draw-and-tell technique was selected for its child-centered approach, which allows children to represent their experiences in a way that is not limited by language or literacy. Furthermore, this method encourages children to actively and creatively reflect on how they make sense of the world while engaging in an enjoyable activity (Coyne et al., 2021; Sage & Jegatheesan, 2010). The study used this data collection technique to capture a more in-depth understanding of children's perceptions.

During the data collection, the second author visited children in their classrooms. The subsequent instruction was to specify to children what they were expected in the activity: *"Could you draw yourself while using a camera, tablet, phone, game console, or computer? You can use colored pencils or crayons to draw."* The drawing activity continued for approximately fifteen minutes. After completing each child's drawing, the second author held a short and semi-structured interview with each child in an empty classroom. Before the data collection process, the opinions of three experts with doctoral degrees in ECE were consulted for the interview questions. The questions were revised in line with the suggestions of the experts. During the interviews, children were asked to explain their drawings (*"Could you tell me what you drew?"*). The purpose of children's drawings and interview questions on their narratives about drawings was to explore children's perceptions of DTs. Children's DT use was determined by five questions after the questions about their drawings. These questions focused on which DTs children use (e.g., *"You said you drew yourself using a tablet in this picture. What do you do while using a tablet at home?"*), for what purposes (e.g., *"What do you do on your phone, tablet, or computer other than gaming?"*) and in what context (e.g.,

"While you are using the phone, computer, or tablet, are there other people with you?"). Interview questions were supported with probe questions to help children answer questions about their drawings and DT use (see Appendix). Each interview lasted a maximum of 10 min and was recorded with audio recording.

Parent questionnaire

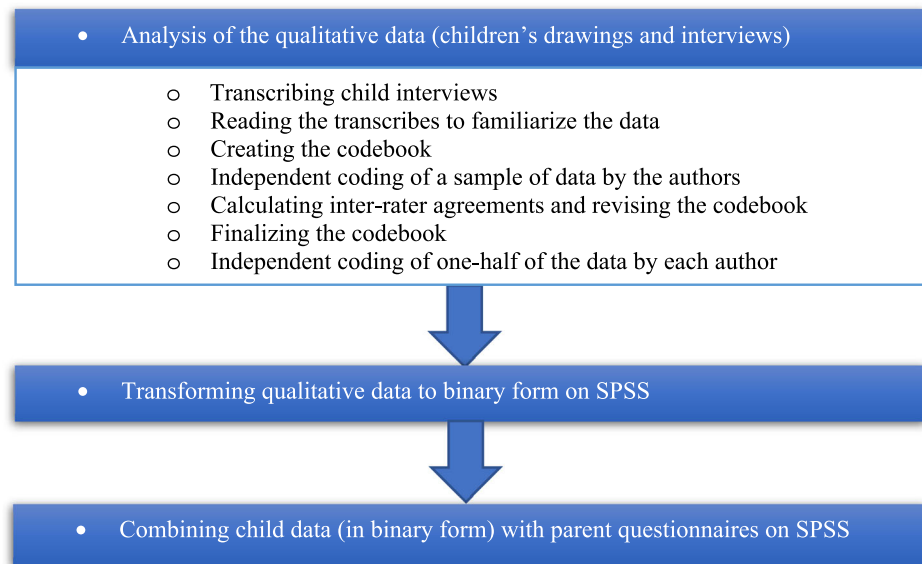
Data on children's digital environment, ST, and how parents mediate their children's use of DT were collected from parents through the questionnaire developed by Konca and Köksalan (2017) and adapted by Konca (2022). The instrument consisted of six questions about the demographic characteristics of the participating children and their parents (e.g., number of children at home, parent's educational level), in addition to 43 sub-questions that were utilized to gather comprehensive information about children's digital environment at home (e.g., availability of the DTs, children's access to these technologies, children's and parent's ST, and PM; *"What DTs do you have in your home?"*; *"Do you restrict the amount of time your child spends on screens?"*; *"Do you use DTs with your children?"*; *"Do you use software to filter digital content that may be harmful to your child?"*).

Data Analysis

Step 1: Analysis and quantification of the qualitative data

In this study, qualitative and quantitative data were analyzed together. After qualitative analysis, qualitative data were converted into quantitative data and analyzed with other quantitative data (Fraenkel et al., 2022). As summarized in Fig. 1, firstly, the interview data were transcribed. Each child's drawing and transcript were analyzed using the inductive content analysis method to comprehend the intended message conveyed through the drawing (Elo et al., 2014). For each child, the drawing and the narrative of this drawing were analyzed first, and then the child's answers to the interview questions about the use of DT were analyzed.

The codebook created by the researchers in line with the relevant literature (Lawrence, 2018; Lieberman et al., 2009; Palaiologou, 2016; Tay et al., 2021), Pan European Game Information (PEGI) age rating system and mobile application stores (Google Play and Apple Store) were used to prefigure codes and categories. In this study, PEGI was used to evaluate the age-appropriateness of the games played by children. PEGI is a rating system that aims to guide parents in deciding which games are appropriate for their child's age in terms of content rather than difficulty level. To this end, PEGI labels digital games to indicate the minimum age at which they are recommended to be played

Fig. 1 The steps followed during the analysis of qualitative data

by children, considering their content (Pan European Game Information, *n.d.*).

