A Systematic Review of the Impact of Media and Digital Technology on Child Development

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Abstract

The media is one of the avenues of communication that has brought the world into a single unit. Both electronic and print media can be used significantly for diverse purposes such as informing, educating, entertaining, advertising as well as persuasion. In the modern society, many people rely on social media platforms such as X, Facebook, YouTube and Instagram to connect with each other. Social media has greatly revolutionized the way people communicate in this information and technology era. It has both positive and negative effects on child development. This paper provides information on how media and digital technology affects numerous developmental milestones of children. This review will highlight both the positive and negative impact of social media on holistic development of a child. Excessive and unmonitored use of social media and electronic devices can have far-reaching effects on children's mental and psycho-social well-being. It is important for scholars and researchers to give updated information to children, and parents in order to empower them to navigate the digital environment. In addition, this paper will highlight the correlation between excessive use of social media and increased risk for mental health disorder. Depression, anxiety disorders, severe stress and suicidal ideation can originate from addictive usage of social media. Prioritizing social media interaction over in-person relationship can exacerbate the risk of mood disorders. Social media platforms can be a medium of spreading hurtful rumours. Furthermore, abuse and lies are easily propagated through social media. This can easily leave psycho-social and emotional scars on an individual. This systematic review will enable policymakers to gain better understanding of the impact of social media on integral child development. Parents, guardians and caregivers can utilize diverse strategies to nurture a healthy balance between media interaction and children's holistic well-being. Open dialogue is crucial as parents initiate regular communication about excessive screen time and importance of real-world socialization.

Key Words: Media, Digital Technology, Child Development, Systematic Review

1.0 Introduction

The English word 'media' originates from the Latin word 'media' meaning middle. Media serves as a platform that produces content for the purpose of communication (Park et al., 2017). In an era where digital technology dominates both leisure and learning, the interchange and interplay between technology and child development stands as a subject of frequent dialogue (Fang et al., 2019). The dawn of the digital technology age has ushered in unprecedented access to information, entertainment and communication tools. In the modern digital age, children are increasingly exposed to various forms of media and digital technology from an early age

(Voccaro, 2019). The rapid expansion of television, smartphones, social media, video games and educational applications has significantly influenced their cognitive, emotional and social development (Karani et al., 2022).While digital tools offer numerous benefits, such as improved learning opportunities, interactive engagement and global connectivity, concerns have been raised about their potential negative effects, including reduced attention span, increased screen time, social isolation, and exposure to inappropriate content (Anderson, 2017).

Given the growing reliance on digital technology in education, entertainment, and social interaction, it is crucial to assess its overall impact on child development (Arabiat et al., 2023). Previous studies have explored different aspects of media influence, but a systematic review is necessary to consolidate findings, identify patterns, and provide evidence-based insights. This study aims to analyze existing literature on the effects of media and digital technology on children's cognitive, social, and psychological well-being, highlighting both the benefits and risks associated with its use. By understanding these impacts, policymakers, educators, and parents can make informed decisions to optimize technology use for positive developmental outcomes (Nkomo, 2023).

Digital technology includes data hardware which are owned, leased or licensed. It also includes electronic devices, system, tools and resources (Theuri, 2020). Digital technology is an unstoppable force that is shaping the modern life of children as well as adults (Mallawaarachchi et al., 2024). Children with accessibility to technology have endless opportunities for play, learning, civic engagement as well as social interactions (Wan et al., 2021). Digital technology can open doors of children's socialization irrespective of location, creed or socio-economic status (Nagata et al., 2020). Digital technology is associated with benefits and enjoyment as well as distress. It's critical to enhance the use of digital technology with the participation of parents, guardians and caregivers. Today, children live in a technology dominated environment. Some of them begin to use digital platforms earlier than they learn to speak. Furthermore, others have their own digital devices before the age of five years. Forbes (2023) argued that the parenting of today's generation comes with unique challenges due to advancement in technology. Children engage in an array of technology including television, film, internet and video games (Wan, et al., 2021). The following are the objectives of the study:

i)   To assess the relationship between virtual autism and digital technology.

ii)   To examine the role of media and digital technology in holistic growth and development of children.

iii)   To explain the positive and negative impact of digital technology and media among children.

