Digital Media and Child Development in the COVID-19 Pandemic: Benefits, Disadvantages, and Effective Approaches

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The COVID-19 pandemic has acted as a resetting, generative, and accelerating force in a changing digital world. To prevent the spread of the novel coronavirus, social distancing and strict personal hygiene have been implemented in many countries. Many ordinarily crowded places have been closed, including schools and community childcare facilities. School closures have a range of consequences for child development. Distance learning using technology and digital media can provide solutions that enable children to maintain access to learning opportunities. However, digital media and devices can be a double-edged sword. Parents and children need to understand the benefits and disadvantages of these tools, and how to use them more effectively to promote children's positive experiences, learning, and development in immersive digital environments.

Keywords: Digital Media; Electronic media; Child development; COVID-19 Pandemic; Distance learning

In the last several decades, rapid growth in digital technology has occurred. Digital disruption is transforming every industry, including healthcare, business, media, and education. Since the beginning of the COVID-19 pandemic in December 2019, outdoor activities have been limited in many places, and social distancing and strict self-care and hygiene have been considered critical. While vaccines are being developed, multiple waves of COVID-19 have occurred in many countries. More than 1.5 billion children and young people have been affected by COVID-19-related school disruption[1]. Policies regarding working from home, distance learning, and lockdown have been implemented. However, in addition to preventing COVID-19 infection, aspects of child development and mental health must be considered. Many children have been reported to be affected by poor nutrition, developmental interruption, and psychological stress related to school closures[2-4]. Furthermore, parents and caregivers of affected children often suffer from financial difficulties. Additionally, working from home while taking care of children can cause psychological stress. In these situations, parents are often required to act as both caregivers and teachers at the same time, and many parents struggle to manage these multiple roles appropriately[5]. Among children with special needs, limitations on social activities during the pandemic can be particularly difficult. Parents of some children with attention deficit hyperactivity disorder (ADHD) reported that their children's behavior, attention, general mood, negative emotion, and performance of routine activities worsened[6,7]. Children with autism have been reported to have difficulty adapting to unpredictable routines because of the COVID-19 crisis, struggling to cope with unstructured daily routines, sleep problems, increasing levels of aggressive and repetitive behavior, and distress[8].

Digital media use has become increasingly widespread during social distancing and lockdown regulations. Media and social media consumption was reported to increase by approximately 30% to 60% worldwide during the COVID-19 pandemic in 2020[9]. Moreover, more than half of users were found to engage with media while performing other tasks, in multimedia multitasking[10]. For example, a user may chat with their friend via WhatsApp while scrolling through Facebook at the same time

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as watching Netflix. During the pandemic, many children have engaged in study at home via online learning using internet, e-learning, educational programs or applications, or teleconferencing. However, online learning is not suitable for every child or every age group. Furthermore, effective online learning requires adequate resources, including internet access, digital devices, and services, which can present significant obstacles, particularly in areas with limited resources[11]. The COVID-19 pandemic has uncovered inequity in educational systems all over the world[11]. The current article reviewed the advantages and disadvantages of media use for children's physical and mental health, and how media could be used appropriately to optimize benefits and outcomes.

Figure 1. An example of digital media to educate children about COVID-19 and social distancing.

Retrieved from https://www.cincinnatichildrens.org/patients/coronavirus-information/videos-for-kids-parents

Benefits of digital media for children's development, mental health, and physical health

Digital media can be useful if engaged appropriately. First, media can enable people to maintain contact with their relatives through video calling services, such as the use of Skype and FaceTime between children and their grandparents[12]. In addition, online social connection enables the promotion of children's positive social relationships with friends[13]. Second, traditional media such as television and radio, as well as new digital media such as social and interactive multimedia on various platforms can function as stress relievers. Children's songs and appropriate content from animated media can help children at home maintain a positive mood and a feeling of relaxation[14]. Dancing to music or interactive video games can promote physical activity among children while they are unable to play outside[15]. Media can also provide information about COVID-19, some designed for children, and help to explain about the pandemic, and how to take care of themselves (Figure 1). Moreover, media can be used as a tool to promote family time, such as co-playing video games[16], creating online conversation, or chatting.

In terms of educational and development, school-aged children can use various online-media platforms as virtual classrooms to connect with their friends and teachers. Remote learning is possible using e-learning or EdTech resources. Distance learning approaches were established rapidly during the COVID-19 pandemic, and helped educators, learners, and parents adapt to these unplanned educational technologies. Fortunately, the COVID-19 crisis demonstrated that

children could learn in a diverse range of settings and approaches, rather than being limited to classroom or traditional lecture-based classes.

