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Association Between Digital Technology Use and Cognitive Functioning, Social Functioning and Emotional Regulation among Pakistani Adolescents

by

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CERTIFICATE OF APPROVAL

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(Namra Khalid)

Abstract

Rapid advancements in artificial intelligence (AI), social media platforms, the Internet of Things (IoT), and 5G technology have increasingly integrated digital technologies into daily life, entailing both potential benefits and critical challenges. Despite enhancing convenience, connectivity, and efficiency, these technologies raise growing concerns regarding their impact on cognitive functioning, social functioning, and emotional regulation. The present study focused on examining the relationship between digital technology use and adolescents' cognitive functioning, social functioning, and emotional regulation (Cognitive reappraisal and Expressive suppression). A total of 300 adolescents aged 13–18 years (N = 300) were recruited using convenience sampling. Self-administered measures, including the Trail Making Test (TMT), the Child and Adolescent Social and Adaptive Functioning Scale (CASAFS), and the Emotion Regulation Questionnaire (ERQ), were used to assess cognitive functioning, social functioning, and emotional Regulation. Digital technology use was assessed using the Digital Addiction Scale for Teenagers (DAST). Data were analyzed using SPSS. Results indicated that digital technology use was significantly associated with cognitive functioning, social functioning, and emotional regulation strategies, including cognitive reappraisal and expressive suppression. Additionally, adolescents with excessive technology use differed significantly from those with limited use across all domains. These findings highlight the developmental risks associated with excessive use of digital technology and underscore the need for targeted interventions. The study provides valuable insights for clinicians, educators, and parents in designing age-appropriate strategies and guidelines to promote balanced technology use among adolescents.

Keywords: Digital technology use, cognitive functioning, social functioning, emotional regulation, adolescents.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

1.1 Background of the Study

The digital age exposes adolescents to technologies, which determine the patterns of learning, communication, and emotional regulation. As digital innovations offer a chance of intellectual development, social networking and creative expression it has raised concerns over their influence on the most important developmental areas. Adolescence is a transformational phase of neurobiological and psychosocial development, and events that transpire during the teenage years may have long-term implications on cognitive processes, social adaptation, and emotional regulation (Crone and Dahl, 2012; Steinberg, 2014).

COVID-19 pandemics also contributed to the trend of increased technology use by accelerating the rate of screen exposure among young people, with reports showing that they spend more time on the screen and less on physical and social activities (Panchal et al., 2021). It is claimed that the prolonged exposure to digital media, in particular to social media and high-speed multimedia, has contributed to a reduced focus capacity, over-empathetic emotional states, and poor socializing skills in individuals (Wilmer et al., 2017; Coyne et al., 2023). Besides, the persuasive nature of most apps and platforms that has been brought on by algorithms and non-stop notifications has also created certain new problems like digital multitasking, fear of missing out (FOMO), and attention fragmentation (Elhai et al., 2019; Orben et al., 2020).

The concern of this study is not just whether digital technology is good or bad, but rather how the trends of its use are intermingling with the cognitive, social, and emotional developmental paths of youth. This section places the study in the context of current empirical arguments by framing the discussion around three interrelated domains, namely, cognitive functioning, social functioning, and emotional regulation, and pointing to the criticality of integrated studies.

Even though the previous underlying research contributed to the development of the concept of the digital natives (Prensky, 2001) and even the general trends of using technology (Livingstone and Helsper, 2007), the situation has changed considerably over the past years. The evidence available today indicates that the effect of digital technology has both positive and negative implications and depends on time spent online, age, gender, and roots (Radesky et al., 2023; Lauricella et al., 2020). However, there is little research that has explored the three domains of cognitive, emotional, and social simultaneously that are inclusive in adolescents.

This study explores the correlation between the use of digital technology and three major areas of psychological functioning, namely, cognitive, social, and emotional regulation among youth aged 13-18. Through the quantitative, correlational study, the proposed research aims to provide new information in a fast-growing sphere of developmental psychology.

