

Ground Rules for Preschooler Exposure to the Digital Environment: A Review of Studies

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Background. The range of digital technologies that children use from an early age has expanded significantly. Most studies demonstrate that preschoolers now spend substantially longer on digital devices and start using them at a younger age. Finding a solution for this challenge has research merits and relevance, as the data on benefits and harm of early preschoolers' exposure to digital devices is contradictory. This poses a need to determine theoretically sound and practically validated criteria that could guide the duration and quality of children's exposure to the digital environment.

Objective. To review studies that contain recommendations on preschoolers' exposure to the digital environment, namely, exposure limits and evidence to justify the limitation of preschoolers' time on digital media.

Design. The analysis starts by identifying theoretical foundations that researchers use in their studies of children's behavior in the digital environment. This is followed by an overview of 40 studies that include research papers, official reports, and methodological recommendations made by healthcare and governmental organizations.

Results. The review identified the following ground rules for children's exposure to the digital environment: to provide for child's interaction with a digital device, to use educational applications that will develop skills appropriate to the child's age, to ensure mandatory supervision of children's engagement by an adult who limits the exposure according to child's age-related capabilities and creates conditions for active exploration of the real rather than a virtual world. Children's cognitive development suffers the most from passive intake of digital content.

Conclusion. The data herein can help to develop strategies to promote healthy and educational engagement of children with digital devices and media; however, the review highlights the insufficiency of psychophysiological research that would make it possible to practically validate the recommendations on the duration of preschoolers' exposure to the digital environment.

Keywords:
digital environment,
digital devices,
parents,
preschool children,
guidelines,
ground rules

Introduction

Today's preschoolers are the first generation to grow and develop fully in the new digital environment and even to be known as digital natives (Sharkins, 2016). Whereas pre-pandemic, it was thought that even primary school children should not be exposed to the digital environment for longer than 20 minutes a day, during the pandemic the duration of digital technology use by children increased significantly (Limone & Toto, 2021; Nikolaeva et al., 2021; Uğraş et al., 2023; Zhang et al., 2022). Today's children are often introduced to an information-dense digital environment before they turn one year old. They have daily access to new opportunities that are not available in the real world around them (Elias & Sulkin, 2017; Ewin et al., 2021; Griffith et al., 2020). Children in Russia were found to receive a personal digital device (smartphone, tablet, smart watch, etc.) when they are 3 to 6 years old (the data range is 42% to 68%) (Kalabina & Progackaya, 2021; Korotkova et al., 2018).

According to parents in Russia surveyed by Nikolaeva and Isachenkova (2022), 10.2% of children under the age of four have their own digital device ("gadget"). In this group, 1% of the children were still under the age of two. Other research shows that preschoolers have good technical skills to confidently use digital devices, especially through touchscreens (Chaudron et al., 2018; Kalabina & Progackaya, 2021; Papadakis et al., 2021; Veraksa et al., 2020). From an early age, children are surrounded by various electronic devices and mobile information tools. Their impact on children's physical, mental, and socio-emotional development is poorly understood (Blackwell et al., 2014; Kılıçer & Çoklar, 2015; Plowman et al., 2010). There are even fewer studies of very young children (Elias & Sulkin, 2017; Twenge, 2019).

Theoretical Basis for Assessing Time Limits on Preschoolers' Exposure to Digital Media

Prior to assessing the scientific foundation, we would like to emphasize that our definition of "screen time" covers the time children spend on a particular gadget or at the computer plus the time children stay around a working TV. This enhanced definition reduces the novelty of the problem, yet makes it all the more relevant, since some parents leave their children next to a working TV all day long to keep them away from gadgets (Kirkorian et al., 2016, 2018).

Screen Time and Television

Electromagnetic waves emitted by TVs, together with the sense of security children feel being around adults, are known to produce a reflex, such that a television relieves anxiety and calms children down. This contributes to a lifelong dependence on keeping the television on (Kubey & Csikszentmihalyi, 1990).

Television has been present in children's lives for quite some time, and there have been longitudinal studies of screen time. Some studies showed that when a child under one year of age watched adult TV programs, the quality of this child's executive functions at age 4 was impaired and his/her linguistic abilities in elementary school suffered (Barr, 2019; Scarf & Hinten, 2018). Moreover, every extra hour of TV screen time before one year of age was shown to weaken the child's attention by 28% at age 7 (Christakis, 2004). And if the TV is on while the child and an adult are playing, the

adult is less cognizant of the child's needs and does not speak to the child or respond to his/her questions quite as often. This generally degrades the quality of their communication (Hanson et al., 2021).