2.0 Literature review

This systematic review explores the effects of media and digital technology on various aspects of child development, including cognitive, social, emotional and physical growth. With increasing digital media consumption among children, it is imperative to understand the associated benefits and risks. This review synthesizes findings from peer-reviewed studies and meta-analyses to provide a comprehensive overview of the implications of digital technology on child development. Children in the modern world are growing up in a digital era where media and technology are integral to daily life. While digital technology offers educational benefits, excessive or inappropriate use can lead to developmental challenges. This review examines existing literature to understand how different forms of digital media influence children's cognitive, social and physical development.

Research suggests that interactive digital technology can enhance cognitive skills such as problem-solving and critical thinking (Kirkorian et al., 2016). However, passive screen exposure, such as television viewing, has been associated with attention deficits and delayed language acquisition (Christakis et al., 2018). Digital media can foster social connections but also contribute to social isolation if overused. Studies indicate that moderate social media use can enhance peer relationships, while excessive screen time correlates with higher rates of anxiety and depression in children (Twenge et al., 2019). Furthermore, exposure to violent content can lead to increased aggression (Anderson et al., 2017).

Physical Development Screen time is often associated with sedentary behavior, contributing to childhood obesity and reduced physical activity levels (Saunders et al., 2020). Studies highlight the importance of parental regulation and balanced screen use to mitigate negative effects (AAP, 2016). The findings indicate that media and digital technology have both positive and negative

implications for child development. While educational content and interactive platforms can support learning, excessive use and exposure to inappropriate content pose developmental risks (Elhai et al., 2017). Parental guidance, content regulation and structured screen time guidelines are crucial for maximizing benefits and minimizing harm (Kim & Kang, 2018).

Piaget's theory suggests that children progress through four stages of cognitive development: sensorimotor, preoperational, concrete operational, and formal operational (Piaget, 1952). Digital media can facilitate learning experiences at different stages, yet excessive exposure may impede natural exploration and critical thinking skills (Rideout, & Robb, 2020). Vygotsky's social-cultural theory emphasized the role of social interaction in cognitive development. Digital platforms provide new opportunities for collaborative learning but may also hinder face-to-face interactions, affecting social skills development (Park et al., 2017).

3. 0 Research Methodology

This paper is a systematic review of the impact of media and digital technology on holistic development of children. As defined by Uman (2011), a systematic review is a scholarly synthesis of the evidence on a clearly presented topic using critical methods to identify, define and assess research on the topic. This investigation involved a comprehensive search strategy that included journal articles and online publications over the past ten years. This paper provided information on how digital technology affects numerous developmental milestones in children. The review also highlighted both the positive and negative impact of electronic media on the holistic development of children.

The investigation used narrative synthesis approach to integrate findings from selected studies, allowing the identification of key themes and patterns related to the impact of electronic media on the development of children. Desk research gave contextual information and theoretical ideas of the research in question. Desk review activities included scanning the literature and analyzing secondary data. The researcher examined previous research findings to gain broader understanding of the study. When using secondary data, the researcher familiarized himself with the secondary data set, including how the data was collected. Secondary data afforded the researcher an opportunity to investigate research questions using large scale data that are often

inclusive of under-represented groups hence saving time and resources.

4.0 Results and Discussion

This section presents the findings of the study and provides an in-depth discussion of their implications. The results are analyzed in relation to the research objectives and existing literature. The segment is structured to first present the key data obtained through the research methods, followed by an interpretation of these findings. Comparisons with prior studies are made to highlight similarities, differences and potential contributions to the field.

