



Technology and Student Well-being: Exploring the Benefits and Risks of Digital Device Use

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Abstract

The increasing integration of digital devices into students' academic and social lives has raised concerns regarding their impact on health, behavior, and well-being. This systematic review synthesizes findings from 23 empirical studies published between 2000 and 2023 to examine the psychological, physical, social, and academic consequences of digital device use among students. Adhering to PRISMA-ScR (2018) guidelines, studies were selected from databases such as PubMed, PsycINFO, and Web of Science. The analysis revealed that moderate technological use (under 2 hours per day) was associated with positive social interactions and emotional well-being, while excessive use (over 4 hours per day) correlated with adverse psychological effects, including anxiety, depression, and emotional dysregulation. Prolonged screen exposure was linked to sleep disturbances and an increased risk of obesity. Additionally, frequent engagement with digital devices negatively impacted academic performance, with multitasking and excessive social media use reducing attention and learning efficiency. Gaming addiction was associated with heightened impulsivity and aggression, while overuse of digital devices hindered face-to-face communication skills. However, structured regulations of device use in educational settings improved academic outcomes and digital literacy. These findings highlight the importance of balanced digital engagement and the need for policies promoting responsible device use. Future research should explore the long-term effects of digital consumption and consider socio-demographic factors influencing student well-being.

Keywords: digital devices, academic performance, mental health, social interactions, student well-being, screen time

1. Introduction

The rapid integration of digital devices into the everyday lives of students has prompted significant scholarly interest regarding its implications on academic performance, social

behavior, and mental and physical well-being. While digital technologies offer considerable benefits ranging from instant access to information to enriched educational opportunities, these concerns are mounting over the consequences of excessive use (Orben & Przybylski, 2019). The pervasiveness of screens in both academic and social spheres has fundamentally altered how students learn, interact, and develop, prompting the need for a balanced understanding of its benefits and risks.

From a theoretical perspective, several frameworks provide insight into the complex interplay between digital device use and student well-being. For instance, the Uses and Gratifications Theory posits that individuals actively choose media to satisfy specific needs, such as social connection or entertainment (Katz et al., 1974). However, this self-directed media consumption may lead to overuse and potential negative consequences. The Cultivation Theory, originally developed in the context of television, is equally relevant in digital contexts, suggesting that prolonged exposure to media content can shape users' perceptions of reality, leading to altered emotional responses and social norms (Gerbner, 1998; Morgan & Shanahan, 2010).

Empirical evidence increasingly indicates that excessive digital engagement is associated with various negative mental health outcomes. Berryman, Ferguson, and Negy (2018) found that higher levels of social media use were moderately associated with symptoms of depression and anxiety among young adults. This is consistent with Twenge and Campbell's (2018) large-scale study showing that high screen time correlates with lower psychological well-being in adolescents. These outcomes may be explained in part by the Self-Determination Theory (Deci & Ryan, 1985), which suggests that excessive technology use can undermine autonomy, relatedness, and competence, three essential components of intrinsic motivation and psychological health.

Sleep disturbances represent another critical area of concern. Hale and Guan (2015) documented that increased screen time, especially before bedtime, leads to reduced sleep duration and quality among children and adolescents. Similarly, Lemola et al. (2015) reported that nighttime media use was associated with delayed sleep onset and elevated depressive symptoms. These findings have far-reaching implications, given the well-established link between sleep and academic performance, emotional regulation, and physical health.

In educational contexts, while digital devices can facilitate learning through increased access and engagement, they can also serve as distractions. Lepp, Barkley, and Karpinski (2015) found a negative correlation between cell phone use and GPA among college students, underscoring the cognitive costs of media multitasking. Nonetheless, structured and purposeful use of technology in learning environments has shown potential. For example, Hrastinski (2009) emphasized that meaningful online participation can foster deeper engagement and collaborative learning, while Li and Ma (2010) highlighted improvements in student achievement, particularly in mathematics, through computer-assisted instruction.