Critical Periods of Early Ontogenesis

One of the most important scientific concepts providing the foundation for an overwhelming number of researchers is the theory of critical periods of early ontogenesis. The theory describes special periods of brain structure plasticity at certain stages in child development (Carson et al., 2015).

Imprinting is one of the first postnatal periods. At this time children capture their parent's image as an ideal benchmark. That explains why researchers are concerned about parental behavior and their screen time, since children have been found to copy them once they become adults (Corkin, 2021). The other most important critical period is that of speech development, which terminates by the end of the preschool age. It has been repeatedly shown that normative speech development begins with the use of personal speech that accompanies a child's independent play. In one study, five-year-old children were first asked to build a tower with physical blocks, and then to do the same using a tablet. The study registered a significant reduction in speech activity when the task was performed on the gadget (Bochicchio et al., 2022).

J. Piaget's Theory of Children's Cognitive Development

The concept of critical periods to a great extent ties in with the theory of J. Piaget (Piaget, 1965), which describes preschoolers' intelligence development. The main theoretical construct is that sensorimotor coupling acts as an equivalent of notions used by adults. The coupling is achieved when the child explores real world objects and engages with them. According to Piaget, prior to facing a symbolic representation of an object in a picture or in a verbal description, the child must get acquainted with it in the real world, feel it, lick it, and otherwise try to interact with it. Only this sequence will shape object's mental schema in the child's mind and enable him or her to cognize the object's symbolic form. Figuratively speaking, the child must first see a chicken, and then listen to "The Speckled Chicken" fairy tale. Disregarding this process was found to impair the formation of cognitive functions and to result in an inability to discriminate the trustworthiness of sources (Richert et al., 2010).

Piaget's proposition initiated a great number of works confirming its relevance to the use of gadgets with content inappropriate to a child's age. We have already mentioned that watching adult programs on TV by children under 2 years reduces their cognitive abilities later on. First of all, a child under 2 years of age has a limited understanding of the content on 2D screens (Radesky et al., 2016). The transition to 3D contexts develops slowly during early childhood. Consequently, children of this age cannot relate a complex video image — including complex speech expressions, often unknown to the child — to reality (Ziemer & Snyder, 2016).

One part of Piaget's theory has a direct match with all the provisions of child learning and cognitive development theories (Lieberman, 2021). It states that appropriation of information requires the learner to stay active. It also warns about negative

consequences that passive information acquisition will have primarily on cognitive control, which is the most important parameter responsible for a child's behavioral changes and metacognitive functions (Marulis & Nelson, 2021).

The Role of Motor Activity in Learning

Motor activity is an essential component of child development and learning. The validity of a baby's picture of the real world is determined by the development of his or her vestibular system (Kim, Avraham, & Ivry, 2021). The accuracy of the picture that the brain creates by analyzing information from receptors is achieved via image corrections based on the head-to-body position. To give three-dimensionality to a flat picture of the surrounding environment presented on the retina as the brain processes information, children must crawl, run or walk to the object many times from different angles, holding their heads in different positions. For that reason unlike all other sensory systems, the vestibular system does not have a simple analyzer in the brain, but rather embraces all brain structures like an octopus. That makes it possible to ensure sensorimotor integration. The less children move, the less accurate is their picture of the outside world (Noel & Angelaki, 2022), the poorer are their metacognitive abilities — that is, the ability to monitor their own cognition (Alvarez-Bueno et al., 2017; Baliram & Ellis, 2019; Escolano-Perez, Herrero-Nivela & Anguera, 2019; Chen & McDunn, 2022).

When preschoolers are given a gadget — instead of less colorful (or sometimes just black and white) book images, where they are required to make an effort to either recognize numbers or letters or even to read — they have sensory experiences which may eventually substitute for other forms and ways of obtaining sensory information. This potentially poses a risk to the child's normal psychophysical development (Tsai et al., 2017; Woodward, et al., 2016). The most alarming evidence is that vivid images produced by gadgets and viewed by the child before he or she actively engages with the real world (i.e., before the age of one year) make the child feel “bored” in non-virtual reality, as its stimulation is less intensive. Later this was found to predetermine the vector of the child's cognitive development to a significant degree (Wolf, 2021). The intensive and uncontrolled use of digital technologies at an early age detaches children from true sources of development and poses a serious risk (Smirnova et al., 2018).