The codebook is structured around three main themes (DT in drawings, DT usage habits, and PM), applied to both drawings and interview transcripts, and revised through three coding rounds by considering the emergent codes and categories from the data (Creswell & Poth, 2018). After the first draft of the codebook was created, a sample of data ($n = 60$; 20.4%) was randomly selected, and both authors independently coded them using this first draft. To ensure credibility, the coders' agreement level was assessed by dividing the number of agreements by the total number of agreements and disagreements (Miles & Huberman, 1994, p. 64). Inter-coder agreements were determined as 0.88, 0.84, and 0.89 through the three coding rounds, respectively. After the third round, the codebook was finalized, and half of the data was coded by the first author and the other half by the second author using this final version. Table 2 shows the main themes, categories, and examples of codes included in the codebook.

Upon completing qualitative coding, the data transformed quantitative data by assigning numerical codes. First, all the codes obtained from drawings and interviews were recorded using SPSS 29. All identified codes were categorized as variables and converted into a quantitative format by allotting a binary score of 1 or 0 based on the presence or absence of a code in each child's data, respectively. Then, these data were combined with the quantitative data obtained from the parent questionnaires.

Step 2: Analysis of the quantitative data

Upon conducting an initial analysis, nonparametric tests were employed because they violated the normality

assumption. Specifically, Spearman's *rho* correlation was employed to examine the potential association between the ST of parents and children. The Kruskal–Wallis *H* and Mann–Whitney *U* tests were implemented to assess whether variations in children's ST and activities were evident across gender and parental educational levels. Moreover, the Chi-square test for independence was performed to examine the relationship between categorical variables (e.g., PM and child gender) (Pallant, 2016) (see Table 2). Analysis of the data took six months. More than one code may be included in the answer given by a participant (e.g., a tablet is included in a drawing by a child to represent both watching videos and playing games). Therefore, the findings are presented through frequencies (how often that code appears in the answers given by the participants).

Findings

How do 3–6-year-old Children Include DTs in Their Drawings (Which Technologies, in What Context, and for What Use)?

Children's drawings and narratives about their drawings were used to reveal their perceptions of DTs. Since 44 of the participant children stated that they drew on other subjects and one child did not remember what s/he drew, the drawings of the remaining 248 children were included in the analyses about drawings. While the most frequently drawn technologies were mobile phones ($n = 76$) and tablets ($n = 65$), some children ($n = 47$) included more than one technology in their drawings. Other technologies included in the drawings were computers ($n = 29$), televisions

Table 2 A summary of the research questions, data collection analysis methods, and codebook

<i>Research questions</i>	<i>Data collection tool</i>	<i>Data analysis method</i>	<i>Themes and examples of codes in the codebook</i>
1. How do 3–6-year-old children include digital technologies in their drawings (which technologies, in what context, and for what use)? a. Do the uses of digital technologies in children's pictures differ according to gender?	• Drawings • Interviews	• Content analysis • Descriptive statistics • Chi-square test	Digital technologies in drawings • Type of digital technology ○ Tablet ○ Computer (etc.) • Context ○ Location/setting ■ Indoor ■ Outdoor (etc.) ○ People ■ Only herself/himself ■ Other people (etc.) • Purpose of usage ○ Entertainment ○ Communication (etc.) • Ways of usage ○ Active ST ○ Passive ST
2. How do 3–6-year-old children use digital technologies (which technologies, for how long, for what purposes, and in what context)? a. Do children's screen times differ regarding various variables (age, gender, parental education level)? b. Is there a relationship between the screen times of parents and children? c. Are the contents with which children interact during their digital activities age-appropriate? d. Do children's favorite digital games differ regarding gender?	• Interviews • Parent questionnaire	• Content analysis • Descriptive statistics • Kruskal–Wallis H • Mann–Whitney U test • Spearman's ρ test	Digital technology usage habits • Purpose of digital activity ○ Gaming ○ Watching ○ Communication (etc.) • Context ○ Setting ■ Home ■ Playground (etc.) ○ People in the setting ■ Mother ■ Father ■ Older sibling (etc.) ○ Activities people in the setting ■ Daily chores ■ Care of the sibling (etc.) • Types of digital content ○ Cartoon ○ Video ■ Memory videos ■ Gameplay videos (etc.) ○ Movie ■ Educational games ■ Sport/racing (etc.) • Age-appropriateness ○ Appropriate ○ Inappropriate • Favorite digital games ○ Types of games ■ Action/adventure ■ Simulation (etc.) ○ Reason ■ Social interaction ■ Reward (etc.)

Table 2 (continued)

<i>Research questions</i>	<i>Data collection tool</i>	<i>Data analysis method</i>	<i>Themes and examples of codes in the codebook</i>
3. How do parents mediate their 3–6-year-old children's experiences with digital technology?	• Interviews • Parent questionnaire	• Content analysis • Descriptive statistics	- Parental mediation • Control (Yes/No/Sometimes) • Video limitation ○ Content ■ Simulation ■ Fear/violence (etc.) ○ Reason ■ Age inappropriate ■ Sleeping problems (etc.) • Game limitation ○ Content ■ Social media videos ■ Fear/violence (etc.) ○ Reason ■ Eye health ■ Aggressive behaviors (etc.)