1.1.1 Digital Technology Use

Adolescents have been radically changed by the emergence of digital technology, as it has altered the way they learn, communicate, and interact with their environments. Previously viewed as supplementary gadgets, smartphones, tablets, laptops, and gaming consoles are now becoming a part of everyday life. They act as access points to entertainment and leisure as well as education, social interaction, and exploration of identity. According to recent surveys worldwide, more than 90 percent of teenagers now have access to a smartphone, and young people spend between six and nine hours a day on the screen, which means that these devices have become central to the lives of teenagers (Anderson and Jiang, 2018; Pew Research Center, 2023). This almost continuous interaction indicates

that teenage years are now a time of digital preoccupation, with developmental milestones being reached alongside technological exposure.

In third-world countries like Pakistan, the level of digital penetration has grown exponentially, closing the gap with the developed world. The Pakistan Telecommunication Authority (2024) reveals that the country has over 197 million cellular subscribers and 129 million broadband users, which indicates the pervasive availability. Adolescents are also some of the most prolific users, and social media networks like YouTube, TikTok, and Instagram dominate the online environment of adolescents (Pew Research Center, 2023). This fast growth presents chances of enrichment of education and connection, but also creates problems of extreme exposure and unsupervised consumption.

Researchers observe that the use of digital technology cannot be discussed as a unitary phenomenon; instead, it has an uneven effect depending on the frequency, type, and situation of interaction (Twenge and Campbell, 2018; Valkenburg et al., 2022). As an example, problem-solving skills and access to information can be improved by means of organized digital experiences, including online learning platforms, and cognitive control and mental health might be deteriorated by unstructured or excessive screen time (Wilmer et al., 2017; Przybylski and Weinstein, 2019). It is also essential that the active and passive uses are distinguished. Active use (creating content, participating in a discussion, learning, etc.) is likely to contribute to better developmental outcomes, and passive scrolling or multitasking is linked to distraction, worse well-being, and social comparison (Verduyn et al., 2021).

In addition, their digital experiences are shaped by cultural and contextual factors of adolescents. Patterns of use in societies with collectivism, such as Pakistan, are shaped by social norms, mediation by parents, and gender relations (Haque et al., 2020; Ahmad and Iqbal, 2021). Structural inequalities in access and social expectations are often reported by boys as they are more liberated, with more screen time than girls. Such differences play a crucial role in highlighting the need to analyze the application of digital technology as a socially incorporated phenomenon as opposed to a behavioral option.

In general, the use of digital technology by adolescents is a complex phenomenon that has developmental potential and threats. Its impact is spread over cognitive, social, and emotional spheres, and the topics of how the continuous connectivity of adolescents affects their functionality and well-being should be investigated.

1.1.2 Cognitive Functioning

Cognitive functioning represents a series of higher-order mental functions, such as attention, memory, learning, reasoning, and problem-solving, which combine to enable people to negotiate complex environments and learn new skills. The adolescence stage is a vital time of cognitive development because neural systems that support executive functions are refined significantly, especially in the prefrontal cortex (Casey et al., 2019). Such changes give adolescents more planning, impulse control, and flexible thinking abilities, but make them more vulnerable to external effects like digital technology. The overlap of cognitive development and using digital media is complicated, and it contains both potential advantages and threats based on the character of interaction, the level of engagement, and the purpose.

Attention is one of the areas that are commonly involved in research. Adolescents are considered heavy multitaskers and can use various types of media at a time, including messaging, video streaming, and social networking. Although this indicates the affordances of digital worlds, there is empirical evidence that habitual media multitasking is linked to reduced sustained attention and poorer academic performance (Baumgartner et al., 2020a; van der Schuur et al., 2019). Additional evidence is presented by neuroimaging, which demonstrates that frequent multitaskers have structural and functional differences in areas of the brain that are involved in attentional control, including the anterior cingulate cortex (Loh and Kanai, 2016). Meanwhile, the digital experiences are not harmful in every case. Action video games, in particular, were also associated with better selective attention, quicker perceptual decision-making, and better visual-spatial abilities, which show the need to draw a line between the types of digital engagement (Bediou et al., 2018).