Encountering an image on television for the first time may positively affect some cognitive processes and accelerate their progress (Scarf & Hinten, 2018). However, it was found to have a negative effect later on, as children preferred passive actions with gadgets to active learning that would require resolving complex cognitive tasks (Madigan et al., 2020). The earlier a child encounters this attractive tool, the more likely he or she was found to choose passive perception over active learning (Kerai et al., 2022).

For that matter, learning applications developed for touchscreen devices promote children's active cognition and, as a consequence, improve their working memory, if compared to passively watched TV (Kirkorian et al., 2016; Papadakis, 2023; Papadakis et al., 2021; Vaiopoulou et al., 2022). These applications are developed on the same theory discussed above and factor in the specifics of sensorimotor integration when children perceive information.

Sensorimotor Integration

The concept of sensorimotor integration requires that children under 4 years of age be presented with information on television at a slow pace and that images be maximally realistic and recognizable (Lillard, et al. 2015). But this does not engage the child's taste, vestibular, and olfactory sensations. Therefore, screen time should be limited to ensure that the child's real world activities are not hindered (Suggate & Martzog, 2020). In this regard, some authors emphasize that parents have time limits for interaction with the child, and therefore the more screen time children have, the less active they are in the real world (Scarf & Hinten, 2018).

Epigenetic Influences

One more aspect is related to the epigenetic impact the early life environment has on the child's subsequent development. It has been demonstrated that certain upbringing conditions will contribute to changes in gene activity that in turn change the way human body functions (McLaughlin, Weissman, & Bitrán, 2019). One of the most important influences is attributed to stresses experienced in childhood. Stresses suppress genes that regulate responses to stress (Meaney & Szyf, 2005). Quite often parents give gadgets to their children to calm them down in tense situations, in which the parents are afraid of a public failure to pacify them by other means (Shin, 2021). This problematic solution starts a vicious cycle, allowing the children to use outside observers as leverage and to force their parents to give them the gadget by throwing a tantrum. Instead of resolving the conflict, this causes regular stress for both parents and children. Stress-released cortisol can be removed from the bloodstream only through motor activity (Kim, Avraham, & Ivry, 2021), which in this case is substituted by a gadget.

Socioemotional Development

Finally, children's socioemotional development is the most important theoretical aspect addressed in many works. Preschool age is a critical period for socioemotional development (Desmarais et al., 2021; Wan, 2021). Many Russian parents show their preschoolers cartoons that were made for children in the USSR. These TV cartoons often have a very strong moral aspect. Parents tend to think this will contribute to the development of child's moral standards. A study by Mares et al (2018) in the United States examined the prosocial behavior of children who were 3 to 5 years old. In the research, 107 children watched cartoons that presented moral behaviors. It turned out that the preschoolers did not understand the content well enough and in the subsequent behavioral tests they did not demonstrate the behaviors promoted in the cartoons.

Many studies are contradictory (Cajochen et al., 2011; Clowes, 2018; Coiro, 2020), which highlights the need to develop evidence-based recommendations that would provide ground rules for preschoolers' exposure to the digital environment. These recommendations should correspond not only to researchers' theoretical assumptions, but also to the realistic capacity of families with children. All of the above has determined the purpose of this article: to review papers that — at varying depth — provide evidence for ground rules for preschoolers' exposure to the digital world.

Methods

Given the conflicting evidence on the benefits and harm of preschoolers' experiences with digital devices and media, this article analyzes research, official reports, and methodological recommendations made by healthcare and governmental organizations that contain data and guidelines on preschool children's exposure to digital media. The literature search for this review was done via Google Scholar, PubMed, Research Gate, and Web of Science. Search keywords: digital environment; digital devices; digital media; early childhood smart devices; impacts of screen time; screen exposure; screen time; parental mediation; preschool children; preschooler cognitive development; preschooler socioemotional development. The review includes studies that: 1) contained proposals or requirements that could form a regulatory framework, describing the rules of digital exposure for children aged 4–7 years; 2) contain justifications for limiting the time preschoolers spend on digital media. A total of 40 publications were reviewed: 11 publications referred to preschoolers' time in the digital environment and 29 publications had research data on how the digital environment impacts preschoolers. These studies in varying degrees justify recommendations and restrictions on preschoolers' time in the digital environment. Publications that only cited limits on preschoolers' exposure to the digital environment and findings of earlier studies were not included in our review.

