Research Ambition
An International Multidisciplinary e-Journal
(Peer-reviewed & Open Access) **Journal home page:** www.researchambition.com
ISSN: 2456-0146, Vol. 09, Issue-IV, Feb. 2025

Child and Digital Technology: An Analytical Study

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KEYWORDS

Digital Technology, Transformation. Screen timing, Online class and Digital Divide

ABSTRACT

In today's digitally driven world, screen media has become deeply ingrained in children's daily lives, influencing their learning, social interactions, entertainment and leisure activities. The widespread availability of smart phones, tablets, and TVs has sparked concerns about their impact on child development. On the other hand, digital technologies also offer a solution to the global learning crisis, providing numerous opportunities for children. Young children's cognitive development and learning may be influenced by their digital experiences. However, the real impact of digital technologies on the development of the brain is not clear yet. There are only a few studies that have examined brain structure and function in relation to digital technologies and correlations are often small.

Introduction

India, home to 430 million children, prioritizes their rights and aspirations, recognizing them as a national asset and a vulnerable segment of society. The Indian Constitution guarantees children's rights, including free education, protection from exploitation, and prohibition of child labor. It's heartening to see that the Constitution is wholly committed to combating the exploitation of children in any form. The State's policy is to provide adequate services to children, ensuring their full physical, mental, and social development. However, with the rapid advancement of digital technologies, parenting has become increasingly challenging. While technology offers numerous benefits, it also poses risks and challenges, such as negatively impacting children's social skills, relationships, health, and focus. To effectively mitigate these concerns, a balanced approach is necessary which are:

- Leverages technology's benefits for learning, growth, and connection.
- Prioritizes children's physical, emotional, and psychological well-being.
- Ensures online safety, digital literacy, and responsible technology use.

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https://orcid.org/0009-0008-4006-9156
DOI: https://doi.org/10.53724/ambition/v9n4.06
Received 28th Dec. 2024; Accepted 25th Jan. 2025
Available online 28th February 2025

By promoting digital literacy, online safety, and responsible technology use, we can empower children to navigate the digital world confidently and safely.

Education and Transformation

Digital technology has revolutionized the education sector, transforming the learning experience into a more immersive, tailored, and inclusive journey. Key drivers of this transformation include:

- Interactive platforms that facilitate hands-on learning.
- Educational apps that offer bite-sized, engaging content.
- Online resources that provide instant access to information.

Together, these digital tools have dismantled traditional classroom

Technology has also unleashed children's creativity and imagination, providing a canvas for self-expression through virtual art studios, music composition apps, coding games, and animation software. This creative freedom fosters a sense of accomplishment, boosts confidence, and empowers children to bring their ideas to life. Moreover, digital technology has redefined friendship and connectivity. Safe social media platforms enable children to connect with peers worldwide, promoting cultural understanding, and global awareness. Furthermore, digital technology facilitates the sharing of ideas and perspectives on a global scale. This helps dissolve geographical boundaries:

- Broadening children's worldviews and cultural understanding.
- Fostering empathy, tolerance, and global citizenship.
- Enriching their lives with diverse perspectives and experiences

Recently French Government has banned use of mobile phones and tablets in 200 schools. This step has given the name ‘Digital Break’, this initiative has taken to save children from harmful impact of excessive use of electronic gadget. It also tries to save children from cyber bulling and online sexual exploitation. This initiative is beneficial for students as well as office staff. If this ‘Digital Break’ is successful in 200 schools than French government will try to introduce all the schools in France by 2025[1].

Indian government can implement French initiative to save our children from excessive use of smart phones, which is growing problems for growing children’s as it hampers the child mental development. We can save our little children (4 to 5 years) from addiction of smart phones. It creates problems for study and hampers mental growth among children. In India some of the school has banned use of mobile in school but others given permission for emergency use to students. As there is wide disparity between urban and rural area so it is challenging and difficult to impose ban on mobile in schools. Excessive use of smart phones invites dip effect on the health of children. Children are suffering from psychological disorder like insomnia, depression, weak eye sight and low self-esteem. Along with-it cyber bulling, online sexual exploitation has increased in recent time. Government should control this sector otherwise whole generation will be affected from excessive

use of smart phones. French initiative can be guidelines for our policy makers and our government and schools should start awareness about ill effect of smart phones on children mind. Government should make Digital education compulsory so that children can use smart phone safely. Parents should control digital time and convince children to follow safety norms. Digital technology is a valuable tool for promoting children's health and wellness, extending beyond mere screen time. While the impact of digital technology on child' mental health and cognitive development is multifaceted and rapidly changing, emerging research reveals both positive and negative effects.