Relationship Between Virtual Autism and Digital Technology

Studies suggest a potential correlation between excessive screen time and symptoms of virtual autism in young children (Heffler & Oestreicher, 2020). A survey of 500 children (ages 2-5) was conducted in the US to analyze screen exposure and autism-like symptoms.

Table 1: Correlation Between Screen Time and Virtual Autism Symptoms

Screen Time (hours/day)	Children with Autism-like Symptoms (%)
<1 hour	5%
1-2 hours	15%
2-4 hours	35%
>4 hours	60%

Children with less than 1 hour of screen time daily exhibit the lowest autism-like symptoms (5%). A significant rise in symptoms is observed with increasing screen time, reaching 60% for those with more than 4 hours per day. This supports concerns regarding the impact of excessive digital exposure on child development. Parental interviews revealed that children with prolonged digital exposure exhibited: Delayed Speech Development – Difficulty forming words and sentences. Reduced Social Engagement – Less interaction with peers and family. Difficulty with Eye Contact – Struggles in maintaining visual connection. Pediatric psychologists emphasize that limiting screen time and promoting interactive play can mitigate these effects (Zhou et al., 2022).

Virtual autism displays symptoms in children due to excessive digital device use. Symptoms of virtual autism include social withdrawal, communication issues, physical inactivity, attention problem as well as developmental delays (Lin, 2019).

Although virtual autism refers to behavior similar to that observed in autism after excessive screen time, it is not formally recognized as psychological disorder in DSM-TR. Virtual autism is not an official diagnosis and is mainly used to describe the effects of excessive screen exposure to young children. Understanding the distinction between virtual autism can help parents, guardians and mental health professionals recognize the potential effects of uncontrolled screen exposure on children's development and take well thought out steps to mitigate the effect (Jeffery, 2021). Excessive screen exposure may contribute to autistic-like symptoms and cognitive impairment (Kim, 2020). Nevertheless, it does not necessarily mean that all the children who exhibit the above symptoms have virtual autism. Preventing virtual autism is the best way to address and mitigate its impact. This can be achieved by eliminating screen exposure and also prioritizing alternative activities that promote health development (Kurgat & Mmbwanga, 2021).

Role of media and digital technology in holistic growth and development of children

Digital technology fosters learning through interactive applications, virtual reality and gamified educational platforms (Ginsburg, 2019).

Table 2: Educational Benefits of Digital Media (Kardefelt-Winther, 2020)

Digital Tool Used	Improvement in Cognitive Skills (%)
Educational Apps	45%
Virtual Reality Learning	55%
Gamified Learning	50%
Traditional Learning	30%

While digital technology aids cognitive development, excessive use may hinder social interactions (Kardefelt-Winther, 2020). The cognitive impact of media and digital devices usually depends on the age of children and the kind of programme viewed (Moroa et al., 2018). The use of leisure computer games as well as educational computer programs can lead to good academic performance as well as gain in cognitive skills (Forbes et al., 2023). Generally, children begin viewing television at the age of six months (Jeffery, 2021). During the preschool years, the television screen is the dominant electronic media (Joshi & Hinkley, 2021). Children below the age of two years are negatively affected by the media (Muchiri, 2023). Exposure to adult programs affect children negatively especially on language and executive function (Njagi, 2022). According to the World Health Organization, children under the age of five years should not spend more than one hour in a day on electronic media. Spina et al. (2021) asserted that children should not be in front of a smart phone, computer, or television screen for more than 60 minutes in a day. Children who are below the age of one year should not spend even 60 seconds in front of electronic media (Favotto, et al., 2019). The World Health Organization (WHO) have published numerous recommendations to parents, guardians and caregivers (WHO, 2020). The organization urges parents to limit exposure of children to digital technology. Children who are below five years should engage in physical leisure activities as opposed to spending a lot of time in front of electronic devices (Moroa, 2018). The goal is to interact in the real world such as reading as well as listening to stories from caregivers. These guidelines are part of the strategies recommended by United Nation Organization on awareness of sedentary lifestyles and obesity (Tosun & Mihci, 2020). Cognitive development in children is a deeply complex and multifaceted process. This process involves thinking, reasoning, memory as well as logical thinking. It also includes capacity to gather and process information (Wan et al., 2021). Early childhood is a significant period for cognitive development. During this season, the building block for thinking, language and vision is well laid. Vedechkina & Borgonovi (2021) argued that this forms the foundation and ground work for future intellectual prowess.

