



Electronic Devices' Impairment of Cognitive Development in Children under Fourteen Years of Age

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Introduction

Technology can be found everywhere in modern society. Most individuals have an electronic device or even two on them at all times. Children born during or before the early 2000s had limited access to technology. Even with limited access there still was opportunities to watch television, make phone calls, and do research but these opportunities were not available in pocket sized devices that could be used anywhere at any time. After the rising popularity of the iPhone in 2007 having electronic devices such as smart phones and tablets became widely popularized (Verizon, 2023). Along with full screen devices gaming consoles developed in quality and became frequently used especially by young boys. With the rise of technology came new generations of children growing up with a screen in their faces from as early as one year old (Rathnasiri et al., 2022). Having a screen in front of oneself gives the opportunity to have every question the child is wondering answered immediately. They also have constant entertainment provided to them meaning they are being stimulated throughout the majority of their daily lives.

Technology is an important and valuable part of modernized society as it has brought a large volume of benefits for children such as greater access to a proper education, improving lifestyles, and providing immediate communication and connectivity to family members and peers. With technology there are also consequences that may influence children such as having access to social media where content is uncensored, a lack of privacy on the internet, and in some cases addiction (Elmwafie, 2022). The influence of electronic devices can affect the social development of minors where the use of photoshop and glamourization can be used to rank an individual's relevance (Twigg et al., 2020). This paper will be looking at how growing up with constant access to technology impacts the cognitive development of children under fourteen years of age.

Literature Review

In the study, "*Impact of Technology Use on Behavior and Sleep Scores in Preschool Children in Saudi Arabia*", researchers looked into how the sleep and behaviour of children owning an electronic device are impacted. They conducted a cross-sectional study with 217 ran-

domly selected participants whose ages ranged from three to five years old. They had an equal ratio of 145 boys and 143 females. The researchers claimed that having a light shining in the child's face inhibited the body from producing the proper level of melatonin. They also found that stress and arousal hormones were being released when children watched media that was dramatic and/or exciting which then resulted in a poor quality of sleep due to the inability to feel tired. The study's results found that the use of technology between the ages three and five for more than three to five hours a day led to a negative impact on the child's sleep and behaviour (Almuaigel et al., 2021).

A key feature of the results showed that there was a positive relationship that correlated technology use with a worsened quality of sleep. Sleep is a vital factor that helps advance a child's brain development. Without the proper amount of sleep a child's mental health and emotional development are reduced. Children who used their devices for an hour or less had less negative affect than those using their devices between three to five hours. This shows that excessive technology use at a young age can harm cognitive delay as well as reduce emotional regulation. A key feature regarding the behaviour of children who owned their devices was that they had less positivity and excitement than those who did not. The children who used their technology to watch movies had lower effortful control than those who preferred playing games or watching cartoons (Almuaigel, et al., 2021).

With media content becoming more targeted at young children through cartoons, YouTube channels, and marketing through online ads it appears that children are becoming more infatuated with their electronic devices. With an increased use of technology children are spending less time playing creatively and exercising which is reducing the amount of melatonin and hormones being released. These hormones are necessary for the child's development and growth in the long term. Children are now more commonly delaying or reducing the amount of time they are spending asleep to include more screen time in their daily routines. Not getting proper sleeps negatively affected participants psychosocial development. Their overall mental health, social competence when interacting with peers and family, and their perceived concept of themselves were all impacted negatively. It's important to understand the children in the study viewed technology as a good way to maintain relationships but failed to recognize the harmful effects toward the same relationships (Almuaigel, et al., 2021).

The role of technology has drastically shifted over the past decade. It has become more and more common for parents to replace quality time with their children with time on electronic devices. The shift to lazy parenting is not only reducing the strength of the relationship between the parents and the child, but it is also negatively affecting the child's cognitive development. The usage of electronic devices getting placed directly in front of the child's face as young as two years old displaces the focus on surroundings and real-life stimuli and replaces it with fast moving objects and colours on a screen. Constantly having the television or playing cartoons for children while they eat, or play can lead them to having problems feeling fulfilled when there is less stimuli around leading to an increased risk of anxiety development and a reliance to technology that can lead to addictions (Sikorska, 2020).

