Screen Time and Adolescents' Academic Achievement

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Abstract

The purpose of this systematic literature review was to define "screen time" with adolescent academic achievement based on measurement within the existing literature and to also identify and define subsets of screen time, i.e. passive screen time, and active screen time. The protocol for this systematic literature review followed PRISMA 2020 recommendations. To draft a protocol, the author reviewed the literature. The author then prepared a protocol describing the keywords, databases, and screening procedures in an Excel spreadsheet. Search terms will consist of "screen time", "adolescents", "positive/negative effects", and "academic achievement". An initial search found there were 1,420 articles. The researcher only found 19 to be useful for this study. Results found that the two main areas in which screentime measurement was found in the articles on academic performance were physical and psychological well-being. Subsets of screentime measures found in the articles are categorized as passive or active screentime.

Keywords: Screen time, Adolescents, Positive/Negative effects, Academic achievement.

1. Introduction

Screen time increased during COVID-19 and remained elevated after reducing public health regulations (Hedderson et al., 2023). Research reported that an increase in the amount of screentime among adolescents could contribute to virtual schooling that took place during the shutdown of COVID-19; virtual instruction was known as learning through any technology to students that does not require the teacher to be physically present (Black & Thompson, 2021). However, there has been a continuing increase in screentime even before the school closures of COVID-19. In 1997, the average time screen time daily for children aged 0 to 2 was 1.32 hours per day and 2.47 hours per day for children ages 3 to 5 years. By 2014, screen time among children aged 0 to 2 it increased to 3.05 hours per day, with most of the time spent watching television and on other mobile devices (Whitney & Peterson, 2019). The purpose of this systematic literature review was to define "screen time" with adolescent academic achievement based on measurement within the existing literature and to also identify and define subsets of screen time, i.e. passive screen time, and active screen time.

2. Literature Review

The debate on screentime and adolescents' academic outcomes continues to be a controversial topic of whether digital media screentime positively or negatively influences adolescents' psychological functions in areas of academics and policy (Kaye et al., 2020). Researchers have stated that the term screentime turned meaningless in the new wave of the digital landscape and that a theoretical framework would help to investigate how and why digital media impacts adolescents (Granic et al., 2020). The definitions of screen time vary and could result in issues related to measurement and comparison (Kaye et al., 2020). The World Health Organization (WHO) investigated how screentime is related to sedentary behaviors, and their

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organization's definition of screentime was "Time spent passively watching screen-based entertainment (TV, computer, mobile devices). Does not include active screen-based games where physical activity or movement is required." The notion that screentime is only in terms of sedentary behavior may not apply to all people with the amount of screentime most individuals have in their daily lives due to the current digital environment. Therefore, a more unified definition of screen time would also improve the literature (Kaye et al., 2020).

Researchers have argued a need for more longitudinal studies on adolescents' screen time and academic achievement (Granic et al., 2020; Kaye et al., 2020). However, current longitudinal studies on screen time academic achievement among adolescents obtained mixed and contradictory findings, with some having positive or negative associations, while others found no association (Amez et al., 2023; Coyne et al., 2020; Madigan et al., 2019; Sanders et al., 2019). Amez et al. (2023) were the first worldwide to conduct their three-year longitudinal study on the causal impacts of smartphone use on academic performance among students attending classes from two Belgian universities. Researchers have identified an increase in overall smartphone use and a decrease in exam scores among students by 0.349 points, with similar findings when smartphones were used while studying or attending class.

On the other hand, Coyne et al. (2020) conducted an 8-year longitudinal study to examine the association between time spent using social media and depression and anxiety at an individual level, finding that increased time spent on social media was not associated with mental health issues across development when examined at the participant's level of individuality. Even at 24, 30, and 60 months of age, children's screen time has been assessed longitudinally with Madigan et al.'s (2019) study from 2011 to 2016 that researched children's screen time and developmental outcomes. The researchers had 2,441 mothers who reported total hours per week as screentime, and mothers answered questionnaires as developmental outcomes. On average, children aged 24, 30, and 60 months watched up to 25 hours of television per week (Madigan et al., 2019). Sanders et al. (2019) found that educational screen time was associated with positive outcomes. They found that passive and interactive screentime had low effects negatively on children's results with their study on Australian children aged 10-11 every two years from 2010 to 2014 to identify relationships between different types of screentime, passive, educational, and interactive, and various outcomes such as physical, psychological, and educational.