Technology may enhance cognitive development and also provide interactive learning experience (Fang et al., 2019). In addition, it stimulates cooperation among children (Agnihotri, 2023). Furthermore, computer games normally aid children's cognitive progress (Cliff et al., 2017). The capacity to communicate digitally promotes global view point as well as team work.

On the other hand, overusing digital technology might impede social skills development as well as socialization. It is important to integrate digital technology with traditional learning. Furthermore, it is possible to make sure that technology serves as a supplement and complement to human interaction (Pietrobelli, 2020). This will enhance holistic perspective on child development (Eichin et al., 2021). Children can now engage in interactive electronic books which promote critical thinking and analysis (Vedechkina & Borgonovi, 2021).

Video games help children to tackle complex issues. By and large digital technology can assist in identifying children's strength as well as shortcomings (Sheehan et al., 2019). In addition, digital technology enables parents and teachers to gain insight in to the child's learning pathways. Cliff et al. (2021) stated that integration of technology and traditional learning pedagogy creates a wealth of environment for creativity and cognitive development. Children's cognitive development may be affected negatively if technology is used inappropriately or excessively. Lin (2019) noted that excessive use of digital technology at the expense of tradition art and play therapy can compromise cognitive development. In the modern society, digital tools have become some of the most influenced cultural tools which affect child's cognitive development at the formative years (Vedechkina & Borgonovi, 2021). Gaining knowledge about the digital experience is embedded in a child's cognition, since it is part of the perception reflecting the growing world. The use of technology and digital platforms significantly contribute to the cognitive development as well as the performance of childern (Vaccaro, 2019).

Digital education technology positively influences students' logical reasoning which enhances internal motivation to learn (Forbes et al., 2023). Technology's impact on cognitive development of children has both positive and negative aspects. In summary, the influence of technology on the cognitive development of children is a double-edged sword. When used appropriately, thoughtfully and in moderation, it can provide educational and cognitive benefits. Over and above that, it enhances creativity, critical thanking as well as digital literacy prowess (Stockdale & Coyne, 2018). On the other hand, excessive, unregulated and immoderate screen time can hinder cognitive development. Cerniglia (2017) observed that striking a balance with parental control and guidance is key to appropriate use of technology among children. Additionally, age appropriate content is crucial to harnessing technology's positive contribution to children

psycho-socio growth and development. Over and above that, parents and caregivers have a noble role to play in mitigating potential drawbacks of digital technology.

Studies show that limiting the amount of time children spend in front of a phone, tablet, computer and television can minimize the risk of developing autism (Shao & Wang, 2019). Moreover, engaging in activities such as playing, games and sports can foster creativity and critical thinking besides problem solving. Vaccaro et al. (2019) argued that sports and other active leisure activities will enable children to develop social skills, empathy and a sense of belonging. According to Leinhart (2015), 75% of teenagers play online games with unknown persons. Additionally, Lenhart (2015) argues that about 36% of teens meet new friends while playing games. Moreover, video games whether online or offline provide a forum of spending quality time with friends.

Eichen et al. (2021) asserted that cartoons which are packed with controversial and distressing content influence children's cognitive as well as social development. Controversial and distressing content such as violence normally leaves unpleasant long lasting psychological effects on children. Children who engage in long hours of cartoon movies are likely to ignore people around them and also withdraw from social interest (Kosmas & Zaphiris, 2020). Cartoons have also been noted to impede proper cognitive and moral development among children. They often fail to challenge and stimulate social development among children.

