

The Impact of Digital Devices on Students' Physical, Social, and Mental Health: A Case of Secondary Students at the Sri Lankan International School Riyadh (SLISR)

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ABSTRACT

With the advancement of electronic devices, life has become easier and much quicker. However, overuse of internet-assisted applications and tools as well as online platforms can harm one's physical, mental, and social health by increasing anxiety, depression, and isolation. The current study examines how digital disturbance affects students' mental, social, and physical well-being and informs of how to mitigate those detrimental impacts, thereby enhancing productivity, broadening skills, and improving academic achievements. This qualitative study employed semi-structured interviews to gather information from ten students in grade 11 and 5 parents at the Sri Lankan International School, Riyadh. The findings of the study were analyzed using the Thematic Analysis (TA) framework. The results indicated that the increasing reliance on digital devices has led to a range of negative consequences for students' physical, social, and mental health, which in turn significantly affects their academic performance. These adverse effects are evident in various academic challenges, including reduced academic quality, increased workloads, absenteeism, boredom, poor organization, difficulties in understanding educational tasks, inadequate preparation, and ultimately, low learning achievement. Students' screen time is largely increasing as a result of the pressure on teachers to incorporate technology into the majority of their lessons. The findings point to the need to reduce students' screen time as well as the harmful effects. This study has raised awareness of the detriments of utilizing digital devices in the classroom and made recommendations on how to integrate them more successfully into the personal and academic lives of students. The study has implications for ESL teachers, syllabus designers, and school management.

Keywords: *Academic performance, Digital devices, Mental health, Physical health, Social health*

INTRODUCTION

The most specific element of the modern age is the advancement of technology's impact on human existence. Thus, society is presently in a new age known as the digital environment (Kesici & Tunc, 2018). People have been exposed to high-definition television, Facebook, YouTube, online streaming, "green" automobiles, 3-D technologies, and so on (Lepcha & Parveen, 2020). As extensive Web surfing and quick technological adoption grow, researchers attempt to determine the effects of heavy Web usage, particularly on younger students. Critically, the universe of social networking apps and digital devices captivates children's

attention. Mobile phones, laptops, iPads, free Wi-Fi, game consoles, and electronic toys are increasingly becoming popular at present. As per Klopfer et al. (2009), "every day, many students are spending countless hours immersed in popular technologies—such as Facebook or Myspace, World of Warcraft, or Sim City" (p. 1). This means that young children have been found to exhibit addictive behaviors towards digital devices. Especially, mobile phone usage of students at schools and colleges who are preparing for competitive environments has become a concern for everyone (Khan & Abid, 2021). The studies conducted in developed countries reveal that access to electronic devices and services is more widespread in those countries compared to underdeveloped or developing nations (Muduli, 2014). In addition, research has revealed that some social media activities, such as sending messages and receiving a response, receiving likes, notifications, and favorable reviews, release a chemical, dopamine, produced by the brain, that can be highly addictive (Kuss & Griffiths, 2017). As a result, social media provides the same level of delight as tablets and gambling, which keeps children engaged in social media activities continuously.

As indicated in the literature, students exhibiting high levels of addictive behaviors tend to have lower levels of psychophysiological inhibition control. In contrast, students with less dependency on devices and the internet demonstrate greater mental flexibility. This is evidenced by higher levels of inhibitory control, allowing them to better manage distractions and impulses, contributing to more effective learning and decision-making processes. In addition, there is strong evidence in the literature to demonstrate that digital devices have a negative influence on students' physical, social, and even mental health in some contexts. The significant technology demands and the extensive screen time required by school teachers severely impact on students' mental, physical, and social health, as well as their overall learning progress (Strom, 2021; Buabbas et al., 2020). Moreover, despite being a risk factor for the development of mental disorders, heavy use of digital devices has a detrimental influence on the cognitive behaviour of children (Straker et al., 2018). As indicated, the growing popularity of digital devices in the last few decades has caused numerous questions about their security, especially among school-aged children. Surprisingly, a few investigations have been conducted in Riyadh, the capital city of Saudi Arabia, to assess the impacts of excessive digital devices on students' physical, social, and mental health. Given this background, the overarching aim of the current study is to examine the effects of digital devices on the physical, social, and mental health of secondary school students in Riyadh.