The mixed results do not stop with longitudinal studies. Recent reviews and meta- analyses have repeatedly produced mixed results regarding the association of time spent on screen-based activities with academic performance in specific areas with children and adolescents (Adelantado-Renau et al., 2019; Viner et al., 2022). Adelantado-Renau et al. (2019) analyzed 5,599 articles, and the meta-analysis did not find an association between the amount of screen time overall with various social media outlets other than children and adolescents' academic performance. Television and video gaming time were reported to be the only two social media outlets that were negatively associated with academic performance: students' composition scores, language, and mathematics (Adelantado-Renau et al., 2019). Viner et al. (2022) systematically reviewed 36 articles about the association between school closures during the COVID-19 pandemic and the well-being of children and adolescents ages 0-19. They identified that the currently available data did not allow for distinguishing between actual school closures and other lockdown factors that could influence children's and adolescents' well-being.

Secondary analyses conducted on the association between screen time and academic achievement among adolescents have also yielded mixed results with researchers. Hedderson et al. (2023) investigated 129 children's screentime before and during the pandemic from July 2019 to August 2021 using the ECHO Child Media questionnaire asking parents of children the different types of digital devices their child uses, how much their child uses said digital device, and what activity is the child using said digital device for from educational or recreational.

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Researchers have found increases in total screen time, educational screen time, and recreational screen time. A 2022 dissertation in public health conducted a secondary analysis with The Centers for Disease Control and Prevention's 2019 Youth Risk Behavior Survey System data but focused on health behaviors such as sexual health and healthy weight management (Cadogan Noland, 2022). Kalvas and Harrison (2024) conducted a secondary analysis around screen time and sleep duration. Boers et al. (2019) used data from a randomized clinical trial assessing the 4- year efficacy of a personality-targeted drug and alcohol prevention intervention to conduct secondary analysis on the association between various types of screen time and depression in adolescents. A more robust secondary investigation involving screen time could be limited because of the mixed definitions of screen time and limited publicly available datasets.

Most of the existing literature on screen time remains mixed in conclusions on how prolonged screen time influences adolescents' academic performance, and many social scientists still focus primarily on hours spent in front of the screen. A reason for the mixed results could be that existing reviews have investigated the relationship between screen time and academic achievement regarding an individual's physical activity, obesity, sedentary behavior, sleep patterns, and socioeconomic status (Kwok et al., 2021; Hisler et al., 2020; Janssen et al., 2020). Research contains different terms used with screen time work, such as media time and digital engagement (Kaye et al., 2020). Researchers have argued that understanding adolescent identity development can help pinpoint adolescents' digital experiences (Granic et al., 2020). The difficulties discussed above that involve conceptualizing and measuring screen time over time continue to be identified as an ongoing gap in the literature (Kaye et al., 2020). This study aims to define screen time involvement with adolescents and their academic achievement based on current literature.

3. Purpose

The purpose of the systematic literature review was to define "screen time" with adolescent academic achievement based on measurement within the existing literature and to also identify and define subsets of screen time, i.e. passive screen time, and active screen time. Definitions were formulated by identifying how screen time was measured in each specific study by researcher. This review was exploratory.

4. Inclusion Criteria

This review is limited to peer-reviewed work that engaged with empirical evidence dating back to 2000. Other reviews were not included due to wanting to define screen time by how researchers measured screen time for their study. Studies will only be used if the participants used for the study, are adolescents from ages 10-24. Search terms will consist of "screen time", "adolescents", "positive/negative effects", and "academic achievement".

5. Methods

The protocol for this systematic literature review followed PRISMA 2020 recommendations. To draft a protocol, the author reviewed the literature. The author then prepared a protocol describing the keywords, databases, and screening procedures in an Excel spreadsheet. The same keywords were used throughout the search. Articles were screened from March 15, 2024, to March 31, 2024. The practical screening focused on identifying current literature going back to 2000. Additionally, only peer-reviewed work that engaged with empirical evidence was included in the final review to ensure quality research was identified. Once initial results were screened for potential inclusion in the study, the text was reviewed to check for relevancy and quality. Once identified as appropriate, the methodology was identified and recorded as quantitative, qualitative, secondary data analysis, or mixed methods.

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6. Databases

An initial search on EBSCOhost found zero results relating to the keywords selected for the criteria. A Google Scholar search found 1,420 articles. Google Scholar was determined to help increase the study's sensitivity. In addition, the researcher sorted Google Scholar results in one session to help reduce the chance that results could change from identical searches.

7. Review Process

Results were limited to peer-reviewed articles to help ensure high-quality results. Additionally, the study was limited to studies that produced new data based on empirical research; systematic reviews, dissertations, thesis, books, book chapters, and conference presentations were also excluded. The initial stage of this review involved reading each title and abstract to check for potential relevance. An Excel spreadsheet was used to help evaluate full- text articles and extract data relevant systemically from the selected articles. The Excel sheet included the study design, participant demographics, definitions of screen time, and subsets of screen time examined in the articles. Screen time also had to be a measured variable in the study. Once the articles were complied with, then the entire article was analyzed for appropriateness.