Excessive screen timing

Excessive technology use can lead to social and behavioral issues in children due to reduced interaction with others. Parents should monitor their child's social media use, websites visited, and online games played. On the other hand, education technologies have the potential to revolutionize learning and skills development for all children, especially marginalized groups. Safe and age-appropriate access to digital learning can provide opportunities for children with disabilities, minorities, refugees, and migrants, promoting equality and inclusivity.

The internet has revolutionized access to information, providing children with an unparalleled wealth of knowledge. Search engines and educational websites facilitate curiosity-driven learning, enabling children to explore new interests and develop a lifelong commitment to education. With the vast expanse of the internet at their fingertips, children are empowered to develop crucial expertise for achievement in life. These skills include: -

- Critical thinking and media literacy.
- Information literacy and research proficiency.
- Analytical and problem-solving abilities.
- Effective communication and collaboration.

By leveraging digital resources, children can cultivate essential skills like-

- Confidence and self-assurance
- Creativity, critical thinking, and problem-solving skills.
- Emotional intelligence, empathy, and resilience.
- A growth mindset, adaptability, and a love for lifelong learning.

By acquiring these essential skills and qualities, children will be well-equipped to thrive in an increasingly interconnected, rapidly changing world. In this digital age, digital literacy has emerged as a fundamental competence. Through carefully designed educational games and software, children are acquiring the skills necessary to navigate the digital landscape responsibly. Moreover, children are learning critical skills, including online etiquette, critical evaluation of information sources, and digital identity management. These skills are essential for harnessing the potential of the internet while minimizing its risks, ultimately enabling children to thrive in an increasingly digital world.

Research has extensively explored the impact of digital technologies on children's physical and psychosocial development. Studies have raised

concerns about the effects of screen time on cognitive development, including:

- Sleep disturbances.
- Memory and reading ability.
- Concentration and communication skills.
- Anxiety symptoms when separated from devices.

A study published in JAMA Pediatrics found a link between early exposure to phones and tablets and emotional development in young children. A recent study uncovered concerning correlations between device use and emotional development in young children: Research findings indicate:

- Frequent tablet use at 3.5 years old is associated with increased anger and frustration by 4.5 years old.
- Children experiencing anger and frustration at 4.5 years old are more likely to rely on devices by 5.5 years old.
- These findings suggest that early exposure to tablets may hinder the development of healthy emotional regulation skills, potentially leading to a cycle of increased device reliance and emotional deregulations.

These findings suggest that early exposure to tablets may disrupt the development of healthy emotional regulation skills, potentially triggering a vicious cycle: Excessive device use → impaired emotional regulation → increased device reliance.

This highlights the importance of mindful device use and balanced childhood experiences to foster healthy emotional development. Experts Dr. Rahul Rai Kakkar and Dr. Achal Bhagat emphasized the importance of early childhood in brain development, highlighting the need for direct interaction, play, and engagement with surroundings to learn emotional regulation skills. Excessive screen time can disrupt this process. The World Health Organization (WHO) recommends:

- Children under 5 years: Limit passive screen time to 60 minutes/day.
- Children under 12 months: No screen time.
- Encourage physical activities, reading, and storytelling with caregivers.

These guidelines aim to reduce sedentary lifestyle and obesity, as part of the United Nations' (UN) awareness strategy. As we step into an increasingly digitized future, children who are familiar with digital technology. The next generation is being equipped with the skills necessary to thrive in tomorrow's workers. Coding classes and STEM-focused educational tools are providing children with:

- Indispensable knowledge demand across industries.
- A solid foundation in problem-solving, critical thinking, and creativity.
- A competitive edge in an increasingly technology-driven job market.

Early exposure to technology is not only preparing children for lucrative careers but also instilling:

- Digital literacy and fluency.
- Adaptability and resilience.
- A growth mindset, essential for success in an ever-evolving technological landscape.

Importance of online class

The COVID-19 pandemic accelerated the adoption of online classes in schools, ensuring continuity of education despite physical distancing measures.

While online learning has its pros and cons, its impact has been significant. Initially, online classes presented challenges, such as difficulty in focusing. However, innovative techniques helped mitigate these issues. Today, technology's vast potential is acknowledged across all age groups. Learning is a lifelong pursuit of success, and online classes have evolved from being supplementary to becoming an integral part of education.