Mental, Physical, and Social Health

According to WHO (2022), mental health includes components of emotional, psychological, and social well-being. It impacts the way people think, understand, manage stress, interact with others, and make decisions. As Keyes (2002) underscores, good mental health can enhance productivity, resilience, and the ability to make a substantial contribution to society. On the other hand, mental illnesses such as bipolar disorder, anxiety, and depression are increasingly becoming common and life-threatening. For instance, one in eight people worldwide has been affected by mental illness at present (GBD 2019 Mental Disorders Collaborators, 2022). As Westerhof and Keyes (2010) claim, well-being, in addition to the absence of disease, encompasses coping mechanisms, the ability to control emotions, and social competence. According to researchers, interventions such as physical activity, social connectedness, mindfulness-based stress reduction (MBSR), and cognitive-behavioral therapy can help a person enrich mental health and well-being (Cuijpers et al., 2019; Chiesa & Serretti, 2009). It is also important to identify the interplay between mental and physical health. For instance, chronic illnesses can increase psychological distress, and those who are depressed are highly likely to suffer from cardiovascular disease (Prince et al., 2007). A comprehensive, multi-dimensional framework that integrates early intervention, public education, and policy-level involvement can only manage mental health.

Physical health refers to the state that supports the function of the body at its best and is maintained by a healthy diet, regular exercise, reasonable sleep, and preventive care. According to the World Health Organization (WHO, 2020), physical inactivity is considered the fourth most important risk factor for death worldwide. Engaging in exercises can frequently reduce the risk of non-communicable diseases such as diabetes, obesity, stroke, and certain types of cancer by enhancing cardiovascular fitness, muscle strength, and bone density (Warburton & Bredin, 2017; Lee et al., 2012). Nutrition can also contribute to Physical health to a larger extent (Willett et al., 2019). Moreover, sleep is the key to hormone balance, cellular repair, and cognitive function (Hirshkowitz et al., 2015). There is evidence in the literature to validate that mental and social aspects of health are strongly connected to physical health. For instance, prolonged depression and anxiety result in chronic physical illnesses, which can unfavorably impact on the quality of life (Moussavi et al., 2007). Moreover, as Ratey (2008) states, the mood and cognitive function of people can be improved by regular exercise and a healthy diet. Similarly, social factors such as access to healthcare, education, and income can significantly influence the physical health outcomes of people (Marmot, 2005).

As Berkman et al. (2000) state, an individual's capability to foster and sustain meaningful interpersonal relationships, manage social responsibilities and be positively involved in communities is referred to as social health. As indicated in the literature, these capabilities are essential for both general well-being and psychological satisfaction. Most importantly, people with strong social connections can develop better mental health, reduce mortality rates and strengthen immune responses (Holt-Lunstad et al., 2010). The lack of social connectedness that can be caused by social isolation or loneliness is linked to the health risks of smoking and obesity (Cacioppo & Cacioppo, 2014). Even though technology facilitates people to connect, it, on the other hand, causes social detachment and anxiety, mostly in teenagers (Twenge et al., 2018). Additionally, poverty, exclusion, and discrimination can unfavorably affect social functioning and psychological well-being (Wilkinson & Pickett, 2009). Hence, as Baumeister & Leary (1995) claim, empathy, supportive social networks, community involvement, and effective communication are the constituents of social well-being. Collaborative models that address social factors such as family, work, and education can enrich individual and collective social health (Durlak et al., 2011). In other words, social health is a dynamic force that can cooperate with mental and physical health rather than operating separately. Given this context, it is important to research how digital devices affect secondary students' physical, social, and mental health.

The Impact of Digital Devices on Students' Learning and Well-being

As a result of the growing use of digital devices in classrooms, a substantial presentage of research has been carried out on how they affect students. It has been demonstrated that digital devices improve student engagement and learning opportunities. According to Wang et al. (2014), student engagement and interaction are enhanced when tablets and laptops are used in the classroom. A more individualized learning experience that can cater to various learning styles is offered by digital textbooks, educational apps, and online resources (Bai, 2019). Furthermore, students can perform in-depth research and broaden their knowledge base when they have access to a wealth of information and scholarly materials (Kim & Frick, 2011). The integration of digital devices has also improved student collaboration and communication. Real-time collaboration is made easier by tools like Google Docs and educational forums, which improve critical thinking and problem-solving abilities (Anderson & Rainie, 2012). Additionally, email and messaging app communication facilitate ongoing discussions between teachers and students, creating a positive learning atmosphere (Nguyen et al., 2016). The development of

technical skills and digital literacy is greatly aided by the use of digital devices in the classroom. Interacting with a variety of software and digital tools helps students develop the skills necessary for participation in a digital society and future employment (Hague & Payton, 2010).