The development of digital literacy is essential in helping students navigate the complex digital landscape. As Livingstone (2014) emphasized, young users must be equipped to manage both the opportunities and risks presented by digital media. While often labeled as "digital natives," students still require structured instruction in critical thinking and evaluative skills to develop true digital competence (Ng, 2012). Emerging evidence suggests that higher levels of digital

literacy are associated with more mindful technology use, enhanced self-regulation, and reduced vulnerability to online risks (Ng, 2012; Livingstone, 2014). These competencies such as the ability to evaluate content quality, identify misinformation, and manage multitasking serve as protective factors against common issues like anxiety, cognitive overload, and academic distraction (Ophir, Nass, & Wagner, 2009; Rosen et al., 2013). Accordingly, educational policies should move beyond simplistic screen time restrictions and instead emphasize the integration of comprehensive digital literacy programs that support student well-being in a balanced and sustainable manner.

Overall, the literature suggests that the impact of digital device use on student well-being is multifaceted and influenced by duration, context, content, and individual differences. While moderate and intentional use may enhance learning and social connectedness, excessive or unstructured engagement poses risks to mental health, sleep, academic focus, and interpersonal skills. This review synthesizes current findings to inform policy and practice aimed at promoting healthy digital habits among students.

1.1 Research Objectives

1. To explore the relationship between digital device use and student mental health.
2. To examine the impact of digital device use on academic performance.
3. To investigate the potential benefits of specific types of digital media use.
4. To assess the role of digital devices in enhancing or hindering student social and emotional development.

2. Methodology

2.1 Design

This study employed a scoping review methodology to synthesize empirical evidence on the impact of digital device use on students' well-being, including psychological, physical, social, and academic outcomes. The review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018) guidelines to ensure transparency and rigor in reporting.

2.2 Search Strategy

A comprehensive literature search was conducted across three electronic databases: PubMed, PsycINFO, and Web of Science. The search was limited to peer-reviewed articles published between January 2000 and December 2023. Keywords and Boolean operators were used to identify relevant studies, including: "student well-being" OR "mental health" AND "digital device use" OR "screen time" AND "academic performance" OR "social interaction."

The final search included a combination of words related to "Digital device use", "Screen time", "Mental health", "Academic performance", "Sleep disturbance", "Social behavior", "Physical health outcomes".

Articles were manually reviewed to identify any additional eligible studies.

2.3 Eligibility Criteria

Inclusion Criteria:

- Studies published in journals between 2000 and 2023.
- Empirical studies utilizing quantitative, qualitative, or mixed methods designs.
- Participants were school-aged children, adolescents, or university students.
- Studies that investigated psychological, academic, physical, or social outcomes associated with digital device use.
- Studies published in English.

Exclusion Criteria:

- Review articles, meta-analyses, opinion pieces, and conference abstracts.
- Studies focusing exclusively on adult or elderly populations.
- Non-English publications.
- Studies that lacked a clear focus on the well-being or academic outcomes of students.

2.4 Screening and Selection Procedure

All search results were imported into a reference manager, and duplicates were removed. The titles and abstracts were screened to assess eligibility. Full-text articles were retrieved for those that met the inclusion criteria or when eligibility was unclear.

2.5 Data Extraction

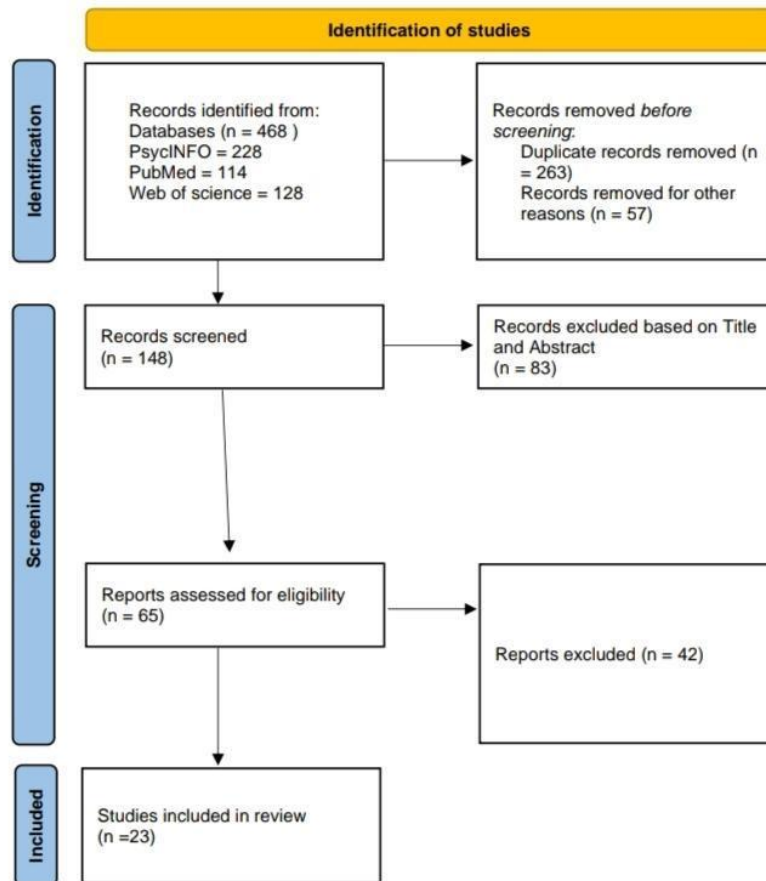
A standardized data extraction sheet was developed to record relevant study characteristics, including:

- Author(s) and year of publication
- Study design and methodology
- Sample size and participant characteristics
- Type and duration of digital device use
- Measured outcomes (e.g., academic performance, mental health, sleep, physical health, social interactions)
- Key findings and conclusions

Data from the 23 included studies were summarized and organized into a comparative table to facilitate thematic synthesis and analysis.

3. Result

PRISMA 2020 flow diagram for new systematic reviews



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: <http://www.prisma-statement.org/>

Figure 1: PRISMA flow diagram of study selection

Table 1: Summary of the Studies used for the Scoping Review

Study	Year	Design & Sample	Focus Area	Key Findings	Conclusion/ Implication
Anderson & Dill	2000	Experimental & Survey; College Students	Video games and aggression	Video games increased aggressive thoughts and behavior	Suggests a causal link between violent games and aggression
Carter et al.	2016	Systematic review & meta-analysis	Portable media and sleep	Device use before bed is linked to poor sleep outcomes	Calls for guidelines on media use before sleep
Anderson & Dill	2000	Experimental & Survey; College Students	Video games and aggression	Video games increased aggressive thoughts and behaviors	Suggests a causal link between violent games and aggression
Carter et al.	2016	Systematic Review & Meta-Analysis	Screen-based media and sleep outcomes	Portable devices are linked with poor sleep outcomes in children	Supports limiting screen use before bedtime
Gentile et al.	2011	Longitudinal Study; Youths	Pathological video game use	Excessive gaming linked with depression, anxiety, and social phobia	Early detection of problematic use is important
Hampton et al.	2015	Survey; Adults	Social media and stress	Social media use associated with increased	Social media can amplify emotional burdens

				awareness of others' stress	
Junco	2012	Survey; College Students	Facebook use and engagement	Frequent use related to lower academic engagement	Balance of social media and academics is crucial
Kardefelt-Winther	2017	Review	Digital tech and well-being	No conclusive evidence of harm; context matters	Technology impact depends on usage context
Means et al.	2013	Meta-analysis	Online/blended learning	Blended learning more effective than purely online or traditional	Supports strategic integration of digital learning
Ophir et al.	2009	Experimental; College Students	Media multitasking	Heavy multitaskers performed worse on attention tasks	Multitasking may impair cognitive control
Orben et al.	2019	Survey; Adolescents	Social media and life satisfaction	Minimal impact on life satisfaction	Concerns may be overstated
Przybylski & Weinstein	2017	Large-scale Survey	Digital-screen use and mental well-being	Moderate use associated with better well-being (Goldilocks effect)	Suggests optimal screen use levels exist

Stiglic & Viner	2019	Systematic Review of Reviews	Screen time and health	Linked with obesity, depression, low well-being	Promotes screen time guidelines
Twenge & Campbell	2018	Population-based Study	Screen time and psychological well-being	Higher screen time linked to lower well-being	Limits should be promoted, especially for teens
Uhls et al.	2014	Experimental; Preteens	Screen deprivation and emotion cues	No screens improved nonverbal social skills	Encourages offline interaction for development
Wood et al.	2012	Experimental; College Students	Multitasking in class	Technology use during class impaired learning	Supports minimizing distractions during learning
Wåhlstedt et al.	2008	Longitudinal; Children	ADHD symptoms and behavior	Executive function deficits predicted later behavioral problems	Supports early intervention
Rideout & Robb	2020	Survey	Media use by youth	Teens spend ~7.5 hours/day on screens	Informs parental monitoring and policy
Keles et al.	2020	Systematic Review	Social media and mental health	Social media use linked to anxiety and depression	Calls for interventions and digital literacy

