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The impact of increased screen time on students during covid-19 school closures

Abstract

This article is a review performed through an extensive review of previous research. Its purpose is to provide a concise overview of the current knowledge regarding the effects of increased screen usage on kids during the COVID-19 school closures. Our objective was to offer a thorough and all-encompassing examination of the current body of research, scrutinizing and deliberating on the methodologies and findings of previously conducted studies pertaining to the subject matter. The global transition to remote learning during the COVID-19 epidemic resulted in an unprecedented increase in the amount of time students spent using screens. Recent research has indicated that children' screen usage has increased by an average of 11.5 hours per week during school closures. This large growth has had significant effects on students' physical health, mental well-being, and educational achievements. Further digital literacy and access to a wide range of learning tools are two good results. However, there have been proven adverse consequences, including musculoskeletal pain, eye strain, anxiety, sadness, and declining in educational inequalities. In addition to highlighting the benefits and challenges of more screen time, this article shows ways to reduce its negative impacts, including managing screen time, exercising, and engaging in mindfulness exercises. The essay also examines what it means for educators, parents, and lawmakers highlighting the importance of adopting well-rounded strategies for digital learning that protect student well-being and ensure fairness. It also emphasizes how important it is to conduct additional study in order to comprehend the long-term impacts and create efficient solutions catered to various demographics.

Keywords: screen time, covid-19, remote learning, children, adolescents, digital literacy, mental health, educational outcomes, school closures

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Abbreviations: COVID-19, coronavirus disease 2019; ICT, information and communication technology; WHO, world health organization; ADHD, attention-deficit/hyperactivity disorder

Background

The COVID-19 epidemic caused a worldwide shutdown of educational institutions, requiring an abrupt shift from traditional classroom-based instruction to remote, digital learning settings. This change has led to a significant surge in the amount of time that children and adolescents spend in front of screens, which has generated considerable worry regarding its effects on their physical and mental health, as well as their academic achievements. Prior research has demonstrated that increased screen time among kids can have both advantageous and detrimental consequences. On the good side, it can enhance digital skills and provide more access to educational materials. However, it also poses elevated risks for physical, mental, and behavioral health problems. This review aims to synthesize current research findings, examine the many effects of increased screen time, and propose effective approaches to reduce the negative consequences linked to prolonged screen use during the pandemic.[1–20]

Methodology

We conducted an extensive literature evaluation by searching numerous electronic databases, such as PubMed, Google Scholar, JSTOR, ERIC, and Scopus. The search was limited to peer-reviewed publications, meta-analyses, systematic reviews, and original research studies that were published from January 2020 to September 2024. The inclusion criteria were defined to include studies focusing on children and adolescents (aged 5-18) that particularly examined the effects of increased screen use during the COVID-19 school closures. The search was improved by using Boolean operators to combine keywords such as "screen time," "COVID-19," "remote learning," and "children and adolescents" in different ways. The articles were subjected to a manual screening process to determine their relevance, based on their titles and abstracts. Full-text reviews were then carried out to confirm that they satisfied all the requirements for inclusion.[19–30]

Inclusion and exclusion criteria

Inclusion criteria:

1. Peer-reviewed articles, meta-analyses, systematic reviews, and original research studies published between January 2020 and September 2024.
2. Studies focusing on children and adolescents (ages 5-18) experiencing increased screen time during COVID-19 school closures.
3. Research exploring both the positive and negative health, psychological, and educational impacts of increased screen time.
4. Publications in English to ensure the findings are accessible to a broad audience.
5. International studies that provide a diverse, global perspective on the effects of increased screen time.[31–36]

Exclusion criteria:

1. Studies focusing solely on adults or pre-school children (under age 5).
2. Articles not peer-reviewed, including opinion pieces, editorials, or anecdotal reports.

3. Publications that do not directly address screen time during COVID-19 school closures.
4. Non-English language studies to avoid translation bias.
5. Duplicates or studies with insufficient methodological quality as determined by established critical appraisal tools.

Search strategy

The literature search was conducted using multiple electronic databases, including PubMed, Google Scholar, JSTOR, ERIC, and Scopus. The search aimed to identify all relevant studies published from January 2020 to September 2024.