Results

Guidelines for How Long Preschoolers May Spend on Digital Devices

Although digital technologies are increasingly important in our lives, some researchers claim that they harm children's health (Anderson & Rainie, 2018). Perhaps most telling was a cognitive ability study of video gamers who began gaming as children in the 1980s and continue to play the games as adults. Excessive gaming time definitely resulted in attention deficit, social communication difficulties, and a higher risk of obesity. But some gamers were found to have cognitive advantages compared to an average subject who does not play computer games. The gamers were highly adapted to processing various types of visual information, had better spatial visualization and shorter response time to external stimulus, and were able to rotate objects in their heads. It was demonstrated that video games limited to 1 hour per day for approximately 4 days a week in 6 months improved the subjects' visual vigilance (the ability to discern and process visual information), spatial attention, and multitasking (Green & Bavelier, 2003).

In response to this challenge, a number of organizations and researchers have developed specific recommendations on the duration of and conditions for children's use of digital devices. Of the publications we analyzed, 12 provide direct recommendations about how long children may use digital devices and/or screen time. These recommendations are not quotes from other sources. Table 1 presents the data in the publications' chronological order.

These guidelines make a significant contribution to shaping the environment that will promote preschooler development, especially with regard to digital exposure. However, the evidence for the guidelines is not always clear. More evidence is needed

Table 1*Guidelines on how long preschoolers may spend on digital devices*

Source	Requirements of digital exposure for children	Type of publication
Australian Department of Health, 2012	Children under the age of 2 should not watch television or use any digital devices.	Report
National Association for the Education of Young Children & Fred Rogers Center for Early Learning Children's Media at Saint Vincent College, USA, 2012	Limit any use of technology and interactive media in programs for children younger than 2 years. Prohibit the passive use of TV, videos, DVDs, and other non-interactive technologies and media in early childhood programs for children younger than 2 years, and discourage passive and non-interactive uses with children ages 2 through 5.	Position statement
Hill et al., 2016	Avoid introducing children younger than 18–24 months to digital media (except for video chats). For children aged 2–5 years, screen time should be limited to 1 hour per day. The guidelines recommend ensuring high quality content and parent–child media sharing.	Policy statement
Canadian Paediatric Society Digital Health Task Force on Okanagan, 2017	Screen time for children under 2 years of age is not recommended, whereas for children aged 2 to 5 years the limit is 1 hour per day and no screen time 1 hour before bedtime.	Position statement
Early Childhood Australia, 2018	Screens should be used for short time periods with regular breaks; screen time should not be a substitute for physical activity and digital devices and screens should not be used before bedtime.	Report
World Health Organization, 2019	For children under 1 year of age, digital media and TV viewing are not recommended. For children aged 2 to 4 years, sedentary screen time should not exceed 1 hour.	Report
Soldatova & Vishneva, 2019	Preschoolers aged 5–6 years ideally shall not use the Internet and digital devices for longer than 1 hour per day.	Research paper
Royal College of Paediatrics and Child Health, United Kingdom, 2019	Families should negotiate screen time limits with their children based upon the needs of an individual child, the ways in which screens are used, and the degree to which use of screens appears to displace (or not) physical and social activities and sleep.	Guide
Sanitary Regulations and Norms, Russian Federation, SanPiN 2.4.3648-20, 2020	Continuous screen use should not exceed 5 to 7 minutes for children aged 5–7 years and 10 minutes for students in grades 1 through 4 and shall alternate with mandatory eye exercises and physical education breaks. Mobile digital devices are not used for educational purposes. Electronic educational devices are not used for children under 5 years of age.	Decree

Hygienic norms and special requirements for the device, content and modes of work in the conditions of digital educational environment in the field of general education. Guidelines, Ministry of Health of the Russian Federation, 2020	The total recommended daily time spent on digital devices and e-learning tools for children aged 6–7 years is 80 minutes. It increases to 90 minutes in grade 3 (starting 9 years of age).	Guide
Pivovarova et al., 2021	No use of tablets or mobile phones by children under 2 years; screen time for children aged 2 to 5 years should not exceed 1 hour per day; avoid using gadgets 1 hour before bedtime; no background TV.	Research paper

to separate the impact of screen time from other factors influencing children's health (Ashton & Beattie, 2019).