As highlighted by Ertmer and Ottenbreit-Leftwich (2010), regular use of digital devices equips students to successfully negotiate the complexities of modern technology and digital communication. Critically, although digital tools have many advantages, they can also create serious drawbacks, such as the opportunity for distraction. According to Junco (2012), students frequently multitask by using social media and other non-educational content, which lowers their attention span and academic performance. As Rosen et al. (2013) argue, the continuous engagement in social media and entertainment can interfere with study time and learning objectives. Long-term use of digital devices is known to cause health problems. For example, students commonly suffer from eye strain, headaches, and other vision issues, which are collectively referred to as Computer Vision Syndrome (CVS), (Blehm et al., 2005). Furthermore, the sedentary nature of using digital devices can result in physical issues like poor posture and obesity (Straker et al., 2018). According to Twenge (2000), students who use social media extensively have higher rates of anxiety and depression. Additionally, experiencing online harassment and cyberbullying can cause serious emotional distress (Kowalski et al., 2014). Concerns about privacy and cybersecurity are also connected to the use of digital devices in the classroom. As Livingstone and Haddon (2009) claim, students' personal information may be susceptible to data breaches. If appropriate security measures are not in place, students' private information may be susceptible to data breaches (Livingstone & Haddon, 2009). Hence, the need for efficient methods to safeguard students online and guarantee a secure digital learning environment is highlighted by the rising incidence of cyberbullying (Hinduja & Patchin, 2010). As indicated, digital devices offer advantages in terms of improving communication, learning, and skill development, but they also create problems with cybersecurity, distraction, and mental health.

Interplay between Excessive Reliance on Technology and Maslow's Hierarchy of Needs

In order to explain human motivation and development, Abraham Maslow developed the psychological theory, Maslow's Hierarchy of Needs, in 1943. As this theory indicates, human needs can be organized in a pyramid-like structure with five levels (Maslow, 1943). Physiological requirements for survival, such as food, water, air, shelter, and sleep, are placed at the base of the pyramid. After satisfying these needs, people tend to find ways to fulfil their safety

needs, which include personal security, financial stability, health, and protection from harm (Kenrick et al., 2010). The third level, which focuses on love and belonging, develops friendship, affection, deep social ties, and community involvement. People tend to concentrate on esteem needs, for instance, confidence, achievement, respect from others, and self-worth, when they are socially connected. According to Maslow (1987), self-actualization, or reaching one's highest potential via personal and professional development, creativity, and problem-solving, can be situated at the top. This means that, as Maslow argues, lower-level needs must be satisfied prior to pursuing higher-level needs.

It is important to note that one can manipulate this hierarchy at any time. As far as the physiological level is concerned, the use of excessive digital devices can lead to poor eating habits, reduced physical activities, and disturbed sleep (Cain & Gradisar, 2010; Twenge et al., 2017). On the other hand, excessive reliance on technology can make people more vulnerable to data breaches, cyberattacks, and a failure in their capability to survive in the real world (Livingstone & Smith, 2014). Even though technology can facilitate staying connected at all times, it mostly disrupts real-world interaction with digital communication, thereby increasing feelings of social isolation and loneliness (Turkle, 2015). In addition, since people are highly likely to receive online approval, likes and shares for validation rather than personal accomplishments, their self-esteem needs can be threatened (Andreassen et al., 2017). Finally, as technology encourages passive consumption over originality, self-examination, and personal and professional growth, it may hinder self-actualization (Carr, 2010).

As indicated, although technology can enrich human lives to a considerable extent, excessive use may impede the deep psychological engagement needed to meet Maslow's hierarchy of needs. This means that a balanced and thoughtful approach is needed to obtain the advantages of technology without sacrificing human development. If this is the case, it is significant to investigate the impact of digital devices on students' physical, social, and mental health.

METHODOLOGY

Research Design

The purpose of this study was to examine the effects of digital devices on the physical, mental, and social health of secondary students. The current study employed a qualitative approach, which was appropriate for gaining a holistic understanding of how digital devices affect these three dependent variables (Abeywickrama, 2023; Abeywickrama & Thasneen,

2022). According to Condon and Feldman (2013), “the scientific explanation for self-compassion is based mainly on an in-depth understanding of people's subjective perceptions” (p. 4). Similarly, for Williams (2007), qualitative research is defined as an unfolding model that takes place in a natural context, allowing the researcher to build a degree of depth via active participation in the actual events. Thus, qualitative analysis can clarify the relationship between research and theory by frequently focusing on how concepts are developed (Bryman & Bell, 2007). Given this background, researchers are highly likely to employ a qualitative approach for their studies (Williams, 2007).

Research Context

Sri Lankan International School, Riyadh (SLISR) was selected as the research context to identify the effects of digital devices on students' physical, mental, and social health. SLISR, the first institution founded by Sri Lankans in the Kingdom of Saudi Arabia, is located in the Malaz District of Riyadh, on Jareer Street. Established on September 17, 1988. SLISR is an independent, non-profit community school that offers a blend of British and Sri Lankan curricula with an international outlook, serving students from Pre-Kindergarten to Grade 12. As a Pearson EDEXCEL Learning and Examination Centre, it consistently produces top student achievements in the region. This day school accommodates over 800 students and employs 70 staff members, with approximately 80% of the students being Sri Lankan. A wide range of nationalities, including Pakistani, Indian, Bangladeshi, Malaysian, and others, make up the remaining students. Under the direction of a Board of Directors, SLISR runs three distinct colleges for kindergarten, boys, and girls. SLISR has become one of the top educational institutions in the area over the last 33 years, which is a noteworthy achievement in a foreign nation.