Keywords and search terms: A combination of the following keywords was used: "screen time," "COVID-19," "remote learning," "children," "adolescents," "health impacts," "digital literacy," "educational outcomes," "social isolation," "visual health," "coping strategies," "school closures," and "pandemic."

Boolean operators: The search terms were combined using Boolean operators (AND, OR) to refine the search results. For example, ("screen time" AND "COVID-19") AND ("children" OR "adolescents") AND ("remote learning" OR "school closures").

Filters and limits: Filters were applied to include only studies published in English and within the specified date range (2020-2024). Additional filters excluded articles that did not focus on the specified age group (5-18 years).

Manual screening: Titles and abstracts of articles were screened manually to identify studies that met the inclusion criteria. Full-text reviews were conducted for articles that passed the initial screening to ensure they met all criteria.

Reference list review: The reference lists of relevant articles were reviewed to identify any additional studies that were not captured in the initial database search.[37–48]

Results

Positive effects:

1. **Enhanced digital literacy and technological skills:** The shift to remote learning due to COVID-19 significantly improved digital literacy and technological skills among students.[2]
2. **Access to diverse learning resources:** Remote learning expanded access to diverse educational resources, including digital platforms and global classrooms, enhancing the overall learning experience.[2]

Negative effects:

1. **Physical health issues:** Increased screen time during remote learning has led to several physical health issues, such as musculoskeletal pain and eye strain.[3]
2. **Mental health challenges:** The surge in screen time has been linked to increased anxiety, depression, and social isolation among children and adolescents.[4]

Educational outcomes:

1. **Disparities in learning:** The digital divide created significant disparities in educational outcomes, especially for students from low-income families or rural areas.[5]
2. **Variable impact on academic performance:** Factors such as limited teacher interaction and lack of structured learning environments contributed to mixed academic results.[6]

Coping strategies:

1. **Screen time management interventions:** Effective strategies include digital detox periods, physical exercise, mindfulness practices, and encouraging parental involvement in guiding screen use.[7]

Discussion

The results demonstrate that while increased screen time has fostered certain beneficial outcomes, such as digital literacy and resource access, it has also exacerbated various health and educational challenges. Physical health issues, such as musculoskeletal pain and eye strain, have been prevalent among students due to prolonged screen use. Mental health problems, including anxiety and depression, have been intensified by social isolation and lack of face-to-face interaction. The pandemic's digital divide has also highlighted existing disparities in education, disproportionately affecting disadvantaged students. Effective interventions, including digital detox periods, regular physical activity, mindfulness practices, and parental involvement, are discussed as potential strategies to mitigate these negative effects. (Tables 1–5)

Table 1 Health impacts of increased screen time

Health impact	Description	References
Eye strain and vision issues	Continuous screen exposures leading to eye strain, dry eyes, and blurred vision.	4,36
Musculoskeletal pain	Increased neck, shoulder, and back pain due to prolonged sitting and poor ergonomics.	50
Sleep disturbances	Poor sleep quality linked to screen time, especially before bedtime.	6,12
Mental health challenges	Increased risk of anxiety, depression, and social isolation due to reduced face-to-face interaction	2

Table 2 Strategies to mitigate negative effects

Strategy	Description	References
Parental involvement	Parents play a key role in guiding screen use and setting limits.	30,50
Regular breaks and physical activity	Encouraging regular breaks and physical activities to counterbalance screen time.	17,39,41
Mindfulness and stress-relief practices	Implementing mindfulness exercises to reduce screen-induced stress and anxiety.	48
Digital detox and screen-free periods	Structured screen-free time to promote offline engagement and rest.	41

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Table 3 Psychological effects of increased screen time

Psychological effect	Description	References
Anxiety and depression	Increased anxiety and depression due to prolonged isolation and lack of social interaction.	1,2,26
Behavioral issues	Higher prevalence of behavioral problems, such as irritability and aggression, among children.	27
Digital addiction	Symptoms of digital addiction, including compulsive use of devices and withdrawal symptoms.	1,26,42
Attention deficit and hyperactivity	Increased screen exposure linked to attention problems and hyperactivity in some children.	1,26,27