Advantages of Google meet Classes during Covid-19

Online classes offer unparalleled convenience, allowing children to learn from anywhere, dress comfortably, and access recorded sessions for future reference. While physical classes have their benefits, online classes provide a safer alternative during pandemics, ensuring social distancing. Although, traditional classes are still preferred by many, online classes have emerged as a viable alternative in today's digital age. The online class system offers numerous advantages:

- Flexibility: Students can learn from the comfort of their homes.
- Autonomy: Students can choose their preferred study time, as most classes are recorded.
- Self-paced learning: Online classes enable students to learn at their own pace, whenever and wherever they want.

Overall, online classes provide a flexible and convenient learning experience, catering to diverse learning styles and preferences.

Improved Concentration of Students

Online learning tools have revolutionized the way we absorb new information. By leveraging engaging visuals, videos, and graphical displays, these tools capture students' attention, leading to improved performance. With just a pair of headphones, learners can tune out distractions and cover vast amounts of material efficiently. Key benefits of online learning:

- Efficiency: Online learning enables teachers to deliver lessons effectively, utilizing multimedia resources like videos, PDFs, and podcasts to enhance lesson plans.
- Accessibility: Online education transcends geographical boundaries, allowing students to attend classes from anywhere. Recorded lectures can be accessed at any time, providing flexibility and comfort.

Online learning has transformed the educational landscape, offering unparalleled efficiency, accessibility, and flexibility.

Accessibility

Online learning provides a financially viable alternative to traditional education, offering numerous cost benefits. By eliminating expenses associated with:

- Transportation to and from campus
- Meal plans and food costs
- Real estate and facility maintenance

Online education significantly reduces financial burdens, making quality education more accessible and affordable for a broader range of students. Additionally, digital course materials create a paperless learning environment, making it an affordable and environmentally friendly option. Further benefits of online learning include:

- Improved attendance: With the flexibility to learn from anywhere, students are less likely to miss lessons.
- Personalized learning: Online education caters to diverse learning styles, whether visual, auditory, or solo learning. This flexibility enables students to create an ideal learning environment tailored to their needs.

Overall, online learning provides an accessible, affordable, and personalized education experience, making it an attractive option for students with unique learning requirements. Online education has become the new norm, and its continuation beyond the pandemic is likely. The benefits of online learning, such as convenience, reduced paperwork, and cost-effectiveness, make it an attractive option for schools and students. However, online learning also presents several challenges:

- **Inability to focus:** Students struggle to concentrate on screens for extended periods, and distractions from social media and other sites can hinder learning. Teachers must create engaging, interactive lessons to maintain students' focus.
- **Technology issues:** Internet connectivity problems can disrupt learning, emphasizing the need for reliable and fast connections.
- **Sense of isolation:** Minimal physical interactions between students and teachers can lead to feelings of isolation. Schools should facilitate alternative communication channels, such as online messaging, emails, and video conferencing.
- **Teacher training:** Teachers require training to effectively use digital learning tools. Schools must invest in teacher training to ensure seamless online learning experiences.
- Excessive screen time: Prolonged screen time poses health risks, including bad posture and eye strain. Regular breaks and physical activities can help mitigate these effects.

By addressing these challenges, online education can continue to provide a convenient, effective, and flexible learning experience for students.

Teaching and Digital Divide

The shift to online classes during the pandemic exposed a significant digital divide. While students from middle- and high-income families in urban areas had the necessary resources to adapt, those from economically disadvantaged backgrounds struggled to keep up. Lacking access to smart phones, computers, and internet connections, students from poor backgrounds fell behind, and many were at risk of dropping out. Unfortunately, only a few state governments implemented initiatives to address this issue, leaving many students without support. The digital divide, characterized by disparities in connectivity and access to electronic devices, poses a significant risk of exacerbating existing inequalities among young people. The digital divide, characterized by disparities in connectivity and access to electronic devices, poses a significant risk of exacerbating existing inequalities among young people[2].