Participants

For this study, primary data were collected by selecting 10 students from grade 11 at SLISR. Additionally, interviews were conducted with 5 parents to gather further data. The parent demographics of SLISR are diverse and predominantly composed of immigrants living in Saudi Arabia. While the majority of the students' parents are Sri Lankans, reflecting the primary community the school was established to serve, there is a significant presence of parents from various other nationalities.

The demographics of students in grades 11 at Sri Lankan International School, Riyadh (SLISR), reflect a microcosm of the school's overall diversity. A significant proportion of students

in these grades are Sri Lankan, mirroring the school's primary demographic. A notable portion of students belong to various countries, including Pakistan, India, Bangladesh, Malaysia, and others, contributing to the international character of the school. Students in grade 11 bring a wide range of cultural backgrounds, fostering a multicultural learning environment. The presence of multiple languages spoken at home among students enriches the linguistic diversity within classrooms. This demographic mix in grade 11 at SLISR enhances the educational experience by promoting inclusivity and cross-cultural interactions, preparing students for a globalized world.

Data Collection and Sampling Methods

Data collection methods are crucial because the chosen approaches and statistical techniques affect how the gathered data is utilized and the conclusions drawn from them (Teherani et al, 2015). To collect data for this study, semi-structured interviews were undertaken with selected parents and students.

The interview with the students was structured into four parts: (1) The personal information section for gathering students' demographic data (2) the background details section for exploring the primary and secondary digital devices used in the classroom and at home (3) a rating scale section for uncovering digital device challenges, and (4) a section of open-ended questions to identify students' involvement with these devices. Digital devices were defined for the participants as any device that used electronic tools similar to computers. Participants had the option of requesting clarification and more information about the inquiries in the interviews. The data-gathering procedure was carried out over two months, and the participants were provided with individual transcriptions to verify the precision and correctness of their perspectives to preserve reflexivity.

This study interviewed 5 working parents, primarily mothers with full-time occupations. Semi-structured interviews were conducted with them to collect data, and each respondent was questioned for 30-45 minutes. The investigator conducted the interviews to elicit unexpected findings, encourage participants to provide extensive additional information, and obtain reasons for their corresponding responses (Cohen & Manion, 1994; Ashworth & Lucas, 2000; Abeywickrama, 2021a). The study used the random sampling method to select parents and students. In random sampling, participants are chosen in such a way that everyone in the population has the same possibility of being selected for the study, and the individual's selection does not influence the selection of others; hence, it has a strong external validity (Omona, 2013).

Data Analysis

Organizing and producing insights from the collected data and thereby arriving at reasonable conclusions is the aim of any kind of analysis, regardless of whether it is carried out in a constructive or empirical research structure (Polit & Beck, 2006). Since qualitative research can "move from concrete to abstract" (Lichtman, 2013, p. 19), not depending on previous hypotheses (Patton, 2002), determining the key concepts that emerge from data is critical to the investigation's value (Hitchcock & Hughes, 1995). Identifying relationships between factors, making comparisons, understanding differences, and thus determining the results of the current study are the essential tasks. Consequently, the data in this research were analyzed qualitatively. The objective of this analysis is to uncover similarities in participants' perceptions while also considering the unique aspects of each participant's knowledge.