Cognitive flexibility, or the ability to adapt thinking to new or changing situations, is another important feature of cognitive functioning. Flexible thinking may be promoted with the use of interactive technologies that introduce young people to different viewpoints and solutions to a problem through various options, including educational apps or strategy-based games (Granic et al., 2014). Nonetheless, researchers warn that excessive dependence on fixed digital spaces, where the direction is already set and algorithms control what appears on the screen, can eliminate creativity and lower the chances of non-linear thinking (Meier and Reinecke, 2021).

Digital interactions also determine the processing speed. The quickness of online environments, with notifications, immediate feedback, and rapid switching between activities, can increase the speed of information processing. Although this can lead to faster reaction times, critics posit that this kind of constant switching encourages superficial information processing, rather than allowing adolescents to process information in a deep and reflective way (Wilmer et al., 2017). According to Rosen et al. (2013), they refer to this phenomenon as continuous partial attention, whereby depth is sacrificed in favor of breadth of focus. These tendencies could lead to challenges at academic levels where long-term and critical thinking is needed.

Overall, digital technology has a dual impact on the cognitive functioning of adolescents. On the one hand, organized and intentional online interaction can improve attentional control, cognitive flexibility, and processing speed. Conversely, the unregulated or excessive use, particularly where it is facilitated by multitasking and algorithm feeds, is capable of impairing concentration, creativity, and understanding. Such subtle influences suggest the need to not just assess the volume of teenagers' digital interaction but also its quality so as to determine the effects of digital technology on their cognitive development results.

1.1.3 Social Functioning

Social functioning is the ability of an individual to develop and maintain the significant relationships, play the roles that are expected of him/her in the family,

school and community, and participate in the social life at large. Social development during adolescence is a very delicate age, marked by growing independence from parents, more dependence on peers, and more involvement in the digital realm (Steinberg and Morris, 2001). The move toward peer-centered socialization implies that the social functioning of adolescents is strongly influenced by the environments and tools in which interactions take place, such as digital technologies, which now comprise one of the main environments of adolescent social life.

The emergence of social platforms has radically changed the way social functioning occurs in the teenage years. On the one hand, such technologies give teenagers a chance to remain in touch with friends, form groups, and receive emotional and informational support in difficult periods (Coyne et al., 2023; Uhls et al., 2017). Studies have pointed out that marginalized young people, including sexual or gender minorities, tend to feel affirmed and included in online communities where they might struggle to do so in real life (Craig and McInroy, 2014). In addition, digital communication enables adolescents to train social skills, have friends who are geographically remote, and/or participate in collaborative learning, which highlights the possibility of technology to improve social connectedness (Livingstone et al., 2021).

However, these advantages are accompanied by a great danger of overuse or unregulated use. The long-term usage of digital communication may replace the physical presence, undermining the familial relationships and decreasing the chances of the social development of in-person skills (Rose et al., 2022; Twenge and Campbell, 2018). Moreover, cyberbullying, peer exclusion, and negative social comparison are also common among the adolescent population on the Internet. Research indicates that viewing unrealistic content about peers on social media can undermine self-esteem and is one of the reasons that lead to feelings of loneliness and isolation (Abi-Jaoude et al., 2020; Nesi et al., 2018). This dynamic puts the adolescents in a paradoxical position: they are always connected, but they might feel even more disconnected and alienated in real offline relationships.

Along with interpersonal factors, academic and domestic issues are also involved in the correlation between the use of technology and social functioning. Digital devices have been associated with decreased classroom attendance, low academic

performance, and a lack of responsibilities in the household due to overuse of technology, which can indicate how excessive internet use can disrupt role performance in key social areas (Keles et al., 2020). Simultaneously, the systematic adoption of technology into learning settings, including collaborative learning environments and virtual classes, has been revealed to promote collaboration, interaction, and access to resources, which shows that the impacts are very context and process-dependent (Livingstone et al., 2021).