Table 3 Digital technologies in drawings according to the gender and age of children

Drawings	Gender (n)		Age (months) (% within this age group)			
Types of technology	Girls	Boys	36–48	49–60	61–72	73+
Mobile phone	43	33	16.1	31.9	25.6	22.7
Tablet/iPad	24	41	22.6	22.2	20.2	36.4
More than one technology	24	23	19.4	13.9	16.1	18.2
Computer	14	15	6.5	8.3	11.9	4.5
Television	6	9	0	5.6	6.5	0
Camera	3	5	0	1.4	4.2	0
Other (e.g., game console or projectors)	2	6	0	0	4.2	4.5
Purpose of usage						
Gaming (playing, downloading games)	54	77	16.1	43.1	50.0	50.0
Watching (videos, cartoons)	16	18	19.4	8.3	12.5	4.5
More than one purpose	15	15	6.5	12.5	10.1	9.1
Communication	9	1	3.2	2.8	3.0	9.1
Other (e.g., learning, taking photos, drawing)	22	21	9.7	11.1	6.0	13.6
No digital technology in the drawing	23	22	35.5	16.7	11.3	13.6
Total	139	154	100%	100%	100%	100%

($n = 15$), and cameras ($n = 8$). Most children drew only DTs ($n = 102$) or themselves with DTs ($n = 98$). Some children drew themselves while using DTs with family members ($n = 17$) or friends ($n = 2$). While the place was unclear in the majority of the drawings ($n = 173$), DTs were outdoors ($n = 48$), indoors ($n = 26$), and underwater ($n = 1$) in the remaining drawings.

Children ($n = 170$) mainly included active screen use in their drawings (e.g., gaming, taking photos, communication). In most drawings, DTs were drawn while used for gaming (playing or downloading games) ($n = 131$)

and watching (e.g., videos and cartoons) ($n = 34$). Some children illustrated multi-purpose uses of DTs in their drawings, and most of these drawings include use for gaming and watching. Other uses of DTs in drawings were communication, taking/looking at photos, learning/studying, and drawing/painting (see Table 3). The Chi-square test for independence showed no significant association between the purpose of using DTs in children's drawings and their gender ($p = 0.98$, Cramér's $V = 0.19$) (see Table 4). Figure 2 presents some examples of drawings and their codes.

Table 4 Chi-square test results for the relationship between purpose of using DTs in drawings and genders

Purpose of usage in drawings	Gender		df	chi-square	p	Cramer's V
	n					
	Girls	Boys				
	116	132	4	9.587	0.98	0.19

How do 3–6-year-old Children Use DTs (Which Technologies, for How Long, for What Purposes, and in What Context)?

The digital environment and screen time

According to the parent reports, the most common technologies in homes were televisions ($n = 279$), mobile phones ($n = 245$), tablets ($n = 125$), and computers ($n = 74$). 97 (33.1%) children had their own tablets, 17 (5.8%) had their own mobile phones, and 13 (4.4%) had their own computers. Parent data revealed that children's daily ST was 180 (*Md*) minutes ($n = 292$), and this period was 240 (*Md*) minutes for parents ($n = 290$). Findings showed a moderate, positive relationship between children's and parents' ST ($\rho = 0.41$, $n = 289$, $p < 0.01$).

Kruskal-Wallis H Test revealed no statistically significant difference in children's ST across four age groups X^2 (3, $n = 292$) = 6.34, $p = 0.09$. Children 73 months and older ($n = 22$) had the highest ST (*Md* = 240), and 61–72 months-old children ($n = 168$) had the second highest ST (*Md* = 210). 26.3% of 61–72 months old and 27.2% of 73+ months old children had ST below 120 min, the maximum recommended ST for children 60 months-old and older in the literature. 36–48 months ($n = 31$) and 49–60 months-old ($n = 72$) children had the lowest ST, with an average of 180 min daily. In these two youngest age groups, the number of children with ST below 60 min, the recommended maximum ST for children of these years in the literature, was low (9.6% of 36–48 months old; 12.5% of 49–60 months) (American Academy of Pediatrics, 2016).

Children's ST differed significantly regarding parental education level X^2 (5, $n = 292$) = 34.8, $p = 0.00$. The lowest median scores belonged to the children whose parents had bachelor's (*Md* = 150) and master's/doctoral degrees (*Md* = 120) (see Table 5). Mann–Whitney U Test revealed that boys' ST did not differ (*Md* = 210, $n = 154$) from girls' (*Md* = 180, $n = 138$) $U = 11766$, $z = 1.586$, $p = 0.11$, $r = 0.09$.