Justification for Limiting Preschooler Exposure to the Digital Environment

Some publications contain data on how various aspects of children's physical health and development are impacted by excessive exposure to a digital environment. Reduced motor activity of children nowadays, as it is replaced by digital device engagement, has been found to result in degradation of children's physical aptitude, poor development of fine motor skills (Binnur 2015), overweight and poor health (Anderson, 2008; Marsh et al., 2013; McVeigh et al., 2016).

Children were found to be less exposed to sunshine because they spend more time on digital devices and stay indoors (Dresp-Langley, 2020). Continuous screen watching at a close range has been associated with vision problems in adolescents (Kim et al., 2016). The bright light from digital screens and digital content was found to excite the child and impact the falling asleep stage and sleep quality (Carter et al., 2016; Cheung et al., 2017; Lin et al., 2021). Though some studies found no correlation between sleep quality and a child's tablet or mobile phone use, they identified a risk of sleep disorders as TV viewing time increases (Zhu et al., 2020).

Anxiety and depression triggered by excessive use of digital devices has been shown in studies of adolescents and is primarily associated with social media use. On the other hand, social media can be a good tool for children to develop social connections, especially for children with disabilities (Perezhogin, 2022). There were no studies of depression in preschoolers caused by digital device use. Moreover, many preschoolers associate the use of digital devices with positive experiences (Kalabina & Progackaya, 2021). Children feel joy when they succeed in digital games and applications (Warburton & Highfield, 2017).

The negative impact of digital devices has also been linked to behavioral problems in children. Lin and colleagues (2020) demonstrated that children aged 18 months to 3 years who use touchscreens experienced emotional and behavioral problems. A four-year longitudinal study tested the hypothesis that use of digital devices such as smartphones and tablets by 4-year-olds is associated with dysregulation symptoms

and lower academic achievement at the age of 6–8. Another study found that a child's screen time at age 4 is directly, positively, and significantly associated with dysregulation and negatively associated with math and literacy scores at age 8 (Cerniglia et al., 2020).

Positive outcomes were found by some researchers who demonstrated that early digital experiences of young children are beneficial for their cognitive development. However, these experiences may potentially negatively affect social and emotional development caused by a delayed development of age-appropriate social interaction skills (Cabr -Riera et al., 2019; Pecherskaya et al., 2013). Developing ways in which large screens in kindergartens are shared to create a single product can promote children's critical thinking and prosocial behavior (Sundararajan, Adesope, & Cavagnetto, 2018).

Positive effects of digital device use on regulatory functions, auditory working memory, cognitive flexibility, and inhibitory control have been confirmed in preschoolers who use digital devices once a week, compared to children who use them 3–4 times a week (Veraksa et al., 2022). Also, the appropriate use of digital technology can stimulate creative activities and promote creative abilities in young children (Fielding & Murcia, 2022).

Authors disagree on the effects of video games on cognitive abilities. The impact depends on gaming intensity and type as well as on the gamer's personal characteristics (Vedechkina & Borgonovi, 2021; Walsh et al., 2020).

A study that explored the association between the age when children start using gadgets and the cumulative effects of digital exposure through the initial 2 years of life on the one hand, and cognitive development at age 4 on the other, found that cognitive development at age 2 positively correlated with a later age of digital device use and with a shorter intense exposure to screen media (Supanitayanon et al., 2020).

It is important to distinguish between active and passive screen time. Passive screen time of 5-year-olds was found to correlate negatively with their math and science achievements, executive function, and social skills. In a study of Chinese children, active time in front of a screen correlated positively with the children's language skills and knowledge of science (Hu et al., 2020).

A longitudinal study that identified how passive viewing and active use of digital resources correlate with preschoolers' executive function and psychosocial development concluded that limiting the use of electronic applications to 30 minutes or less per day and limited multimedia app viewing may positively correlate with preschoolers' cognitive and psychosocial development (McNeill et al., 2019).

Longer screen use (hours per day/week) was negatively associated with children's language skills, whereas higher quality use of digital devices (e.g., using educational programs or watching together with adults) was positively associated with children's language skills (Madigan et al., 2020). A longitudinal study in families of children in Taiwan showed an association between parental involvement, children's screen time, and their social competence. In children aged 3 to 5 years, parental mediation correlated positively with the children's social competence, whereas time spent by children in front of a screen correlated negatively with their social competence (Ma et al., 2022). These studies support pediatric recommendations to limit children's screen time, to choose high-quality programs, and to assure joint child–adult use of digital devices.