In sum, digital technology has a dual impact on the social functioning of adolescents. On the one hand, it gives unparalleled access to connection, support, and involvement in communities that exist beyond geographical locations. At the other end, overuse or maladaptiveness may lead to loss of in-person communication skills, overstretched family and peer relationships, and development of social comparison, exclusion, and withdrawal experiences. These effects are determined by the balance between these results and the use patterns, personal vulnerabilities, and the social context of technology implementation.

1.1.4 Emotional Regulation

Emotional regulation is an essential developmental task in adolescence, which involves the mechanisms that individuals use to track, assess, and adjust their emotional experiences and expressions (Gross, 2015). Some of the most common strategies include cognitive reappraisal, where a person reinterprets the meaning of an emotionally stimulating situation, and expressive suppression, where the person suppresses his or her outward emotional responses but not his or her inner responses. Reappraisal can be thought of in general as an adaptive process that is connected to resilience and positive well-being, and suppression is associated with maladaptive consequences, including high levels of stress, low levels of social connectedness, and higher levels of internalizing symptoms (Aldao et al., 2022; Morawetz et al., 2020).

The use of digital technologies in everyday life has created new circumstances in which adolescents control emotions. Many adolescents tend to hide genuine feelings and bring out idealized self-images online, where social media platforms tend to promote such curated self-presentation. It has been indicated that teenagers

who often use suppression during online communication, including concealing distress or disguising negative affect, report more anxiety, feelings of loneliness, and depressive symptoms (Marino et al., 2020). On the other end, reappraisal possibilities can be created in supportive online communications, where teens are able to redefine stressful circumstances with the assistance of peers or parents. Studies show that mediation of digital engagement by parents has the potential to develop reappraisal strategies, which minimize the risk of maladaptive online behavioral patterns (Coyne et al., 2019).

Mood regulation through digital media has been of particular interest, especially among adolescents. Digital escapism often takes the form of binge-viewing or perpetual scrolling, activities that might temporarily distract young people but, in most cases, do not help them overcome any underlying distress (Brailovskaia and Margraf, 2020). Meanwhile, online platforms can act as sources of social support and confirmation, which can facilitate emotional healing in times of stress. Such a dual role brings out the paradox of digital environments: they can be coping resources and risk factors of dysregulation.

The latest neuroscientific findings also show that emotionally charged online content can impact the brain activity in the brain areas connected with emotional regulation, including the prefrontal cortex and amygdala. As an example, teenagers with high-intensity emotional media exhibit different neural activation, and it is possible that constant exposure to such media re-tunes the neural processes of regulation (Silvers et al., 2017). According to these findings, the issue of digital engagement can be considered as both a behavioral factor and a biological force that defines the regulatory abilities of adolescents.

The cultural context also contributes greatly to the emotional regulation strategies in the digital environments. Cultural expectations that promote modesty, restraint, and family honor may predispose adolescents in collectivist cultures such as Pakistan to suppress instead of having open expression or reappraisal (Ahmad and Iqbal, 2021). Gender norms also make this image more complicated because boys tend to have more freedom in using the internet, whereas girls can encounter more restrictions that might affect the coping process as well as the types of emotional expression (Haque et al., 2020).

Overall, digital technologies have become the focus of how adolescents manage emotions. Although they offer means of adaptive mechanisms like cognitive reappraisal, they also promote the maladaptive ones, e.g., suppression and escapism. Knowledge of such dynamics is crucial in developing interventions that enhance healthier emotional growth at a time when the regulation processes of adolescents are increasingly of a digital nature.

1.2 Gap Analysis

Although there is increasing literature about the role of digital technology in adolescent development, there are still some critical issues. Some of the previous literature e.g., (Prensky, 2001; Negroponte, 1995) presented the vision of digital natives through the perspective of techno-optimism, and this assumption should be reconsidered now due to our new empirical evidence. Modern research is still revealing subtler impacts of screen-time, multitasking, and digital spaces on minds and behaviors, but few standardizations of healthy vs. unhealthy use have been established (Twenge, 2019; Odgers and Jensen, 2020). Moreover, there is little research that has explored the three domains of cognitive, emotional, and social functioning in adolescents simultaneously.