The context in which digital technologies are used

The usage context of DTs has been analyzed in two categories: locations where DTs are used and the individuals present in those settings during use. The results revealed that the majority of children reported using DTs “at home” ($n = 252$, 68.6%) and

“both at home and when visiting other people's places” ($n = 30$, 10.2%). Most of the children ($n = 183$; 62.5%) said they use DTs when others are in the environment. Others ($n = 63$; 21.5%) said they were alone or ($n = 47$; 16%) sometimes alone and sometimes in the presence of others during digital activities. The people in the environment were mainly mothers ($f = 110$), fathers ($f = 96$), and older siblings ($f = 81$). Children stated that during their use of DTs, their mothers were mainly busy with daily chores (e.g., washing dishes or cooking) ($f = 125$) and with using DTs by themselves or with family members (e.g., watching TV, talking on a mobile phone) ($f = 51$) during their children's DT use. According to children, fathers' main activities during children's DT use were doing job-related work (e.g., going to work or working online from home) ($f = 65$) and with daily chores ($f = 62$).

Digital activities

Interviews showed that most children ($n = 284$) watch television, and the most frequently watched content is cartoons ($f = 209$) and videos on digital platforms ($f = 47$). Most children also use DTs like tablets, mobile phones, and computers for watching ($n = 286$, 97.6%) and gaming ($n = 283$, 97.3%) (see Table 6). Children said they mostly watch game videos, videos on social media platforms (TikTok et al. videos), and cartoons. The children gave the names of 28 YouTube channels. It was determined as a criterion whether these channels are included in YouTube Kids based on their age-appropriateness. It was found that 20 of these channels could not be accessed when the parent filter for young children (5–8 years old) was implemented on YouTube Kids, even though the search feature was opened to children. Besides, some children reported watching horror videos (see Table 7).

Children were asked which games they had played, and 133 children recalled the names of digital games (50 games). In addition, 148 children explained the games they had played but could not remember the names of the games (e.g., car racing games and baby dress-up games) in their own words. Digital application platforms (App Store, Google Play Store, STEAM) were referenced to categorize the types of games. Among the games said their names by children, the most played were simulation games, action-adventure games, and educational games. Among the games not named but depicted by children, the most played were simulation games, vehicle games, and educational games (see Table 8).

Since children and parents mostly download games from digital application platforms, Google Play Store was referenced to determine the age-appropriateness and content of the games. Google Play Store application uses the PEGI rating system. When the game names the children ($n = 133$) gave were examined, it was determined that 64 children played age-appropriate games, 54 played not appropriate for their age, and 15 played both. Considering the frequency of telling

Examples of Drawings, Narratives, and Their Coding

"While I was looking at the tablet, I made a video call to Beyza, talked and hung up." (C51, 70 months)

Type of DT: tablet; **Context-people:** other people; **Context-location:** unidentified; **Purpose of use:** communication; **Ways of use:** active ST.



"This is my pants, I painted purple, my hair is black. This is the phone. I'm playing a game on the phone. Angela is the name of the game." (C77, 62 months)

Type of DT: mobile phone; **Context-people:** herself/himself; **Context-location:** unidentified; **Purpose of use:** gaming; **Ways of use:** active ST.



"Here my brother is looking at the tablet, my mother is looking at the phone, here I am looking at the computer, I have a computer at my hand, here my mother is looking at the phone." (C267, 65 months)

Type of DT: multiple DTs; **Context-people:** other people and herself/himself; **Context-location:** unidentified; **Purpose of use:** watching; **Ways of use:** passive ST.



"This camera. For example, I can take pictures of Urfa. The places I've been to, Istanbul or Erzincan or Erzincan. Then I'll take pictures of Cyprus, America." (C119, 63 months)

Type of DT: camera; **Context-people:** only DT; **Context-location:** unidentified; **Purpose of use:** taking photos; **Ways of use:** active ST.



"I'm playing Huggy Wuggy on the tablet." (C306, 46 months)

Type of DT: tablet; **Context-people:** only DT; **Context-location:** unidentified; **Purpose of use:** gaming; **Ways of use:** active ST.



"There are cars here, I am playing car racing on my phone. There are coins here, and this shows gasoline. There is a gas can here, if it cannot go over this hill, this fuel, that is, gasoline, is getting low." (C237, 70 months)

Type of DT: mobile phone; **Context-people:** other; **Context-location:** unidentified; **Purpose of use:** gaming; **Ways of use:** active ST.

Fig. 2 Examples of drawings, narratives, and their coding

age-inappropriate games played by children, it was seen that 7+ (7 and above) ($f=45$), 12+ ($f=24$), and 13+ ($f=20$) games were played the most. Among the games named by the children, there were also games for 16+ ($f=1$) and 17+ ($f=3$). When the content descriptions on the PEGI were examined, it was found that these not age-appropriate games played by children, which are inappropriate for their age, contain violence, blood, mature humor, drug references, or obscene themes.

Children were also asked about their favorite games, and the most frequent answers were simulation games ($f=93$; 71% boys and 29% girls), action/adventure games ($f=49$; 85.7% boys and 14.3% girls), and vehicle games ($f=35$; 94.3% boys and 5.7% girls). Children reported they liked these games primarily because of their content features (e.g., favorite vehicles or animals, containing a large number of games) ($f=66$), they found them entertaining ($f=61$), and the expectation of rewards (e.g., winning, leveling up) ($f=22$). The chi-square test revealed a significant association between the types of children's favorite games and their gender, $X^2(7, n=283)=89.3, p=0.00$, Cramér's $V=0.56$. Post-hoc tests revealed that the percentages of boys in action/adventure games and vehicle games were higher significantly than girls;

the rates of girls in educational games and simulation games were higher significantly than boys (see Table 9).