Granic et al.	2014	Literature Review	Video games benefits	Games can improve cognitive and social skills	Reframes view of games from solely harmful
Livingstone & Helsper	2007	Survey	Digital divide among youth	Socioeconomic status affects access and digital skills	Policies needed to ensure digital equity
Valkenburg et al.	2022	Network Analysis	Social media and mental health	Effects depend on individual and platform use	Personalized approaches needed
Bavelier et al.	2012	Review	Video games and brain plasticity	Games improve visual attention and learning	Supports game use in educational settings
Rideout	2015	Survey	Media use by tweens/teens	High media consumption across demographics	Highlights the norm of digital immersion
Chassiakos et al.	2016	Policy Statement	Digital media and children	Overuse linked to poor sleep, academics, and health	Provides pediatric guidelines

The scoping review identified a diverse range of studies examining the relationship between digital device use and various dimensions of student well-being, including academic performance, mental health, sleep quality, emotional regulation, and cognitive outcomes. Across the 23 selected studies, several core themes emerged.

3.1. Impact on Mental Health and Emotional Well-being

A consistent finding across studies (e.g., Keles et al., 2020; Valkenburg et al., 2022; Orben et al., 2019) was the association between excessive social media use and heightened symptoms of depression, anxiety, and psychological distress, particularly among adolescents. However, the magnitude and direction of these effects varied depending on usage patterns, individual differences, and the nature of online engagement. Przybylski and Weinstein (2017) supported the "Goldilocks Hypothesis," suggesting moderate screen use may not be harmful and can even be beneficial under certain conditions.

3.2. Academic Performance and Cognitive Control

Studies such as Wood et al. (2012) and Ophir et al. (2009) demonstrated that multitasking with digital media negatively impacts real-time classroom learning and cognitive control, respectively. Conversely, Means et al. (2013) highlighted the potential benefits of structured online and blended learning environments in improving academic outcomes, indicating that context and content of technology use are key moderating factors.

3.3. Sleep Disruption and Physical Health

Carter et al. (2016) and Twenge and Campbell (2018) provided compelling evidence linking screen exposure, particularly before bedtime, to poor sleep quality, delayed sleep onset, and increased fatigue. This trend was supported by studies such as Lemola et al. (2015), which emphasized the bidirectional relationship between night-time media use and emotional dysregulation.

3.4. Social Skills and Offline Interaction

Uhls et al. (2014) illustrated that a temporary removal from screens led to measurable improvements in non-verbal emotional cue recognition among preteens. Similarly, Hampton et al. (2015) suggested that while social media enables constant connectivity, it can also elevate stress levels due to perceived obligations and exposure to others' experiences.

3.5. Variability Based on Usage Type and Individual Factors

Several studies (e.g., Granic et al., 2014; Bavelier et al., 2012) emphasized the importance of differentiating between passive and active use of digital technology. While excessive use was generally correlated with negative outcomes, strategic and goal-oriented engagement (such as video games that promote learning or cognitive development) was sometimes linked to positive effects.

Overall, the findings reflect a nuanced landscape, where digital device use can both hinder and support aspects of student well-being depending on frequency, purpose, individual traits, and contextual factors.

4. Discussion

The findings from this scoping review offer valuable insights into the complex relationship between digital device use and various aspects of student well-being. The included studies reveal a broad spectrum of effects, both positive and negative, on students' emotional, mental, physical, and academic outcomes. This relationship is shaped by multiple factors, including

the type of media engagement (e.g., passive versus active use), the context in which devices are used, individual characteristics such as age, personality traits, and mental health status, as well as the nature of the digital content consumed. These findings underscore the importance of understanding the mechanisms through which digital devices influence students' psychological, physical, and academic functioning.