Table 4 Impact of screen time on physical health and development

Physical health impact	Description	References
Decreased physical activity	Reduction in physical activity levels due to increased sedentary behavior associated with screen use.	18,50
Obesity and weight gain	Higher risk of obesity due to decreased physical activity and increased snacking during screen time.	3,17,36
Cardiovascular health risks	Potential increased risk of cardiovascular issues linked to prolonged inactivity and poor posture.	25
Impaired posture and musculoskeletal issues	Development of poor posture and musculoskeletal pain due to inappropriate ergonomics during screen use.	42

Table 5 Educational interventions and strategies to improve remote learning outcomes

Educational intervention	Description	References
Interactive and Engaging Content	Utilizing interactive digital tools and multimedia content to maintain student engagement.	44
Personalized learning approaches	Adapting teaching methods to suit individual learning styles and paces for better educational outcomes.	Carter S, Li Y, Chen H
Regular teacher-student interaction	Ensuring frequent communication between teachers and students to foster motivation and support.	Williams K, Nguyen P and Olson S
Technology access and support	Providing necessary technology and resources to students, especially those from disadvantaged backgrounds.	Brown S, White T, Davis R, Garcia J

Conclusion

This review underscores the dual-edged nature of increased screen time among students during COVID-19 school closures. While digital learning has facilitated significant advancements in digital literacy and accessibility to diverse educational resources, the adverse health impacts and exacerbation of educational disparities present substantial concerns. A balanced approach, incorporating structured guidelines for screen use, regular physical activity, mental health support, and equitable access to technology, is essential to maximize the benefits and minimize the risks associated with increased screen time. The increase in screen time among students during COVID-19 school closures has presented both opportunities and challenges. On one hand, the shift to remote learning has enhanced digital literacy, improved technological proficiency, and provided access to a wide range of online resources and personalized learning opportunities. These developments are critical in equipping students with skills that are essential for future learning and career development in an increasingly digital world.[34,35,38]

However, the negative consequences of prolonged screen time, such as physical health issues, mental health challenges, and academic disparities, cannot be overlooked. Extended screen exposure has been linked to eye strain, musculoskeletal pain, sleep disturbances, and increased risks of anxiety, depression, and digital addiction among children and adolescents. Moreover, the pandemic has exacerbated existing educational inequities, particularly for students from low-income families or rural areas who may lack access to reliable internet and digital devices.[3,11]

Implications for practice and policy: To mitigate these negative impacts while maximizing the benefits of digital learning, it is essential for educators, parents, and policymakers to adopt a balanced and evidence-based approach. Schools and educational institutions should implement structured guidelines for screen time, promote regular breaks, and encourage physical activities to reduce the risks associated with sedentary behavior. Additionally, integrating mental health support and digital well-being education into the curriculum can help students manage the psychological effects of prolonged screen use.[37,43]

Policymakers must address the digital divide by ensuring equitable access to digital devices and internet connectivity for all students, especially those in underserved communities. Providing resources and support for teachers and parents to manage screen time effectively is also crucial for fostering a healthier and more equitable digital learning environment.

Future research directions: This review underscores the need for further research in several key areas:

1. **Long-term health impacts:** Investigating the long-term physical and mental health effects of increased screen time in children and adolescents is essential to develop targeted interventions.
2. **Effective management strategies:** Research should focus on identifying and evaluating effective strategies for balancing digital and non-digital learning methods, including the role of technology in supporting personalized learning without compromising health.
3. **Parental involvement and digital literacy education:** Exploring the impact of parental involvement and digital literacy education in mitigating negative outcomes associated with screen time can provide valuable insights for future interventions.

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4. **Vulnerable populations:** More studies are needed to understand the specific effects of increased screen time on vulnerable populations, such as children with pre-existing health conditions or those from disadvantaged backgrounds, to develop tailored approaches that meet their unique needs.
5. **Comprehensive interventions:** Developing and testing comprehensive interventions that combine physical, psychological, and educational support will be crucial in addressing the multifaceted challenges posed by increased screen time.[49,50]

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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