How do parents mediate their 3–6-year-old children's experiences with DT?

Parents' reports indicated that they most frequently use restrictive mediation strategies such as limiting ST ($f=262$) and allowing the child to use DT at specific times (e.g., only on weekends) ($f=168$). Another strategy frequently used by parents was co-using/co-playing ($f=245$). Findings obtained from the children revealed that most parents ($n=145$; 49.5%) supervised their children's digital activities, some ($n=105$; 35.8%) did not, and some ($n=26$; 8.9%) did from time to time.

According to the children's reports, most parents ($n=141$) do not restrict their children's digital games, while some do ($n=132$). Children were asked the names of these games, and the findings revealed that parents ($n=67$, 50.7%) mostly did not want their children to play games with violent/horror content. Some children ($n=47$; %35.6) reported that they did not know why this restriction occurred. The other cited reasons are fear/violence, being bad/dangerous, and not being age-appropriate. The same questions were asked for videos, and it was found that 147 parents did not impose a video limitation, while 135 did. Most of the videos that parents did not want their children to watch ($n=38$) included violence and horror content. Children associate the reason for this limitation with the fact that these videos cause fear and violence, lead children to learn bad words, and are wrong and harmful. Besides, some children ($n=20$; 14.8%) reported that they did not know why their parents did not want these videos, while some proposed other reasons (e.g., sleeping problems, being nonsense by parents) (see Table 10).

Discussion

This study focused on exploring the perceptions and usage of DTs among 3–6-year-old Turkish children, with data

Table 5 Results of Kruskal–Wallis H test performed to identify whether children's ST differs their age and parental educational level

Age groups (month)	n	Md	df	X^2	p
36–48	31	180	3	6.342	0.09
49–60	72	180			
61–72	167	210			
73+	22	240			
Parent educational level					
Primary school	13	240	5	34.855	0.00
Secondary school	23	240			
High school	61	240			
Associate degree	52	210			
Bachelor's degree	114	150			
Master's or doctoral degree	29	120			

Table 6 Activities that children engage in while using digital technology

Digital activity	f	Quotation
• Watching (e.g., social media videos, movies)	286	"I watch YouTube on my phone." (C101)
• Gaming (playing or downloading digital games)	283	"I play a princess dress-up game, a cake-making game, a sandwich-making game." (C144)
• Taking or looking photos	39	"I look at my baby photos on the computer." (C146)
• Creating (e.g., drawing pictures)	21	"We have a drawing game on the phone. We draw, then we paint." (C174)
• Communication	14	"I'm video calling someone." (C152)
• Internet (e.g., searching something on web)	11	"Sometimes my mom and I look at things online." (C203)
• Doing homework	9	"I do homework on the computer." (C114)
• Other (e.g., listening to music or fairy tales)	4	"There are book applications, I listen to fairy tales." (C80)

collected from children and their parents. Children's perceptions of DTs were uncovered through their drawings and narratives related to the drawings. Children's digital environment, ST, and technology usage were explored through parent questionnaires and interviews conducted with children.

Table 7 Content watched by children and their distribution by gender

Watching activity on mobile devices (PC, tablet, mobile phone)	<i>n</i>	Gender (%)	
		<i>Girls</i>	<i>Boys</i>
<i>Video</i>			
• Game videos	91	32.9	67.1
• Social media videos (e.g., Youtuber videos, Instagram)	80	55	45
• Memories videos	13	69.3	30.7
• Educational videos	13	61.5	38.4
• Animal-themed videos	13	23	77
• Funny videos	8	50	50
• Nursery rhymes or songs	8	50	50
• Horror videos	7	14.3	85.7
<i>Cartoons</i>	75	56	44
<i>Animation movies/movies</i>	10	40	60
<i>TV series on YouTube</i>	5	60	40

Table 8 The games children play and quotations from children

Type of digital games played	<i>f</i>	Quotation
<i>Named games</i>		
• Simulation games (e.g., farming, job)	64	"Sometimes I play Minecraft." (C10)
• Action-adventure	63	"I also play Roblox." (C279)
• Educational games	17	"I play a game called Toca Boca (Toca Life) on the phone." (C208)
• Strategy games	6	"I have chess, checkers, and sudoku on my phone." (C266)
• Platform	6	"I play ladybug and the black cat." (C123)
• Casino games	1	"There is a very good game called Coin master on my aunt's phone." (C260)
<i>Not named games</i>		
• Simulation games	69	"I play makeup game, that's my favorite game." (C107)
• Vehicle games (e.g., car races, truck games)	61	"I play car racing." (C128)
• Educational games (e.g., puzzles, matching games)	35	"I play puzzles on the computer my teacher sends me." (C157)
• Animal-themed games (e.g., dinosaur games, rabbit games)	31	"I mostly play equestrian games, equestrian hero or just horse." (C229)
• War games	26	"I downloaded soldier games, it shoots bad people, and they shoot too. There is blood all around." (C46)
• Simple entertainment (e.g., throwing a ball at the target)	25	"Watermelon, orange, strawberry cutting game." (C187)
• Platform	10	"Parkour games!" (C181)
• Others (e.g., zombie, sports, robot)	23	"A monster is coming, trying to catch us; we are running away." (C30)