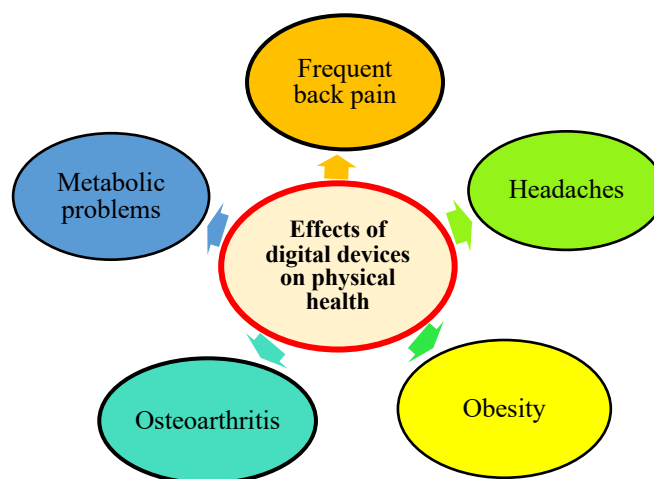
Thematic Analysis

It has been demonstrated that Thematic Analysis (TA), as a broad method, can help researchers discover various cross-references that appear between data and study themes (Ibrahim, 2012). As such, throughout the last decade, TA was widely used in educational research (Coldwell, 2017; Crowe, Inder, & Porter, 2015; Liyanage & Bartlett, 2010; Skinner et al., 2019; Tan et al., 2015; Tuckett, 2005). The process of creating or recognizing themes, subthemes, and connections among themes and subthemes forms the foundation of TA (Braun & Clarke, 2006). A theme is "a particular pattern of significance found in the data" that "captures something essential" about their relationship to the research question (Joffe, 2011, p. 209). Codes, the smallest units of the analysis, are collapsed or clustered to produce themes and subthemes. Themes and "patterns of meaning" shared by research participants can be "built" using codes (Braun & Clarke, 2017, p. 297). TA is a valuable instrument for recognizing, summarizing, and interpreting individuals' experiences with a problem, their perceptions, current practices/behaviors, and common representations of social demand (Braun et al., 2016; Abeywickrama, 2021b). Additionally, TA is a flexible method in qualitative data analysis that can be adapted to various research objectives (Braun & Clarke, 2006). This flexibility allows for handling the data in distinct ways based on specific methodological choices. Given this background, the current study also used TA to analyse the data collected through the semi-structured interviews as outlined by Braun and Clarke (2006).

RESULTS & DISCUSSION

Through systematic data analysis, this study was able to uncover the framework of digital device usage and its representational impact. Each theme and subtheme that emerged from the examination of the information gathered from the interviews was included in the findings. The researcher discovered several major themes early in the analysis. The detrimental effects of digital devices remained the main theme after further review and improvement. This overarching theme includes subthemes in terms of physical health, social health, mental health, and psychological well-being.

Figure 1: The Effects of Using Digital Devices on Physical Health

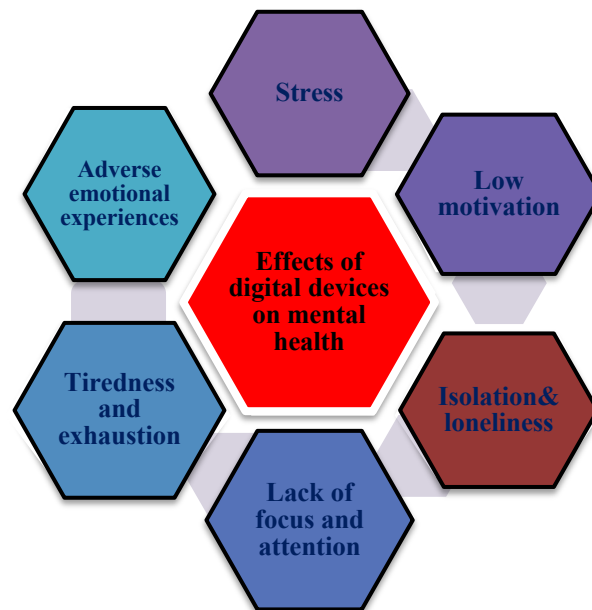


There are serious concerns about the detrimental effects of students' growing reliance on digital devices on their physical health. Long-term and inappropriate use of digital devices can result in a number of health issues that are becoming more prevalent among students, as shown in Figure 1. Back pain is one of the most commonly reported problems, and it is frequently brought on by bad posture when spending extended periods studying or watching entertainment on screens. This condition is made worse by inadequate ergonomic support, particularly in residential or hostel environments. Headaches are another common problem, mostly caused by prolonged screen time and eye strain. This discomfort is exacerbated as many students neglect to wear glasses, use screen filters, and take regular breaks. These perceptions were effectively reflected in the students' comments. For instance, I noticed that after being seated in front of a screen for hours, I develop headaches that can last for hours. I guess my sight has become worse. But I cannot stay wearing spectacles (Student 3). A similar perspective was

reported by Student 5: *It seems that I am addicted to the internet, as I have much homework to complete every day. So, I cannot live without my tablet. I mean, I utilize it both inside and outside. I take the device right after school and engage in gaming until 5. Then I start doing my homework, and I take the tablet once again at bedtime without my parents' consent and watch some videos until midnight. I don't know whether I overuse it. Anyway, I did not have physical issues such as inactivity, back pain, headaches, or vision problems previously. Most importantly, parents' responses also validate students' comments. Of course, we're aware that engaging with devices for prolonged periods can lead to addiction as well as the negative consequences associated with overuse* (Parent 3). This means that parents have observed particular health issues in their children that may be caused by excessive device usage, the majority of which involve eye issues such as blurry vision, tired eyes. According to the previous literature, the blue light produced by mobile devices, computers, tablets, and TV screens reduces the generation of a hormone that regulates the cycle of sleep and awakening, or the circadian cycle (Silvani, Werder, & Perret, 2022). In other words, digital media dependency is closely linked to excessive daytime sleepiness in young people (Qanash et al., 2017). Insomnia, snoring, breathing problems, teeth grinding, and frequent nightmares are also associated with this.