In the study, *"Addictive' for Children and 'Helpful' to Parents: Electronic Devices as a Non-human Actor in Family Relations"*, Malgorzata Sikorska takes a deep dive into how electronic devices are shifting the relationship between the child and the parent. The increased usage of technology by children has altered the dynamic of power within families and influenced how

family members interact. Children were found to have developed more agency which increases anxiety for the parental figures as electronic devices divide their sense of control in their homes. For this study, interviews were taken from 24 pairs of parents and 6 single parents. It was based on families who had at least one child who had reached the age of six. The focus was not on the devices themselves but on how the devices served purpose in punishments, rewards, daily routines, and quality time (Sikorska, 2020).

The study found that when children first begin to use devices, they gain an increasing amount of influence over their parents, while in turn the parents influence over their children began to decrease. This can lead to issues maintaining power as a parent which may uncover behavioural issues for the young child in areas such as listening and emotional regulation. Parents reported they had found the use of technology was separating the child from the world. The isolation implies the child is in a separate space and/or using the device by themselves. Activities such as reading a book, colouring, or playing are also isolating activities, however, they allow others to be present and for interaction to take place more easily instead of the child feeling detached. Parents also reported that with the detachment came more greedy behaviour from the child. The child typically wanted a sweeter snack will using their devices and would make constant demands they expected to be met. If the demands were not met children often responded with aggressive actions or verbal communication (Sikorska, 2020).

Social media can have a powerful influence over children's images of themselves and how satisfied they feel with their lives. With the growing popularity of social media apps images and videos are being shared to the public in extremely high volumes. This can have good effects on children as some content creators make instruction and learning based posts. There can be a lot of advantages to social media such as keeping in touch with family members and friends, finding new ideas and hobbies, and having access to others who may share the same values and beliefs. Although there are many advantages there are also a lot of disadvantages. Disadvantages often come with the overconsumption of media and can look like a dissatisfaction with one's lifestyle. Popular creators on social media apps often only show the glamorous side of their lives such as the products review, their nicer homes and cars, and their in-trend high priced clothing. This can make a child feel insufficient because they do not have access to these luxuries. Another issue is the use of photoshop to edit faces and bodies to unrealistic and unachievable standards. On social media it can be difficult to differentiate between the real and the fake. Not being able to spot the fake can leave children feeling like they don't fit the beauty standard and their confidence can drop significantly (Twigg, et al., 2020).

In the study, "*Is Social media Use Associated with Children's Well-being? Results from the UK Household Longitudinal Study*" by Liz Twigg, et al., the researchers collected data on the level of happiness children ages 10-14 felt in relation to the amount of social media they consumed. The results showed that consuming an average or moderate amount of social media did not have a significant correlation to a decrease in overall life satisfaction. A moderate level of social media use in a day averages at three hours. However, having a high level of consumption was a predictor of decreased levels of happiness. Higher levels of social media consumption ranged from four to seven hours daily. The effects of social media were mainly dependent on the female gender (Twigg, et al., 2020).

An interesting result they found was that the young girls were more likely to have a decrease in their moods. With this decrease it was predicted they may have a satisfaction trajectory that would decline more and more as time goes by. They also found that as girls grew older the influence of social media impacted their happiness more. For young boys the amount of social media consumption did not impair their levels of happiness as they aged to the extent it affected the girls. Children who were racialized as white had a worse life satisfaction than those of other races and ethnicities. This may be due to the majority of social medias targeting being based off of beauty standards getting directed to those who are white while representation for other races are still relatively limited. This may also be a factor in why boys who consumed up to seven hours of media a day had an extremely higher life satisfaction than the girls (Twigg, et al., 2020).