Children's Perceptions of Digital Technologies

Children's drawings predominantly included smartphones and tablets within the context of gaming and watching. In a similar study, Oliemat et al. (2018) found that children perceive tablets as an entertainment tool for playing games and watching videos. Although the findings of this study do not provide a direct inference, they may indicate that children's perceptions of the usage alternatives of DTs may be limited. In parallel with the literature (Altun, 2019; Dong et al., 2022; Rideout & Robb, 2020), according to the parent reports in this study, children's digital environment at home is mainly surrounded by television, mobile phones, and tablets. The fact that children mainly focused on specific DTs and their specific uses in their drawings may be related to the fact that they only encounter some DTs in their digital environments and witness the use of these technologies for certain purposes. For children to realize the possibilities that DTs can offer, such as learning in a fun and interactive way and reflecting on their creativity, they need opportunities to improve their digital literacy repertoire and skills at home and in learning settings (Goodwin, 2016; Isikoglu-Erdogan et al., 2021; Oliemat et al., 2018; Ozturk & Ohi, 2022). Young children can develop a more comprehensive perspective, recognizing that while technology and digital media may provide opportunities for fun and recreation,

they simultaneously function as platforms for acquiring learning and knowledge (Tay et al., 2021).

Children's Digital Environment and Digital Technology Usage Habits

In parallel with other studies, children's ST was above the recommended maximum times in all age groups in this study. The number of children under five who had ST

below the maximum recommended ST (maximum 60 min per day for 2–5-year-old children) was quite limited (American Academy of Pediatrics, 2016). While children's ST did not differ according to gender and age, similar to Xie et al. (2020), it differed according to the parents' education level. Children of parents with undergraduate and graduate education levels spend less time on the screen than others.

Prolonged screen exposure may result in heightened attention-deficit symptomatology, diminished motor skills, behavioral problems, technology addiction, social detachment, hindered brain development, and disrupted sleep patterns for children (Small et al., 2020; Xie et al., 2020; Zheng & Sun, 2022). Therefore, being more careful about children's ST is vital for parents and caregivers. Furthermore, in parallel with the relevant literature (Konca, 2022; Tay et al., 2021), this study revealed that children's ST increased with increasing parental ST. Young children are keen observers of family members using DT and take family members as role models in technology use (McPake et al., 2013). Goodwin (2016) emphasized that the most effective way of inculcating healthy and sustainable technology habits in children is for family members to be appropriate role models for children in this regard. Given the potential benefits of digital activities for children and the long-time children spend in front of screens, discussions for parents should now go beyond strictly restricting ST and include a critical look at its quality (Shapiro, 2018).

Table 9 Chi-square test results for the relationship between children's favorite games and their gender

Types of games	Gender		<i>Chi-sq.</i>	<i>p</i>	<i>p (Bonferroni adjustment)</i>
	<i>(%)</i>				
	<i>Girls</i>	<i>Boys</i>			
Action/adventure	12.3	87.7	34.81	0.00	0.00
Simple entertainment	63.6	36.4	2.56	0.92	14.76
Cartoon games	50.0	50.0	0.04	1.00	16.00
Other	41.5	58.5	0.64	1.00	15.98
Educational games	76.9	23.1	10.24	0.18	2.81
Platform games	44.4	55.6	0.04	1.00	16.00
Simulation	75.6	24.4	39.69	0.00	0.00
Vehicle games	6.3	93.8	24.01	0.00	0.02

Table 10 The reasons for game and video restrictions by parents from the perspective of children

Reasons for digital games	f	Quotations
• Unknown	47	"I don't know why they didn't want it; they didn't tell me." (C168)
• Exposure to fear/violence	28	"Because there are guns in war games, there are bad characters." (C142)
• Bad-dangerous-harmful	20	"They don't want me to play gun games because it's harmful." (C294)
• Not age-appropriate	13	"Because we have to play the ones that are appropriate for our age." (C181)
• Not free	8	"Because it's not a free game and my dad doesn't want to run out of money." (C235)
• Sleeping problems	5	"If we play the zombie game, it will come to our dreams." (C151)
• Timing	5	"They say stop playing when dinner's ready" (C106)
• Eye-health	4	"Because I think they don't want our eyes to get damaged." (C29)
• Other (e.g., missing or irrelevant answers)	35	"Because I have to study." (C18)
Reasons for videos		
• Exposure to fear/violence	27	"Because stabbing video is scary, they don't want it, but I watch it anyway." (C163)
• Unknown	20	"I do not know why." (C107)
• Exposure harmful words/profanities	13	"The boy's father in that video was saying bad words, so I don't watch him anymore." (C126)
• Bad-dangerous-harmful	12	"My father because they think Cartoon Cat videos are harmful." (C243)
• Sleeping problems	9	"I think it's because it's scary and I have nightmares at night." (C169)
• Not age-appropriate	8	"There are videos not suitable for my age on TikTok." (C145)
• Disliking by the parent	8	"Because my mom, dad, and brother didn't like car videos." (C172)
• Aggressive behaviors	5	"They don't want me to play fighting games because I learn fighting from those videos." (C253)
• Other (e.g., addiction, irrelevant answers)	30	"I went to the park today." (C170)