Additionally, the inactive lifestyle connected with extended screen time has considerably raised students' obesity rates. Particularly, inactivity combined with irregular eating patterns—often influenced by prolonged device use—increases the risk of weight gain and related consequences, as in the case of Student 10, *I used to go out for exercise and sports; however, due to excessive homework and assessments, now I spend additional time with the computer and finally no time to relax and sports. Life has become so hectic. I feel sorry, I am becoming overweight.* Furthermore, because of their unhealthy routines and decreased mobility, students are more susceptible to metabolic issues like high blood sugar and hormone imbalances. Osteoarthritis and other joint-related problems, especially in the fingers, shoulders, and neck, can also result from the repetitive and static nature of device use. These findings have been strongly supported by previous researchers (Demir & Sumer, 2019).

Overall, while digital devices have become essential tools for learning and communication, students' physical health is seriously at risk when they are misused. Preventing these detrimental effects and ensuring a healthier learning environment requires increasing awareness and encouraging responsible usage, which includes implementing screen breaks, ergonomic seating, and frequent physical activity.

Figure 2: The Effects of Using Digital Devices on Mental Health

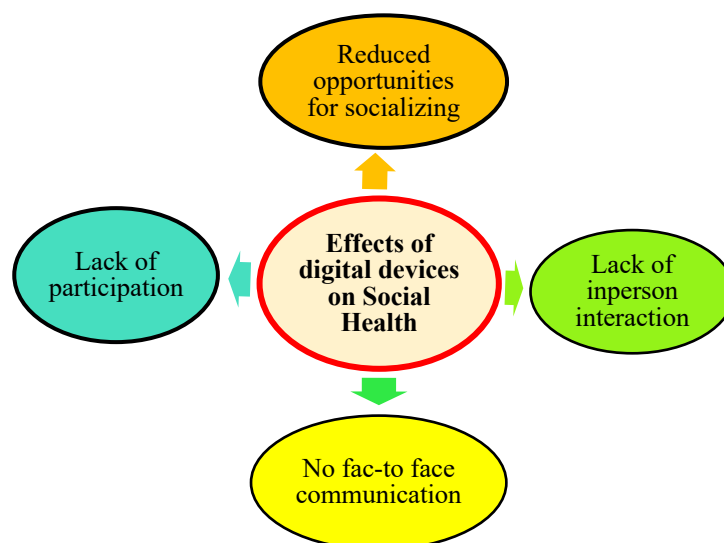
Students' overuse of digital devices has had serious detrimental effects on their mental health in addition to raising concerns about their physical health. The effects on mental health are diverse and intricately linked, as seen in Figure 2, which reflects a developing crisis in the digital age. According to the respondents, stress is one of the most common problems, which frequently occurred by pressure to perform well academically, constant notifications received to the mobile phones, and overload information in digital platforms. In contrast, it is important to note that the internet-assisted applications and tools are increasingly supporting them to reduce their anxiety and uneasiness. This perception is reflected in the comments of the participants: *I use all social media platforms such as Instagram, Facebook, WhatsApp, and TikTok because they provide me with mental relief (Student 3); I can't live without Snapchat. As I want to post my pictures now and then, but no one in my family knows that, it helps me reduce my depression (Student 2).*

Low motivation, which can result from a decrease in personal interaction and the addiction to the internet content is another significant effect. Students who use digital devices excessively may replace meaningful in-person relationships with virtual ones, which weakens their sense of support and connection and contributes to feelings of loneliness and isolation. Additionally, the frequent switching between apps and platforms causes many students to lose focus and attention, especially in academic settings. This means that digital multitasking has the

potential to decrease cognitive function and weaken focus, as in the case of Student 4. *Excessive smartphone use can result in low learning efficiency or achievement, as well as disengagement from focus during both instruction and study time. Despite its effect on academic performance, I believe that utilizing a smartphone and the internet diverts my attention away from my studies. Finally, this can be a cause for my low motivation and anxiety.* Another common complaint is fatigue and exhaustion, which is usually connected to disturbed sleep patterns caused by late-night screen use and a lack of digital downtime. Additionally, students may experience negative emotional experiences like anxiety, depression, and low self-esteem, which are frequently brought on by exposure to depressing and negative online content on social media. Parents' perceptions strongly emphasize the negative impacts of digital devices on their children's mental health and well-being. *There is an excess of technology. Children are addicted to it. They don't spend time outside, and have no socialization. Family and friends have been disregarded, and daily responsibilities have been ignored. and children are becoming overweight as a result of a lack of movement. We are worried that they might spend excessive time on the internet, and have finally looked for medical advice* (Parent 1).