An association was identified by Hutton and colleagues (2022) between longer digital media use and less cortical thickness and sulcus depth in brain regions that are responsible for primary visual processing and for higher-order functions such as top-down attention, complex memory encoding, letter recognition, and social cognition. These outcomes are consistent with the findings by those researchers' earlier study of adolescents and suggest that differences in the cortical structure associated with screen use may become apparent in early childhood (Hutton et al., 2022). Digital device use for longer than the times recommended by the American Academy of Pediatrics was found to be associated with lower scores of microstructural organization and myelination of brain white matter tracts that support speech and literacy development (Hutton et al., 2020).

Discussion

Most of the featured studies are based on the evidence collected through sociological or psychological surveys of educators, parents, and teachers. The psycho-physiological approach to guidelines on the exposure to the digital environment is often neglected, as it is difficult to do such research with preschoolers. Most papers analyze "screen time," i.e., the time that the child passively perceives some content, while in fact many children actively engage with characters performing on the screen. The real screen time of preschoolers has been found to exceed recommended limits (Hu et al., 2020; Kalabina & Progackaya, 2021; Kornienko et al., 2022; Nikolaeva & Isachenkova, 2022; Soldatova & Vishneva, 2019). Surveys of preschoolers' parents showed that the time parents spent on digital devices closely correlated with their child's screen time (Lauricella et al., 2015; Lin et al., 2021).

Research shows both positive and negative effects of screen time and digital technology. It also demonstrates an association with the duration and frequency of device use. Quite often researchers do not include the positive impact of early age digital literacy in their outcome measures (Ashton & Beattie, 2019), though digital competence is seen as a key skill in the world today and is necessary for lifelong learning (Cortesi et al., 2020; Kalabina & Progackaya, 2022). An important recommendation refers to the quality of and context wherein the content is watched and whether it is discussed with an adult.

Key recommendations to parents and teachers include the reduction of total screen time for preschoolers, the use of quality content, and the adult-child joint use of digital technologies (Hill, 2016; Royal College of Paediatrics and Child Health, 2019). Despite the importance of a family's social profile and its geographical location, the recommendations are universal as they are based on the child age-related profile. However, the region of domicile (e.g., its climatic, cultural, economic, and other parameters) has an established relationship with preschoolers' screen time (Kornienko et al., 2022). Three studies indirectly support the guidelines on digital device use and screen time (Madigan et al., 2020; McNeil et al., 2019; Hutton, 2020).

Research into and discussions of the challenge with an exclusive focus on screen time seem inadequate. Today's preschoolers engage with voice assistants, smart speakers, and interactive toys connected to the internet. These tools are also part of the digital environment. The general challenge is the fast pace of technological

changes, while researchers are unable to keep up in their study of how technologies affect children (Komarova, 2022). The impact of virtual reality and immersive technologies on children deserves a separate discussion (Bailey & Bailenson, 2017), but there is not yet much data specifically on preschoolers. Compared to their older peers, young children are more likely to perceive any digital content as real, and this may influence their behavior (Richert et al. 2011).

Conclusion

Rapid digital transformation and digital technologies that penetrate all domains of children's lives do not allow the construction of defensive strategies if they focus only on limiting the use of technology. Focusing on the influence of screen time and limiting exposure to it do not harness the digital world's benefits to stimulate preschooler development. On the whole, the data presented in the studies we reviewed enable us to describe some specifics about how cognitive abilities and their psychophysiological mechanisms develop in preschool children who have different experiences of digital socialization. However, the data is incomplete and contradictory. Nevertheless, theoretical concepts regarding critical periods in early ontogenesis, sensorimotor integration, and motor activity in the development of cognition, allow us to identify some ground rules of children's exposure to the digital environment, namely: to stay active while engaging with a digital device, to use educational applications that will develop skills appropriate to the child's age, to ensure mandatory supervision of the child's engagement by an adult who limits the exposure according to child's age-related capabilities and creates conditions for active exploration of a real rather than virtual world. Children's cognitive development suffers the most from a passive intake of digital content.

Limitations

The study scope is limited as it describes and reviews publicly available research and full-text guidelines.

Author Contributions

E.I. and I.K. conceived the idea. All authors discussed the results and contributed to the final manuscript. All authors selected sources for the review and equally contributed to the analysis of the sources. E.I. and I.K. contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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