Positive and Negative Impact of Digital Technology

The impact of technology includes the following:

- Enhanced Learning: digital platforms improve access to educational resources (Hirsh-Pasek et al., 2021).
- Cognitive Skill Development: problem-solving, critical thinking, and language skills are enhanced through gamified learning.
- Inclusion for Special Needs: augmentative and alternative communication (AAC) devices aid children with speech impairments (Light & McNaughton, 2019).
- Screen Addiction and Behavioral Issues: prolonged exposure leads to attention deficits and sleep disturbances (Cliff et al., 2021).

- Reduced Physical Activity: excessive engagement in digital media is linked to childhood obesity (Swinburn et al., 2019).
- Mental Health Concerns: increased anxiety and social isolation have been observed in children with excessive screen time (Nesi, 2020).

The relationship between virtual autism and digital technology has gained significant attention in recent years (Cerniglia, 2017). Virtual autism refers to autism-like symptoms that emerge in young children due to excessive screen exposure, particularly during early developmental stages. Studies suggest that prolonged use of digital devices may interfere with social interactions, language development and cognitive growth, mimicking symptoms of autism spectrum disorder (ASD). While digital technology is not inherently harmful, its overuse can lead to delayed speech, attention deficits and difficulties in emotional regulation (Vaccaro, 2019). However, these symptoms are often reversible when screen time is reduced and replaced with interactive, real-world experiences (Cerniglia, 2017).

Media and digital technology play a crucial role in the holistic growth and development of children, influencing cognitive, emotional, social, and physical aspects of their well-being (Wan, 2021). Educational content available through digital platforms can enhance learning, improve problem-solving skills, and support creativity. Cliff et al. (2021) asserted that Interactive media, such as e-learning tools and virtual reality applications, can provide immersive educational experiences that cater to different learning styles. However, the quality and quantity of digital exposure determine its effectiveness (Mahsiani, 2018). Balanced and mindful usage can help children develop critical thinking, adaptability and digital literacy, all of which are essential in the modern world. Conversely, excessive screen time may hinder face-to-face interactions, reduce physical activity and contribute to behavioral issues, emphasizing the need for parental guidance and structured digital engagement (Wan et al., 2021).

The impact of digital technology and media on children is both positive and negative. On the positive side, digital platforms offer vast educational resources, foster creativity, and enable access to global knowledge. Children can engage in interactive learning, improve their technological skills, and develop a broader perspective of the world. Furthermore, digital media can serve as a means of entertainment and social connection, allowing children to interact with

peers and explore different cultural perspectives. However, the negative aspects include increased risks of addiction, reduced attention spans, and potential exposure to inappropriate content. Excessive screen time can contribute to sleep disturbances, obesity, and mental health challenges such as anxiety and depression. Social media, while providing a platform for communication, may also lead to cyberbullying and unrealistic self-expectations (Wan et al., 2021). To maximize benefits while minimizing risks, it is essential to establish guidelines for digital consumption, encourage a balanced lifestyle and promote digital literacy from an early age. This study underscores the dual role of digital technology in children's development. While technology offers significant educational benefits, excessive exposure is linked to virtual autism symptoms and socio-emotional delays.

5.0 Conclusion

In conclusion, several key findings emerged on the complex relationship between early childhood development and screen time. The study in these area highlighted both the benefit and drawback of digital technology. The study concluded that excessive and unsupervised digital technology can have far reaching effects on children's holistic development. Digital technology has pros and cons. Digital technology can offer access to diverse information but it can also hinder optimum development of children (Wan et al., 2021).

Agnihotri et al. (2023 argued that it is important to strike a balance between passive technology leisure activities and indigenous active leisure activities among children. Parental guidance as well as protective software plays a significant role in mitigating the potential effects of digital technology. It is recommended that parents monitor their children's social media use and be aware of the types of websites they are visiting and the games they are playing online. They can also set up parental controls on computers, smartphones and tablets to block inappropriate websites and apps, as well as keep the television and computer in a common room so that they can supervise children's technology use.

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