In summary, even though digital devices are convenient and provide connectivity, students' mental health can be seriously harmed by their uncontrolled use. To ensure a balanced and mentally healthy lifestyle, it is crucial to promote offline activities, set healthy screen time limits, and support students' emotional awareness in order to promote digital well-being.

Figure 3: The Effects of Using Digital Devices on Social Health



Students' social dynamics have been broadly changed by their increasing reliance on digital devices, which frequently hinders their capacity to participate in meaningful, real-world, in-person interactions. One of the most noticeable consequences is the decreased opportunities for socializing, as shown in Figure 3, since students are more likely to spend time online than engaging with peers in person. This change hinders the development of critical social skills and restricts spontaneous communication. The unfavorable effects of the reduced opportunities for social interaction were strongly emphasized by both parents and students in their comments, for instance, as Participant 7 claims, *throughout the day, we are with digital devices connected to the internet, and highly likely to use diverse applications or AI driven tools for education and other purposes. No one has time to relax due to the excessive workload that needs to be completed during the day. As parents reported, sometimes, they don't speak with us or our relatives when they visit our home. We feel embarrassed to say that they are doing their assessment and homework. We want our children to be educated, but now it seems, they have become machines and have no human relationships; this is not what we expect from our children* (Parent 3).

The absence of face-to-face communication is another critical issue that can impede students' empathy and emotional bonds. Crucial elements of human communication, such as tone, body language, and face-to-face exchanges, are frequently lost in digital interactions. Given that, students might find it difficult to communicate in person, which could hinder their capacity to establish rapport, settle disputes, and establish trust. Additionally, since many students prefer virtual interactions over in-person interactions, the absence of participation in group activities is becoming more widespread. Respondents contended that social disengagement and a lack of face-to-face interaction can lead to a sense of alienation from the academic and peer community, which in turn can affect their social well-being and sense of identity. For example, Student 6 commented that *we have no opportunities for collaborative and cooperative learning, as teachers often request to carry out the activities via internet-assisted applications and tools. Such activities are interesting and meaningful; however, we should always be in a smart classroom, where we have fewer opportunities to learn from smart students.*

Overall, although they provide connectivity and convenience, students who use digital devices excessively may become disconnected from real-world human interaction. Fostering healthier social development in students requires encouraging group activities, promoting balanced digital habits, and expanding opportunities for in-person social interaction.

The Adverse Impact of Digital Device Usage on Students' Academic Performance

As indicated previously, the growing reliance on digital devices has negatively affected students' physical, social, and mental health, which has a substantial impact on their academic achievement. These unfavorable effects, according to participants, demonstrate a variety of academic challenges, such as decreased academic quality, increased workloads, absenteeism, boredom, poor organization, issues in understanding educational tasks, inadequate preparation, and, finally, low learning achievement. Students who exhibit excessive engagement with digital devices often demonstrate poor educational outcomes, such as low grades, incomplete homework, and an inability to maintain focus during study sessions. These patterns result in additional academic burdens and disengagement from the learning process. Moreover, exposure to extensive digital content can cause cognitive overload, which hinders students' capacity to efficiently process and retain knowledge. Particularly, the emergence of a learner profile characterized by limited autonomy, low motivation, and a lack of self-regulated learning strategies has become a considerable challenge for their studies. These students often experience anxiety, demonstrate weak analytical thinking, and lack confidence in their academic capabilities. The absence of supportive learning behaviors and effective coping mechanisms further aggravates their academic struggles. Most importantly, digital devices pose serious risks to children's mental and physical well-being by diverting them from active leisure activities such as sports and other events available in schools, and leading them to a sedentary lifestyle. As Warren et al., (2010) underscores, sedentary lifestyles associated with an increased risk of medical conditions such as heart disease, may result in death.

Although some students are uninformed of that suffering from mental health issues is linked to digital device use, the majority were aware of the adverse effects, particularly those stemming from social networking sites. Only a small number of students appeared unaware of how device usage might affect their mental health. Parental viewpoints highlighted a significant aspect of this problem. The majority of parents, fathers and mothers alike, were aware of the dangers of addiction and the psychological and physical effects associated with it. However, many parents are helpless to restrict their children's device use since they believe it would be hard or impossible to do so.

Overall, students' reliance on digital devices has significantly impacted their academic performance, social behavior, and mental health. Overuse of devices not only hinders academic performance but also increases cognitive problems and emotional distress. As a result, encouraging students to use digital devices responsibly and professionally is crucial.