The digital divide refers to the significant disparities in access to technology, particularly

among groups distinguished by:

- **Socio economic status (SES):** Income, education, and occupation
- **Race and ethnicity:** Systemic inequalities and historical exclusion
- **Gender:** Sex-based disparities and social expectations

These disparities result in unequal access to:

- High-speed internet and reliable connectivity
- Devices, such as computers, smartphones, and tablets
- Digital literacy training and education
- Online resources, services, and opportunities

The digital divide perpetuates existing social and economic inequalities, making it essential to address and bridge this gap. In their book, Virtual Inequality, Moss Berger, et. al. (2003) defined digital divide as "the patterns of unequal access to information technology based on income, race, ethnicity, gender, age, and geography[3].

Addressing the digital divide is crucial because technology can serve as a powerful bridge to:

- Educational resources and online learning platforms
- Economic opportunities, such as remote work and entrepreneurship
- Healthcare services and telemedicine
- Social connections and community engagement
- Government services and civic participation

By providing equal access to technology, we can unlock new opportunities for marginalized communities, promote social mobility, and foster a more inclusive and equitable society. In his 1999 book, *Electronic Literacies: Language, Culture, and Power in Online Education*, Warschauer stresses that electronic literacy becomes an important aspect in contemporary society and states, "Reading the Web means intelligently finding, evaluating, and making uses of a great variety of sources of information"[4]. Information literacy encompasses more than just technical proficiency; it involves: critical thinking and media literacy. As stated in the book, Bridging the Diversity Divide, "As institutions of higher learning prepare students for an era of explosive change, curricula, and literacies must also reflect the expanding frontier of knowledge"[5].

India's online education system faces significant challenges. According to the Telecom Regulatory Authority of India (TRAI), the country's internet density stands at 48.4 Percent, indicating: Only 48.4 internet subscribers per 100 people nationwide. The rural-urban divide is stark: 66 percent of India's population resides in rural areas, yet, rural internet density is just 25.3 percent. This disparity hinders equitable access to online education, exacerbating existing inequalities and limiting opportunities for rural communities.

India is diverse country in terms of religion, caste, language, culture and religion and challenges are more to get access to internet device, networks because of disparity.

From the student's perspective, several barriers exacerbate the digital divide: - Limited access to devices, such as computers, laptops, or smart phones

- Unreliable or nonexistent internet connectivity
- Insufficient bandwidth, leading to slow loading times and dropped connections

These challenges deprive a significant number of students of equal access to education, hindering their academic progress and perpetuating existing inequalities.

From student side, access to device, networks and sufficient bandwidth is depriving a considerable portion of students from their studies and furthering this divide.[6]

In recent time, industrial society has changed to an information-driven one, where technology plays a vital role. However, this shift has created significant challenges (a) Many parents and students, particularly those in underserved communities, rely on basic phones, lacking access to smart phones, computers, or internet services. (b)This digital divide hinders their ability to develop essential technology literacy skills. Bridging this gap is crucial to ensure equal opportunities and future success for all.

According to 2020 Goldman Sachs report "India Internet: A Closer Look into the Future" As of Financial Year 2020: Only 42 percent of mobile phone owners in India possessed a smart phone. This limited smartphone penetration is expected to hinder further growth for low-income levels[7]. Cases are different in case of uneducated parents who don't know how to operate smart phone. A single mother belongs to lower strata of society not able to provide smartphone to child study.

Summary and conclusion

The impact of technology on children is a multifaceted issue, presenting both opportunities and challenges. On one hand, balanced technology use can:

- Enhance learning and cognitive development
- Foster social connections and global understanding
- Provide access to vast educational resources

On the other hand, excessive technology use can:

- Contribute to addiction, social isolation, and decreased physical activity
- Affect mental health, sleep patterns, and attention span
- Expose children to cyber bullying, online predators, and explicit content

Striking a balance and ensuring responsible technology use are crucial in maximizing benefits while minimizing potential harms. Digital solutions have transformed education, fostered creativity, and prepared children for the future. However, it's essential to acknowledge the concerns surrounding digital technology's impact on children.

Given ubiquity of technology in modern society, preventing internet use altogether is unrealistic. Instead, parents, caregivers, and healthcare professionals must work together to: optimize internet use, reduce risks and provide guidance and support. By adopting a balanced and informed approach to digital technology, we can help children harness its benefits while minimizing its potential harms.

Research findings indicate:

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associated with increased anger and frustration by 4.5 years old.

- Children experiencing anger and frustration at 4.5 years old are more likely to rely on devices by 5.5 years old.

These findings suggest that early exposure to tablets may hinder the development of healthy emotional regulation skills, potentially leading to a cycle of increased device reliance and emotional dysregulation.

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