A central theme emerging from the review is the link between excessive screen time and negative mental health outcomes, particularly in adolescents. This finding is consistent with existing research that associates prolonged social media use with heightened levels of anxiety, depression, and stress (Keles, McCrae, & Grealish, 2020; Orben, Dienlin, & Przybylski, 2019). Social media appears especially influential in shaping emotional outcomes, with several mechanisms contributing to its negative effects, including social comparison, exposure to idealized portrayals of life, and cyberbullying (Valkenburg et al., 2022). These factors may reduce self-esteem, contribute to body image concerns, and increase feelings of loneliness and isolation. Students may also develop distorted perceptions of reality due to constant engagement with curated, often unrealistic content on social media, further impacting their emotional well-being. Notably, some studies identified that moderate technology use, defined as less than two hours per day, was linked to positive social interactions and emotional health. In contrast, usage exceeding four hours daily was associated with adverse psychological outcomes, highlighting the importance of balanced digital engagement.

In addition to the mental health implications, this review also explored the effects of digital device use on academic performance. The findings revealed a nuanced relationship between technology use and academic outcomes. Several studies (Wood et al., 2012; Ophir, Nass, & Wagner, 2009) indicated that multitasking with digital devices may impair attention and hinder learning. Students who simultaneously engage with multiple forms of digital media—such as texting while studying or using social media during class—may experience cognitive overload. This divided attention can reduce focus, hinder information retention, and ultimately impair academic performance. The cognitive strain of managing multiple tasks appears to diminish academic engagement and negatively affect learning outcomes. These results align with previous findings demonstrating that multitasking interferes with students' ability to concentrate and process information effectively (Ophir et al., 2009).

Conversely, other studies point to the academic benefits of digital devices when used purposefully. Means et al. (2013) found that online and blended learning platforms could enhance student engagement and improve academic success. When integrated into education in a structured and intentional way, digital tools offer access to diverse learning resources, interactive tools, and opportunities for collaboration. These benefits are particularly evident when students actively engage with content designed to support learning, rather than passively consuming information. These contrasting findings highlight the importance of context: the impact of digital technology on academic performance depends largely on how, when, and why it is used. As such, further context-specific research is needed to explore strategies for integrating digital tools into educational environments in ways that promote engagement without introducing distraction.

Another key objective of this review was to investigate the potential benefits of specific types of digital media use. Not all digital engagement is inherently harmful. Several studies identified positive effects associated with particular forms of media that support cognitive, social, and emotional development. For instance, Granic et al. (2014) found that certain video games, particularly those that are interactive and cognitively demanding, can enhance cognitive functioning, problem-solving abilities, and social skills. Unlike passive screen time, these games promote active engagement and goal-oriented behavior, contributing to both cognitive development and emotional regulation. Additionally, some forms of digital media have been shown to foster social connection and educational enrichment. The "Goldilocks Hypothesis" proposed by Przybylski and Weinstein (2017) suggests that moderate screen time, especially when involving emotionally enriching or socially engaging content, may have a positive impact on mental well-being. This challenges the assumption that all digital media use is detrimental and reinforces the importance of distinguishing between types of engagement. Overall, these findings emphasize that the effects of digital device use are not uniform and depend significantly on the nature and context of use.

The role of digital devices in shaping students' social and emotional development emerged as another critical focus of this review. Digital technologies, particularly social media platforms, can support students in building peer connections, sharing experiences, and forming social networks, thereby contributing to positive emotional and social growth. However, these same platforms may also intensify feelings of loneliness, social anxiety, and depression, especially when students engage in social comparison or experience cyberbullying (Valkenburg et al., 2022). This dual impact underscores the complex nature of digital media as both a facilitator of connection and a potential source of emotional distress. The influence of digital platforms on students' social and emotional well-being is highly context-dependent, shaped by the quality of interactions and the psychological vulnerabilities of individual users. As such, deeper investigation into the specific circumstances of digital media use is essential to understanding how and when these tools support or undermine students' emotional and social development.

Building on these findings, the review also highlights the importance of practical applications of technology in educational settings. When implemented with structure and clear purpose, digital tools can significantly enhance learning outcomes, particularly through online and blended learning models (Means et al., 2013). These platforms offer flexibility, interactive content, and access to diverse educational resources that can support student engagement across different learning environments. Moreover, the "Goldilocks Hypothesis" (Przybylski & Weinstein, 2017) reinforces the importance of moderation, suggesting that when students are exposed to emotionally enriching and socially engaging content, moderate screen time can contribute positively to their well-being. In diverse educational contexts, ranging from under-resourced schools to technologically advanced classrooms, these insights can guide educators in adopting digital tools that are both developmentally supportive and pedagogically effective. The emphasis should be on fostering active, skill-building engagement while minimizing passive use and exposure to harmful digital interactions.