It should also be noted that strict restrictions on ST and access to digital devices may prevent children from acquiring digital skills (Stoilova et al., 2021). Parents can support their children's digital skills and healthy DT usage habits by co-using DTs and discussing their digital activities with their children, monitoring and placing limits on ST, and consistently applying rules about ST (Goodwin, 2016; Zheng & Sun, 2022). In addition, there are findings in the literature that the use of DTs together can enhance the educational value of the digital content and activity (Radesky et al., 2015), strengthen social interaction between family members (Ozturk & Ohi, 2022), and may be associated with increased levels of family commitment (Padilla-Walker et al., 2018).

As in their drawings, findings obtained from children on their digital activities revealed that they mostly engage in watching and gaming. They mainly watch TV and videos (mostly gameplay and social media videos) and play digital games during their ST. In another study conducted with Turkish preschool children, Ozturk and Ohi (2022) found that children are predominantly busy with digital activities such as watching, listening to music, drawing, and using the internet. Similarly, in this study, some children were also found to engage in activities such as taking/looking at photographs, creating (e.g., drawing, designing), communicating, using the internet, and doing homework. However, the frequency of these activities was much lower than watching and gaming. This difference may be related to the fact that in the current study, data regarding children's digital activities were collected from themselves rather than from their parents. As pointed out in the literature (Al-Attayah et al., 2022; Daley, 2022; Kewalramani et al., 2020; Lawrence, 2018), DTs can be supportive, motivating, and assistive tools for children's development and learning processes when used in line with children's developmental levels and needs. For this, children should be encouraged to interactive ST, which allows them to develop their creativity and digital literacy (e.g., creating digital animation, digital storytelling, video recording observations on nature, doing online research), rather than passive ST focusing on watching (Danby et al., 2016; Flier, 2020).

This study also showed that most YouTube channels children reported watching are unsuitable for their age. The social media applications (TikTok and Instagram) where children watch videos are available in the Google Play store in Türkiye with the information that they can be used with "parental guidance" without age restrictions. However, in the United States, these applications carry a "12 years and over" label in the same store. This difference may cause social media applications, which may not be suitable for young children, not to be caught by parental filters and thus be widely used by children in Türkiye. Moreover, the rate of children watching social media videos in this study (27.2%)

is considerably higher than in similar studies (Rideout & Robb, 2020; 6%). As Rideout and Robb (2020) emphasized, understanding the nature of the content children are exposed to in online environments is a top priority, as well as ST. These findings from the study indicate that the age labels in the application stores used in Türkiye should be reviewed by considering the possible effects of the content in these applications for young children and should be more careful about the use of social media by young children.

According to their reports, children mostly play simulation, action/adventure, educational, and vehicle games. When looking at children's favorite games, findings revealed that girls prefer educational and simulation games more than boys, and boys prefer vehicle and action/adventure games more than girls. Similarly, Dias and Brito (2021) found that girls preferred games related to daily life, such as make-up and dressing up dolls and taking care of pets, while boys preferred games that involve more action and movement (e.g., sports/racing games, action/adventure games). This finding might be related to the role social expectations, innate interests, or stereotypes about gender roles play in children's favorite game choices (King et al., 2021). Children reported that they prefer these games because of their content features and fun, and they satisfy the expectation of rewards. Alongside interactivity, appealing to multiple senses, and offering choice, these features mentioned by children are considered the main reasons why DTs and content are found attractive by children and have the potential to support children's learning (Goodwin, 2016; Isikoglu-Erdogan et al., 2021).

According to the PEGI rating system, some games played by children were not age-appropriate (mostly 7+). Indeed, some children reported that they played games that contained content that might negatively affect their development (e.g., blood, violence, fear, and harmful words) and appeal to audiences over their age. Children also reported using DTs mainly in the home environment and most presence of other family members (primarily mothers). According to the findings, most parents are engaged in daily and work-related tasks and use DTs alone or with family members while their children use DT. Almost half of the children stated that their parents did not check what they were watching or playing. All these findings support the literature drawing attention to the importance of parents in mediating children's use of DT (Nascimbeni & Vosloo, 2019; Scott, 2022). Parents of older preschoolers (e.g., 5–7 years) may tend to provide less supervision or be less involved in children's digital activities than parents of younger (e.g., 2–4 years) (Palaiologou, 2016; Tay et al., 2021). However, the possibility of accessing and using DTs more independently may increase the likelihood that preschoolers will be exposed to inappropriate content for their age. Parents can lessen the likelihood of children

encountering harmful content through supervision, filtering software, and co-using age-appropriate digital media (Cho & Cheon, 2005; Veziroglu-Celik et al., 2022). In addition, guiding children from early childhood to acquire media literacy that allows them to analyze the digital media content they encounter critically is essential for providing a sustainable skill to prevent exposure to harmful content and minimize adverse effects of digital media (Rogow, 2015).