Empirical, peer-reviewed studies were used for the systematic review. Other reviews, dissertations, thesis, books, book chapters, and conference presentations were excluded from the search excluding 872 articles: 175 review entries and books and 697 dissertations and thesis.

Articles were systematically reviewed to remove 510 articles from the analysis due to not meeting inclusion criteria such as not having participants ages 10 to 24, not measuring screen time, or not being a longitudinal, mixed method, or secondary analysis. After further evaluation of the 38 articles remaining, 19 articles were removed due to including parental and teacher responses in studies or participants were students with learning disabilities. In total, there were 19 studies included for analysis (See Figure 1). All studies used for the analysis are included in the reference page.

8. Results

All units of measurements of screentime in the articles were measurements of how many hours per day adolescents spent either online, on social media, watching TV, or playing video games. The two main areas in which screentime measurement was found in the articles on academic performance were physical and psychological well-being. Screentime was categorized as a sedentary behavior when measured for physical activity (Aulbach et al., 2020; Lee & Spence 2016). Screentime helped measure rates of depression and anxiety among adolescents when measured for psychological well-being (Marciano, et al., 2022; Sârbu, et al., 2024; Thorisdottir, et al., 2020; Twenge, et al., 2018). Subsets of screentime measures found in the articles are categorized as passive or active screentime. Passive, or leisure, screentime use consisted of watching videos, TV, or continuous scrolling through social media apps, while active screentime involved interactions among users by liking posts, uploading videos or photos, and engaging in academic purposes (Coplan et al., 2022 & Keles, et al., 2024). For screentime measures of psychological well-being, gratification, and ritual habits were also categorized as passive screen time.

9. Summative Data

The researcher initially screened 1,420 articles from Google Scholar in stage one of the systematic literature review. A total of 19 articles were used for the analysis based on inclusion criteria selected by the researcher. As seen in Table 1, 5 of the 19 articles were in the physical category and 14 were in the psychological well-being category. As seen in Table 2, 14 of the studies were quantitative, 2 were secondary, and 3 were qualitative studies.

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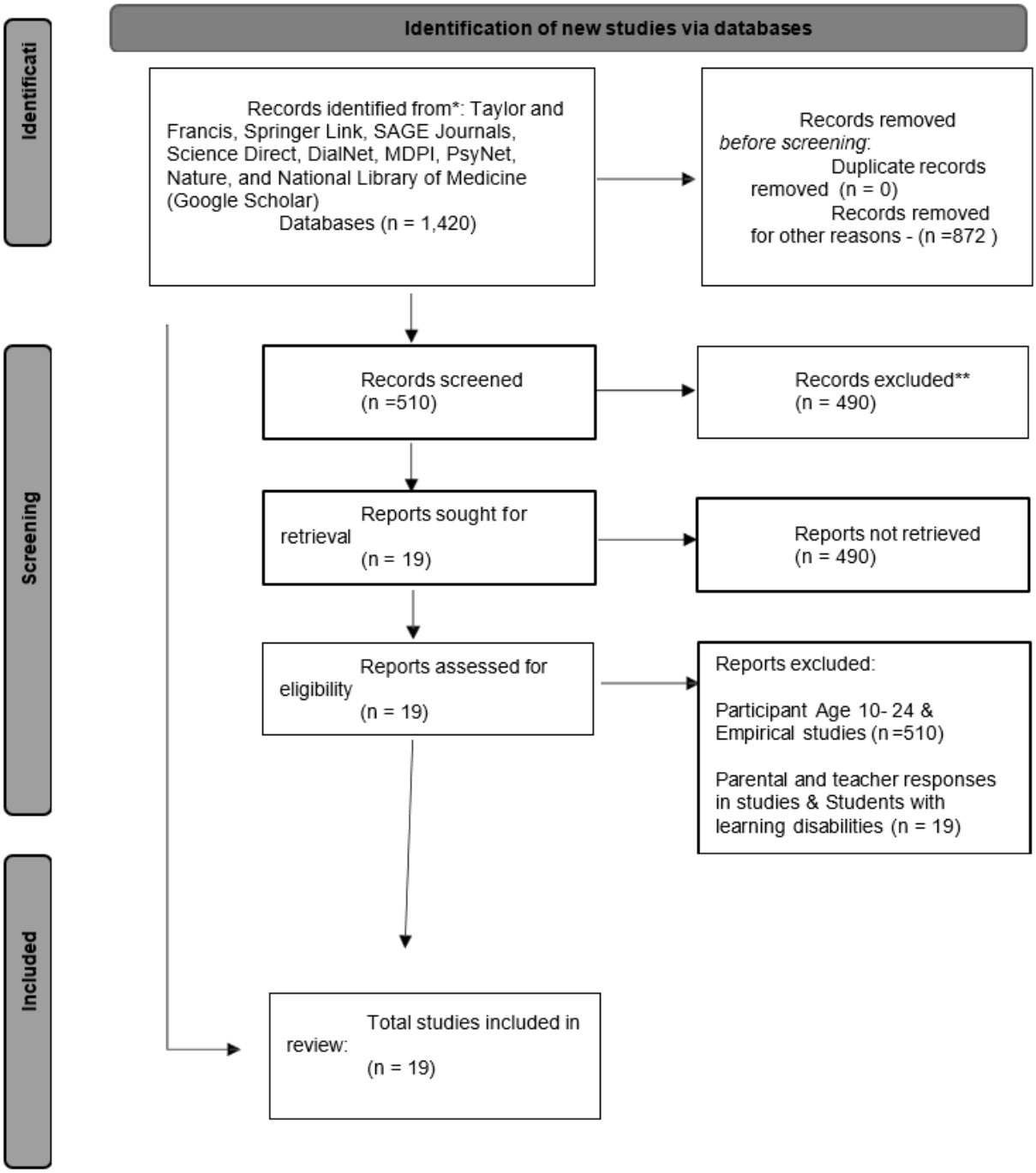