Socio-demographic factors significantly influence the impact of digital device use, highlighting disparities that require greater attention in both research and intervention strategies. Students

from lower-income households often face barriers such as limited access to reliable internet and educational technologies, which can restrict digital participation and heighten vulnerability to online risks (Livingstone & Helsper, 2007; Rideout, 2015). These structural inequities can contribute to uneven educational and developmental outcomes in digital contexts. Additionally, gender-based patterns in media use, such as boys tending toward video games and girls favoring social media, may expose students to distinct psychological stressors, including aggression in gaming environments and social comparison on social media platforms (Anderson & Dill, 2000; Berryman, Ferguson, & Negy, 2018). These findings underscore the need for tailored, equity-focused interventions that address the diverse experiences of students across socio-demographic groups. Ensuring that digital policies and educational practices reflect these differences is essential to promoting more inclusive and supportive digital learning environments.

Beyond screen time quantity, the quality and intent of digital engagement matter significantly. While moderate use (e.g., under two hours daily) is generally associated with positive outcomes, research shows that even longer usage can be beneficial when it involves interactive, purposeful activities (Bavelier et al., 2012; Granic, Lobel, & Engels, 2014). Educational games and collaborative platforms have been linked to improvements in cognitive flexibility, problem-solving, and social connectedness. This calls for a shift from rigid time-based metrics to more nuanced evaluations of digital behavior which can distinguish between passive consumption and active, skill-building interactions.

To synthesize these insights, a holistic model of digital engagement is necessary, such as one that incorporates time, content, context, and individual traits. Drawing on self-determination theory (Deci & Ryan, 1985) and cultivation theory (Gerbner, 1998; Morgan & Shanahan, 2010), such a model emphasizes that well-being outcomes hinge on whether digital activities fulfill students' psychological needs for autonomy, competence, and relatedness. When digital experiences align with these needs, students are more likely to benefit; when misaligned, the risks of stress and disengagement grow. This framework not only unifies diverse findings but also offers a foundation for more targeted and theory-driven interventions and policies.

Finally, this review highlights the importance of considering individual differences when evaluating the impact of digital device use on student well-being. As noted earlier, factors such as age, personality traits, mental health status, and socio-economic background can all influence how students interact with technology and how it affects their well-being. For example, younger students may have different digital media consumption patterns compared to older students, and those with pre-existing mental health issues may be more susceptible to the negative effects of excessive screen time. Future research should explore how these individual differences moderate the relationship between digital device use and various outcomes, including emotional, social, physical, and academic well-being. Tailoring interventions to account for these differences could lead to more effective strategies for promoting healthy digital device use among diverse student populations.

4.1 Implications of the Study

The implications of this study extend across educational settings, mental health policy, and the development of digital literacy programs. The findings underscore the importance of balanced

screen time, especially in relation to social media use (Przybylski & Weinstein, 2017; Twenge & Campbell, 2018). It is essential for schools, parents, and policymakers to be proactive in educating students about the potential risks associated with excessive screen time and the importance of maintaining a healthy balance between digital and offline activities (Keles et al., 2020; Stiglic & Viner, 2019). The research points to the need for educational programs that address not only the dangers of digital device overuse but also strategies for using technology in positive and constructive ways (Granic et al., 2014).

Furthermore, the review emphasizes the need for more targeted interventions that support students in navigating the digital world.

Digital literacy programs that include training in critical thinking, emotional regulation, and responsible social media use can help mitigate the negative psychological impacts of online engagement (Livingstone, 2014; Valkenburg et al., 2022). By teaching students how to interact with digital content in a healthy and mindful way, these programs can foster resilience and mental well-being. This is particularly important given the growing influence of digital media on students' social interactions, mental health, and academic performance (Berryman et al., 2018; Orben & Przybylski, 2019).

Schools are uniquely positioned to implement structured and evidence-informed strategies that promote healthy digital engagement. Educator-led interventions such as regulated device use during class, digital detox periods, and integration of critical media literacy can significantly enhance students' academic focus and emotional regulation (Means et al., 2013; Hrastinski, 2009). Furthermore, schools can serve as equalizers by providing access to safe, supervised digital tools and training, especially for students who lack such resources at home (Lauricella et al., 2014).