Parental Mediation in Children's Use of Digital Technology

In this study, in parallel with the literature (Konca, 2022; Shin & Li, 2017), parents' reports indicated that restrictive mediation (e.g., limiting ST and allowing use at certain times) and co-using were the most used PM strategies. On the contrary, data from children showed that most parents did not restrict their children's digital activities. Some children whose parents impose restrictions on games and videos said they did not know why. In contrast, the remaining children reported that parents' primary concern was to be exposed to content such as fear and violence by children. Other studies have also found that parents often have concerns about screen use, such as addiction, cyberbullying, exposure to inappropriate content, or excessive ST (Rideout & Robb, 2020; Tay et al., 2021).

Different types of PM strategies may bring about different outcomes. For example, co-using can improve children's social and emotional development, language skills, and learning capacities (Goodwin, 2016; Nikken & Jansz, 2014). Similarly, restrictive mediation may reduce ST and the possibility of exposure to age-inappropriate or harmful contents (Collier et al., 2016). However, when children's rules and underlying logic are not clear, restrictions can result in parent-child conflict, increased behavior problems, and breaking the rules without adult supervision. Besides, restrictions imposed by parents on specific games and videos may cause children to arouse interest in prohibited content or increase the incidence of prohibited/limited activity (Petegem et al., 2019). Therefore, parents are proposed to monitor their children's digital activities, often talk to the children about what they engage in during DT use, actively co-use DTs with children, and talk to them about which information is appropriate to share in online environments (Goodwin, 2016; Shin & Li, 2017).

Unlike other studies' findings (Konca, 2022; Nevski & Siibak, 2016), a few parents reported filtering the content through software (monitoring). However, protecting children from the potential adverse effects of the media requires parental supervision and monitoring (Barnes & Potter, 2021). As Nevski and Siibak (2016) found, although parents install some applications or games on their digital devices for their children due to their educational content,

they may not be careful whether these contents meet their children's developmental and educational needs and are age-appropriate. Video game rating systems like PEGI and ESRB can be valuable tools for parents to make informed decisions about suitable content for their children (Duffy & Derevensky, 2022). App stores contain settings that allow parents to filter games suitable for age groups as determined by PEGI or ESRB. All these findings provide evidence that adults responsible for children's education and development should take a critical approach to the intellectual and social-emotional changes from using DT and the time children spend in front of the screen (Meyer et al., 2021; Shapiro, 2018). Parents need to be aware of these rating systems and ways to limit access to content and mediate their child's use of DT, and approach from a critical lens to the digital contents and activities their children engaged with (Duffy & Derevensky, 2022; Scott, 2022; Shapiro, 2018).

Conclusions

This research, which provides an in-depth look at young children's perceptions and usage habits of DT through their self-reports, reveals the necessity of interactive, development-supportive, and age-appropriate content and usage alternatives of DTs. In light of the findings, this study has some implications for parents, educators and schools, the community, digital content developers, digital platforms, and future studies. In addition to being good role models to help children develop healthy digital habits, parents are recommended to use a combination of active mediation, collaboration, and monitoring strategies and to use rating systems to ensure age-appropriate content. At that point, it is recommended that community centers and universities organize seminars for parents on how digital technologies can be used to support the development and education of young children in out-of-school environments and how they can help children's digital literacy development.

Schools and educators can integrate digital literacy into the curriculum in developmentally appropriate ways, enable children to experience various uses of DTs beyond gaming or watching, and use DTs for creative expression, exploration, and learning. Schools and educators can also inform parents about their role in forming their children's digital habits, choosing age-appropriate digital content for their children, and effective mediation strategies. Educators can participate in training that supports their professional development on pedagogical approaches and developmentally appropriate practices for integrating digital technologies into ECE environments to support learning.

Digital content developers for young children are suggested to create content that can encourage children to think, create, and learn, and they incorporate features that

assist parents in monitoring and limiting screen time and selecting content. Besides, digital platforms should ensure robust filtering systems to prevent young children from accessing inappropriate content and provide apparent, consistent age and content ratings across different countries to aid in parental mediation.

This research also has recommendations for future studies in line with its limitations. Firstly, the study was conducted in one province of Türkiye and with accessible participants. Since the study's sample was not representative at a national level, the conclusions drawn from this research cannot be generalized to all children throughout Türkiye. Future studies can be conducted with larger samples to understand better and identify patterns. Besides, culture (Shin & Lwin, 2022; Topić et al., 2023) and different rating systems in different countries may be influential in children's ST, DT perceptions, and usage. Therefore, future studies can replicate this study with children and parents in different countries. Secondly, in this study, the questions asked regarding children's perceptions of DTs are within the scope of the technology(s) they include in their drawings and for what purpose they have included this technology(s). Therefore, more than the findings are needed to infer children's perceptions of DTs and usage alternatives directly. Future studies may investigate what children understand about DTs and their potential uses. Thirdly, in the study, some children's responses to interview questions were not understood due to their developmental characteristics (e.g., having articulation disorders). Therefore, data obtained from these children were excluded from the analysis. In future studies, assistance from a speech therapist could be sought during interviews with children.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval Ethical procedures were followed for research involving human participants in the study.

Informed Consent Informed consent was obtained from their parents for the children's participation.

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