In the study, *“Health Risks of Electronic Display Devices and Safety Practice Awareness Level among Children: Effect of a Health Educational Program”* researchers looked at risks associated with children’s health due to their lack of awareness on how to safely use electronic devices. The study involved 300 children aged from 3 to 12 years of age and 120 parental figures. Almost half the participants were between the ages six and twelve with an almost equal divide between boys and girl. The results showed that those who had their own electronic devices reported they had physical problems such as posture issues, worsened eyesight, and body pain in the head and neck. They also experienced a decreasing level of overall concentration which may lead to difficulties maintaining a high level of education and impair social relationships. Social isolation was also a reported issue as children who owned their own devices were spending less time socializing with their family members (Elmwafie, 2022).

These findings are similar to those in the study, *‘Addictive’ for Children and ‘Helpful’ to Parents: Electronic Devices as a Non-human Actor in Family Relations*” showing a trend in electronic devices negatively effecting children’s social presence alternatively decreasing their mental health (Sikorska, 2020). Another similarity found was the increase of aggressive behaviour children displayed while using technology which may play a part in the level of addiction the child has connected to the internet (Sikorska, 2020). These studies do acknowledge that children’s use of electronic devices can be beneficial with instilled parental control and a limited amount of usage, however, technology use in larger quantities can cause impairment for many young children during their cognitive developmental stages (Elmwafie, 2022).

These patterns of ill behaviour from children are a common theme across many available studies. In 2020 when Covid-19 forced school closures and all classes to be moved online. With the lockdowns across the world came many children who were isolated from the outside world and their only means of accessing it were through their electronic devices. In the study, *“Assessment of Parents’ Perception regarding Electronic Device Use among Children following COVID-19 Lockdown in the Field Practice area of Urban Health Center of a Medical College in Anantapuramu”*, researchers found that children around or above the age of ten were consuming exponential volumes of the internet. Over 180 parents filled out questionnaires about their children’s experiences over the pandemic and all reported the increased usage of devices (Krishna et al., 2022).

The increased use in the “pleasures” of the internet for entertainment purposes such as watching movies, scrolling through media, and watching pornography may have led to an increased number of depressed children. Cyberbullying, inattention to at home schooling, and the

reduced ability to exercise outside also decreased as focuses remained on technology. Parents found that the devices purchased for online schooling were hardly used for their intended purposes almost as if the children had grown addicted to the internet. The use of devices reduced family interactions, increased the children's irritability when parental control over device usage was enforced, and the level of sleep duration and quality was worsening (Krishna et al., 2022). The issues regarding sleep are similar to those found in the study, "*Impact of Technology Use on Behavior and Sleep Scores in Preschool Children in Saudi Arabia*" (Almuaigel et al., 2021).

In the last study, "*Electronic Screen Device Usage and Screen Time among Preschool-attending Children in a Suburban Area of Sri Lanka*" researchers conducted a cross-sectional study consisting of participants aged between thirty-six to fifty-nine months to determine how common usage of electronic devices were at the preschool age. The study looked at the average amount of time spent on the devices and the factors that influenced the usage. The study looked at an equal ratio of 340 boys and girls in preschool and found over half the children went over the daily recommended screen time of one hour. Seventy-one of the children ranging in ages three to five used their devices for over two hours a day while nine reported using their devices for over four hours. Shockingly usage of the devices began as early as two years old for most of the children. A major finding was the excessive internet browsing negatively affected the children's development of language which is crucial at these ages. Cognitive development is at risk of underdevelopment along with social skills and learning behaviour in children already by their preschool years (Rathnasiri et al., 2022).

Conclusion

Children are increasing their overall usage of electronic devices at rapid rates and obtaining their first devices at lower ages than previously seen before. These conditions put forward by the parents can lead to very harmful consequences especially in regard to their ability to maintain attention and their quality of mental health (Rathnasiri et al., 2022). This over consumption of the internet is negatively affecting children all across the world's cognitive development as it is reducing their quality of education, reducing their valuable sleep needed for brain development, and allowing addictions to overtake their social lives. Although there can be benefits found when looking at technology use the negative impacts on overusing electronic devices can have detrimental effects on the cognitive development of children under fourteen years of age. With a lack of parental control and awareness of the internet's harmful effects the negative consequences such as addiction, isolation, learning disabilities, and declining mental health are likely to continue lowering young children's quality of life.

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