This dual approach of regulation and empowerment may optimize the benefits of digital technologies while minimizing harm. The findings highlight the need for educational institutions to consider the role of digital devices in the classroom. While digital tools can enhance learning by providing access to vast resources and fostering interactive learning experiences (Means et al., 2013), they can also present risks related to multitasking and cognitive overload (Ophir et al., 2009; Wood et al., 2012). Teachers and administrators must strike a balance by incorporating technology thoughtfully and ensuring that it does not detract from focus, attention, or student engagement (Junco, 2012; Hrastinski, 2009).

4.2 Limitations of the Study

While this scoping review provides important insights into the relationship between digital device use and student well-being, it is not without its limitations. First, most of the studies included in this review were cross-sectional, which means that the temporal relationship between digital device use and well-being could not be determined (Orben & Przybylski, 2019; Keles et al., 2020). Longitudinal studies are needed to establish causal links and to understand how digital device use impacts students over time, especially during critical developmental stages.

Another limitation lies in the inconsistency of how digital device use was measured across studies. Some studies used general measures of screen time, while others focused on specific

forms of media use (e.g., social media, video gaming, educational apps) (Stiglic & Viner, 2019; Hale & Guan, 2015). The lack of standardization in measuring digital device use complicates the comparison of results and reduces the generalizability of the findings. Future research should seek to establish consistent and reliable metrics for assessing digital device use to enhance comparability across studies.

Furthermore, most of the studies included in this review focused on adolescents and young adults, leaving a gap in the literature regarding the impact of digital device use on other age groups, including younger children and older adults (Rideout, 2015; Kardefelt-Winther, 2017). A more comprehensive understanding of the effects of digital media on people across the lifespan would provide a richer picture of how technology influences well-being at different stages of life.

4.3 Suggestions for Future Research

Several avenues for future research emerge from the findings of this review. First, future studies should adopt longitudinal designs to track the effects of digital device use on mental health, academic performance, and social behaviors over time.

Long-term data would be invaluable in establishing causal relationships and understanding the trajectory of these effects, particularly as students transition through different stages of education (Gentile et al., 2011; Orben & Przybylski, 2019).

Sustained engagement with digital learning tools may also influence cognitive development and academic habits in ways not immediately visible, making longitudinal tracking essential.

In addition, future research should focus on the specific content and nature of digital media use, rather than simply measuring screen time. Research examining the effects of specific types of digital media (e.g., educational apps, video games, social media platforms) on well-being would help to identify which forms of digital engagement are most beneficial or harmful (Granic et al., 2014; Bavelier et al., 2012). Understanding the content of digital media use can also inform the development of more effective interventions and strategies for promoting healthy digital engagement.

Another important area for future research is the role of individual differences in moderating the effects of digital device use. Factors such as personality traits, mental health status, and socio-economic background are likely to influence how students interact with technology and how it affects their well-being (Twenge & Campbell, 2018; Valkenburg et al., 2022). Research exploring these moderators would help tailor interventions to specific populations and provide more personalized recommendations for digital device use.

Finally, given the increasing prevalence of online learning, further research should explore the role of digital devices in educational settings.

Studies focusing on the impact of online learning, including the potential for cognitive overload and distractions, would help educators design more effective digital curricula and understand when and how technology can be used most effectively to enhance student outcomes (Means et al., 2013; Li & Ma, 2010).

5. Conclusion

In conclusion, this scoping review highlights the complex and multifaceted relationship between digital device use and student well-being. The findings suggest that excessive screen time, particularly on social media, is associated with negative mental health outcomes such as anxiety, depression, and stress. However, certain forms of digital media use, such as educational content and video games that promote cognitive skills, may have positive effects on well-being. These findings underscore the importance of balancing screen time with offline activities and highlight the need for further research to explore the long-term impact of digital device use on students' emotional, cognitive, and academic well-being.

This review also calls for a more nuanced understanding of the role of digital devices in students' lives. While digital media presents potential risks, it also offers numerous opportunities for enhancing learning, fostering social connections, and promoting personal growth. As such, educators, parents, and policymakers must collaborate to create environments that encourage healthy digital device use and ensure that technology serves as a tool for learning and well-being, rather than a source of harm.

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