It has been postulated that multitasking is associated with attention issues based on some older findings. Brain scans and extended longitudinal research, among other improved methods, are now being utilized to demonstrate an increased connection between intensive media consumption and impaired attention in adolescents (Baumgartner et al., 2020b). Previously, it was considered that digital technology could enhance learning interventions for all people, and recent studies have found that children who belong to poorer families sometimes might have less access to high-quality digital resources (Chaudron et al., 2021). There is also a lack of understanding about emotional regulation in digital media. More recent research emphasizes the emotional impact of social media on teens; in particular, they can be influenced by peer pressure and endless comparison (George and Odgers, 2023; Nesi et al., 2018). On the same note, although previous studies had cautioned against excessive screen time diminishing face-to-face communication, newer studies present a more multifaceted scenario: that some aspects of digital

use contribute to connection, but that excess can result in damage to social skills (Orben et al., 2020).

In addition to the gaps discussed above, an observable fact is the lack of empirical studies undertaken in Pakistan that investigate the combined impact of the use of digital technology on cognitive, social, and emotional functioning in adolescents. Despite the reports of the rapid advancement in the use of smartphones and internet penetration among Pakistani youth in the results of national surveys (Pakistan Telecommunication Authority (Pakistan Telecommunication Authority, 2024; UNDP Pakistan, 2018), the psychological studies of how this exposure improves the developmental outcomes are limited. The majority of local research has mostly concentrated on the addiction to the internet or academic performance e.g., (Hussain and Sultan, 2021; Javed and Malik, 2022), overlooking the deeper cognitive and emotional aspects. Moreover, contextual variables, including culture, gender differences in digital access, and different parental mediation levels, are not studied (Ahmad and Iqbal, 2021; Haque et al., 2020).

Thus, the given study is going to fill these gaps by providing insight into the impact of digital technology adoption on cognitive abilities, social interactions, and emotional control in adolescents. It employs more recent studies to inform its strategy and combines older concepts with new discoveries that are in line with modern digital behaviors.

1.3 Problem Statement

Digital technology is a major component of the everyday life of children and adolescents that transforms their interaction with the environment, the learning process, and the form of socialization. Although digital tools can provide a range of positive implications, including expanded access to education and better social interaction, the possible negative impact of digital tools and their influence on the cognitive, social, and emotional well-being of young people have become increasingly relevant (Radesky et al., 2020; Valkenburg and Piotrowski, 2017). The studies have also associated unlimited access to digital media, e.g., smartphones, video games, and social media platforms, with the development of such outcomes

as attention deficits, dysregulated emotions, anxiety, depression, and social withdrawal (Twenge and Campbell, 2018; Keles et al., 2020). Although the use of digital technology among adolescents is widespread, the particularities of the influence of such tools on cognitive development, peer and family interactions, and emotional control are poorly understood (Odgers and Jensen, 2020). The available literature usually targets one part of media consumption or works with some generalized measures such as total screen time, without taking into consideration the differences in type of use (e.g., passive use vs. active, educational use vs. entertainment) as well as a developmental stage (Granic et al., 2014; Radesky et al., 2016). The study will offer information regarding the effects of digital engagement on the cognitive, social, and emotional functioning of adolescents. Based on an analysis of the usage patterns, the study aims to guide more specific and developmentally adequate promotion of healthy technology use.

Chapter 2

Literature Review

2.1 Digital Technology Use

Digital technology refers to systems, devices, and tools based on digital encoding that are employed to create, store, and process data. This involves technologies like computers, cell phones, the internet, and digital media, including social media, games, education sites, and online communication. Emerging technologies have been shown to enhance the scalability, interactivity, and efficiency of analytic processes, thereby fostering increased opportunities for social engagement, communication, and learning (OECD, 2021; Livingstone, 2019; Twenge and Campbell, 2018).