However, preschoolers, toddlers, and infants are reported to benefit less from the two-dimensional-images on a screen compared with the learning from in-person experience, because of the "transfer deficit" or "video deficit"[17]. Because of their cognitive developmental stage, very young children may be unable to obtain information, interpret what they have observed on a screen, or draw implications for further learning that can be applied in real life. However, toddlers and young children may benefit from parents using media as a resource to play together with their children, in addition to activity sheets, arts and crafts, or e-book reading[18]. Many interactive multimedia programs have been developed for young children, with some studies reporting that this type of media can promote child development. For example, watching Sesame Street and Mister Rogers' Neighborhood have been reported to help preschoolers improve their language development, prosocial skills, and school readiness[19]. Some educational applications can promote fine motor and visuomotor coordination in children[20]. Recently, a meta-analysis found that animation, background music, and sound effects in multimedia programs or applications can improve expressive vocabulary and scaffold story comprehension for children. In contrast, some studies have reported that excessive multimedia, such as access to interactive elements such as hotspots, or games can distract children from learning[21].

Children with disabilities often require additional assistance with digital media technologies for

communication, organization, and education compared with typically developing children[22]. During the COVID-19 pandemic, some vulnerable children may not understand the lifestyle changes among people around them and may struggle to adapt to new situations. Caregivers of children with disabilities might be affected not only by their own lifestyle changes, but may also be overwhelmed by childcare, such as the need to perform healthcare management, rehabilitation, speech therapy, occupational therapy, and special education at home. In response to stress, some children may develop challenging behaviors and emotional problems that amplify their caregivers' difficulties[23]. The use of digital and social media tools such as telemedicine or telepsychology for therapy or consultation might be beneficial for some children and caregivers[24,25]. However, children with specific impairments tend to prefer specific places and therapists to support participation and effective learning[26] and may require specialized technology for telehealth, such as sign language interpretation[27] or assistive devices.

Disadvantages of media for children's development, mental health, and physical health

Before the COVID-19 crisis, there was substantial evidence regarding the negative effects of excessive or inappropriate media use for children's physical and mental health[28]. Inappropriate media use can lead to overeating habits and sedentary lifestyles, which can lead to obesity. During the COVID-19 lockdown, this situation has worsened, with the emergence of the international "Covibesity" phenomenon due to excessive screen time[29]. The blue light from screens is also reported to cause eyestrain and affect children's sleep patterns[30]. Additionally, lifestyle changes involving more indoor activities, less sun exposure, and social media overuse are associated with depressive mood and anxiety problems[31].

Inappropriate screen time exposure can impact child development, particularly among young children and infants. Background television or excessive one-way screen time can affect children's verbal language development, social interaction, and executive function[32]. Furthermore, regular use of media has also been reported to lead to aggressive behavior, conduct disorder, and hyperactive-inattentive symptoms[33]. Moreover, the prevalence rates of online sexual exploitation, domestic violence, risk-taking behavior, and cyberbullying among children and teenagers have increased during the COVID-19 crisis[2].

Children with special needs are a vulnerable group, and they are particularly prone to higher media consumption and experiencing negative effects of media compared with typically developing children[22]. Additionally, during the COVID-19 crisis, it has been reported that children with ADHD spend substantially more time gaming and using social media[34].

Balanced approaches to media use

The COVID-19 pandemic has been a catalyst for the rapid development of educational technology. Although many studies have reported disadvantageous effects of media and technology on child development, during the COVID-19 pandemic an increasing number of studies have reported its advantages[35]. Optimal approaches for engaging with technology in a healthy way involve awareness and knowing about digital literacy and digital citizenship, for both parents and children. Digital and media literacy includes the ability to analyze and understand the meaning of messages, as well as critiquing and assessing the quality of a digital content. Digital citizenship refers to an individual's responsibility to use technology appropriately, as well as taking responsibility for prosocial behavior related to online rights, safety, and communication[36,37].

For parents with young children

- Parents should understand that "playing and learning from real life experience" is still the best way for young children to learn, particularly those younger than two years old, because their cognitive ability and development still limit their ability to obtain information and comprehend content via screens. There is currently no evidence that early digital media use in infants improves child development. The more time infants spend watching screens, the fewer opportunities they have to learn from hands-on experience.

- Parents can act as mediators, using screens or digital media as tools for "interactive playing" with their children instead of letting them use devices alone.

- When exposing their children to digital media, parents should understand the "three Cs", which are the Children including age, characteristics, and temperament, the Content, and the Context[38,39]. Parents should look for appropriate media content such as television programs including pop-up advertisements, mobile applications, and social media that are creative and non-violent for their

Figure 2. Example of interactive multimedia.

Retrieved from https://www.commonsense.org/education/app/khan-academy-kids

children. Interactive multimedia is preferable over one-way content delivery platforms (Figure 2). Rather than focusing solely on the number of hours of media watched, parents should pay attention to what their children watch, and who they engaged with. Co-viewing with children can help them to understand more about the content seen in media, as a "scaffolding" process. Parents can use this opportunity to teach their children about experience and stories related to the media and can be treated as quality time in which parents and children share experiences and talk together.

- Parents should learn about appropriate digital media resources such as "High quality TV programs" and "Proven educational applications" from sources such as https://www.commonsensemedia.org/, and understand how to create child-safe environments for their children while using applications or browsing the internet.