Figure 1: Identification of new studies via databases

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Table 1: Measurements of screentime

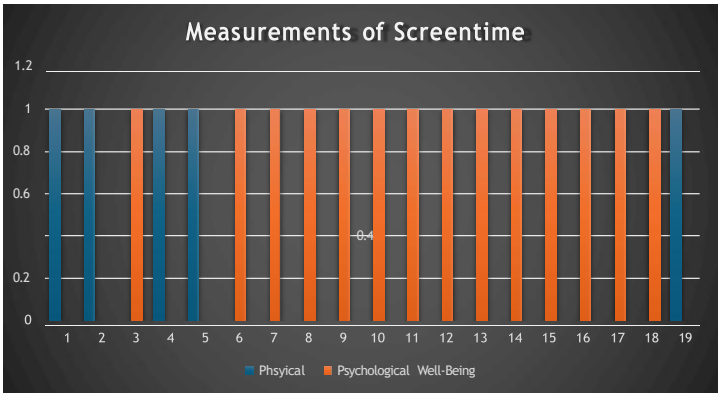
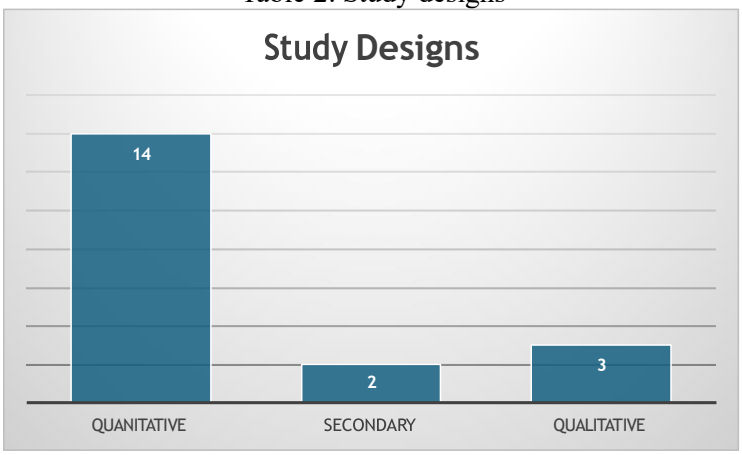


Table 2: Study designs



10. Lack of Measurement

This study indicates that more research needs to be conducted on not just the amount of screen time students use, but also how that screen time is being measured across different areas. This study suggests that studies that measure screen time among adolescents and their academic performance are limited to only two main categories which are psychological well-being and physical well-being. This study indicates a gap in the existing literature by using more than just two variables of measurement. Subgroups of screentime measurement were passive screen time use and active screen time use. Passive screen time is the most negative towards adolescents as they are not engaging in any content whatsoever. This study addresses that gap that there is still not all around way to measure adolescent's passive screen time use.

11. Limitations

One potential limitation of our study could be publication bias which is that studies with exciting findings are more likely to be published and more likely to be returned from search results. Additionally, the researchers were limited to studies conducted in English. Finally, it is also possible that other studies did use different keywords or did not have the keywords "screen time", "adolescents", "positive/negative effects", and "academic achievement" in the main abstract.

12. Conclusion

Despite these limitations, the data indicates that almost most of the screen time and academic achievement studies among adolescents were measured either in the area of psychological or physical well-being.

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Subgroups of screentime measurement were passive screen time use and active screen time use. Passive screen time, according to the literature, seems to be the most influential to adolescents in the areas of psychological and physical well-being. These two in turn then affect academic achievement.

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