Furthermore, it was discovered that the existence of strong family bonds and a positive home environment has considerably influenced children's use of digital devices. Children's over-reliance on smart devices can be reduced by parents who encourage their children to play and interact freely. Furthermore, students can gain from technology without sacrificing their overall development by promoting time management skills, boosting academic focus, and promoting mental health. As children represent the future of society, safeguarding their health and development in the digital age is of utmost importance. As indicated, although technology can enrich human lives to a considerable extent, excessive use may impede the deep psychological engagement needed to meet Maslow's hierarchy of needs. This means that a balanced and thoughtful approach is needed to obtain the advantages of technology without sacrificing human development.

CONCLUSION

The results of this study uncover that secondary students at the Sri Lankan International School, Riyadh who use digital devices excessively face significant and multifaceted consequences. In particular, students reported back pain, eye strain, headaches, and sleep disturbances that occur due to poor posture, continuous screen exposure, and inactive behavior. Unhealthy habits and inactivity exacerbate these problems, leading to weight gain and other physical health problems. The study also revealed how the use of excessive digital devices affects mental health, including increased stress, anxiety, depression, low self-esteem, and short attention spans. Socially, students' interpersonal skills have deteriorated, their involvement in group activities has decreased, and a sense of loneliness has been developed as a result of their dependence on digital interactions rather than in-person interactions.

Academically, the impact is particularly alarming. Reduced academic performance, poor concentration, cognitive overload, lack of motivation, and disengagement from the learning process are all results of an over-reliance on digital devices. Students who struggle with these issues frequently exhibit poor time management and self-regulation, which further impedes their academic progress. These concerns are supported by parental observations, which acknowledge the dangers but also a sense of powerlessness in controlling their children's device use. Ultimately, while digital devices provide undeniable educational benefits, their uncontrolled use poses major risks to students' academic performance, social development, and health.

Recommendations

Based on the findings of this study, a number of strategies to mitigate the adverse effects of excessive digital device use among students can be suggested. First, to increase awareness of healthy screen habits and the negative effects of excessive use on one's physical and mental health, digital literacy and well-being education must be incorporated into school curricula. In order to encourage disciplined and goal-oriented device usage, educators should support students in developing time management and self-regulation skills. Additionally, encouraging ergonomic practices and implementing regular screen breaks can help lower the occurrence of headaches, eye strain, and back pain.

Schools and families should actively encourage physical activity and outdoor engagement as vital elements of a balanced lifestyle in order to combat sedentary behaviors. Promoting social and emotional growth via group projects, real-world interactions, and cooperative learning opportunities is equally crucial since it can improve interpersonal bonds and lessen feelings of loneliness. Setting reasonable screen time limits, keeping an eye on digital behavior, and encouraging genuine conversations about internet use and emotional health in the home are all important tasks for parents, who should be assisted in doing so.

In addition, educational institutions should also make sure that students have access to professional support services like psychologists or counselors, particularly for those who are struggling with anxiety, depression, or other mental health issues related to digital dependency. In an increasingly technologically advanced world, stakeholders can collaborate to promote responsible digital engagement and protect students' overall well-being by implementing these measures.

Implications of the Study

The study's conclusions have a number of implications for parents, educators, policy makers, and healthcare professionals. The findings emphasize how urgent it is to take a more comprehensive approach to student welfare in the digital era. For educators, the study underscores the importance of designing curricula and classroom practices that balance digital engagement with physical activity, social interaction, and emotional support. In order to assist students in forming healthier technology habits, it also highlights the importance of incorporating digital wellness initiatives into the educational system. The study also highlights the need for parents to take a more active role in monitoring and guiding their children's screen time while also promoting more offline activities. Policymakers can use these insights to create

national standards for school-age children's safe and responsible technology use among school-aged children, ensuring that mental, physical, and social health are prioritized alongside academic performance. Moreover, the study suggests the necessity of a collaborative effort among all stakeholders to build supportive environments both at home and at school that encourage responsible digital behavior and emotional resilience among students.

Limitations of the Study

It is important to recognize the limitations of this study despite its insightful conclusions. First, the results may not be as generalizable to larger populations as the sample size was restricted to a particular sample of parents and students. Although cultural, socioeconomic, and regional factors may also have an impact on students' digital behaviors and health outcomes, however, the current study has not considered such aspects. Moreover, the study mostly used self-reported data, which can be subject to biases like social desirability, underreporting, and exaggeration. Furthermore, the research's cross-sectional design limits the capacity to infer causal relationships regarding the long-term impacts of using digital devices. It can be difficult to identify trends and new patterns in real time because of how quickly digital technology and student behavior are changing.

Future research could employ longitudinal designs, larger and more diverse samples, and the inclusion of objective health and academic performance data to validate and expand on these findings.

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