- Parents should implement limitations for their children, such as "screen-free times" or "screen-free zones", and act as good role models. At least during meals and 1-hour before bedtime, children should avoid all digital media. A healthy Family Media Use Plan can help with time-setting among online and offline activities for family members (https://www.healthychildren.org/).

- During the COVID-19 pandemic and associated school closures, online learning for very young children may not be the most appropriate solution. Home education by engaging in activities and playing with children is likely to be the most effective option. While children can maintain connections with their school friends and teachers via online platforms, allocating time for offline activities alongside online learning might provide an optimal solution. (https://www.zerotothree.org/resources/3264-at-home-activity-guide)

For parents with school-aged children and teenagers

- The content and context of media are still important for this age group. Parents should talk to their children about what they engage with online, which applications they use, and, most importantly, how they feel about their online life.

- Parents and their children should understand their rights regarding social media use and how can they protect themselves if they feel unsafe while using online applications. Children should be informed about online social support groups, and hotlines and online reports such as https://www.inhope.org/EN or https://www.ecpat.org/ if they feel uncomfortable or at risk of being abused online.

- Parents should educate their children about how to stay safe online, such as preferentially using personal laptops and avoiding sharing log-in and password information or using public computers, avoiding posting, or giving online users any personal information or private pictures or video clips, and not believing everything they encounter in online social media.

- Although online media can be used as a tool for distance learning, children should spend time engaging in non-online activities, such as reading books, playing sports, or other recreational activities such as dancing, arts, and crafts, instead of sitting in front of a screen for extended periods.

For parents and children with special needs

- Parents should ask for help and advice from healthcare workers, therapists, and social support using telemedicine or teletherapy if needed. They should also talk, Skype, or FaceTime with other parents to share experiences or relieve the stress they face because of their children's behavior as a form of parental support group.

- Parents can take advantage of easily under-standable media to explain the COVID-19 pandemic to their children, as well as the changes they are experiencing around them. They should not focus solely on how long their children spend on media or social media, but on the use of media as a tool for intervention or special home education with their children.

- Parents should maintain as much of a routine as possible.

For teachers

- In the current period of educational disruption and the COVID-19 pandemic, teachers should adapt their roles from lecturers to classroom facilitators, in both virtual and in-person classrooms.

- Project assignments should enable children to personalize and conduct their own classes to suit their own style and mode of learning.

- Teachers should encourage critical thinking and creativity rather than rote learning. This can enable children to choose the digital technologies most suitable for them as the tools of learning.

- Teachers should cooperate with parents to help them educate their children at home by providing help with activity planning, resources for learning, and acting as consultants if parents were struggling with their children.

- Teachers should upskill in the use of technology and digital media in preparation for the new normal of post-COVID-19 changes in education.

For pediatricians

- As health care professionals, pediatricians should provide information about COVID-19 and good hygiene practice, keeping children healthy via good nutrition, and appropriate vaccinations.

- Pediatricians should understand stress in families during the pandemic and act as advisors for crisis adaptation, maintaining a healthy mental state, and approach for relieving stress.

- Because screen time during the COVID-19 crisis may be unavoidable, it is increasingly important for pediatricians to educate parents and children about healthy media use during lockdown, its benefits and disadvantages for children, media hygiene, and how parents can act as positive role models for their children.

- Pediatricians should help parents, teachers, and caregivers to seek appropriate online resources for their children that they can access while staying home.

- Pediatricians should encourage parents to engage in offline activities with their children.

- Pediatricians should support parents by acting as partners in promoting their children's health. Periods of stress or crisis often have negative effects on children's emotions, sleep, and eating. Pediatricians can ask parents and caregivers to watch out for the emergence of these problems.

Conclusion

In contemporary societies, children and teenagers are growing up in an immersive digital environment, at the same time as experiencing the COVID-19 crisis. Digital media can be useful for distance learning, online education, social connection, and entertainment, particularly during strict social distancing, if they were used consciously. However, the disadvantages of digital media for child development and health are concerning if misused. Given the exponential growth of digital media and technology, more research is needed to clarify what kinds of technology are suitable for learning experiences and child development, as well as the benefits of more personalized media, particularly for children with special needs, how multitasking using online and electronic devices affects children's learning, and the long-term child development outcomes of lifestyle changes. Finally, technology and artificial intelligence cannot replace interactions with other people and contact with others is important for children growing up in the digital world.

What is already known on this topic?

Many previous studies have shown the negative effect of digital media and technology to children development, as well as physical and mental health. Many policies and guidelines were established to discourage digital media use especially in young children.

What this study adds?

Presently, the author is in an immersive digital environment and the COVID-19 crisis revealed more about the benefits of digital media in our life during this difficult time. The present review summarized both the advantages and the disadvantages of digital media including screen time. Digital literacy and citizenship are the key success of effective digital media use in children.

Conflicts of interest

The author declares no conflict of interest.

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