Digital technology is now a fundamental aspect of everyday life, especially for teenagers, affecting their social, emotional, and cognitive development (Anderson and Vogels, 2022). Twenge and Campbell (2018) refer to today's youth as "digital natives"—people who are raised in an environment saturated with digital technology, which influences their communication and learning. Research by Rideout (2016) indicates that the amount of time spent on digital devices significantly affects developmental outcomes, including academic performance and social relationships. Recent studies highlight the importance of digital technologies in changing the nature in which information is digitized, assimilated over different platforms, and communicated. New technology has transformed how people interact socially and support their communities, as it has generated a method of swift

content creation and constant connection to the internet (Lupton, 2020). Digital platforms have become central to communication, as well as the transformation of charges and information ecosystems Van Dijck et al. (2018). Digital technology is poised to transform pedagogy and learning, particularly for younger individuals, with digital tools increasingly influencing not only their academic experiences but also their social lives (Livingstone et al., 2021).

Empirical evidence indicates that digital technology use increases with age across adolescence, with older teens reporting more frequent and intensive use than younger teens. Large-scale surveys find that older adolescents (15–17 years) are substantially more likely to report "almost constant" internet or social media use than early adolescents (13–14 years). Findings from recent descriptive studies and reviews also show that patterns of device ownership and platform preferences shift with age, as older adolescents adopt a wider range of social platforms and engage more in autonomous online activities (e.g., streaming, social networking), while younger teens' use tends to be more parent-mediated.

2.2 Digital Technology Use and Cognitive Functioning

While digital technology has been shown to enhance problem-solving skills and creativity through educational tools and interactive learning environments, its excessive use may contribute to attention deficits and reduced academic performance (Rose et al., 2022). Research links excessive screen time to difficulties in sustaining attention among children and adolescents (Christakis and Moreno, 2018). The excessive use of multitasking in media has proven to result in poor cognitive control, changes to the brain structure, including a decrease in the gray matter volume in the regions that provide attention, and low outcomes in studies (Baumgartner et al., 2020b; Ophir et al., 2009). Unfortunately, despite the highest levels of information availability, people seem to have a worsened sense of attention and concentration. The need to sustain a continuous relationship contributes to this problem as well, with fear of missing out (FOMO) being recognized as a factor that disrupts the ability to focus and experience emotional regulation (Elhai et al.,

2021). The paradigm of continuous partial attention also strongly applies to the digital realm by providing continuous notifications and multitasking, leading to cognitive overload and inability to maintain attention (Van Der Schuur et al., 2019). These tendencies have been linked with lowered productivity, loss of memory, and increased levels of stress. Shanmugasundaram and Tamilarasu (2023) undertook a review of the incorporation of social media, digital gadgets, and artificial intelligence (AI) tools into everyday life and its role in influencing cognitive functions. They discuss that the feature of digital platforms, including tailored material and notifications, is supposed to keep the user, but can lead to attentional overload and continuous partial attention. Diamond (2020) points out that the key elements of cognitive development include executive functions, including cognitive flexibility, inhibitory control, and working memory. In the same way, Anderson et al. (2021) emphasize such processes govern behavior, problem-solving, and emotional control. In contrast to the advantages of digital technology as a source of access to a significant amount of information and supporting learning capabilities, the continuous exposure to the media with high-speed content, especially social media, can minimize the attention span (Wilmer et al., 2017). The reliance on online devices promotes the practice of cognitive offloading that undermines memory retention (Risko and Gilbert, 2016). Cognitive flexibility and creativity can also suffer as a result of overuse of structured digital platforms (Meier and Reinecke, 2021).

Recent studies show that combining artificial intelligence (AI) with adaptive learning technologies on digital platforms has complex effects on adolescent cognitive development. AI-driven personalized learning can increase engagement, improve problem-solving skills, and support strategic thinking by adjusting task difficulty based on learners' progress, providing immediate feedback, and aiding executive functions like working memory and planning (Luckin et al., 2016; Blume et al., 2020). However, these algorithm-based environments might accidentally create "filter bubbles," which limit exposure to diverse perspectives—crucial for developing cognitive flexibility, innovative problem-solving, and analytical thinking skills (Selwyn, 2021). Frequent exposure to algorithm-selected content could promote

surface-level information processing and reduce opportunities for deep engagement with educational material (Montag and Walla, 2021).

The potential of digital technology for social and collaborative interactions also intersects with cognitive growth. Virtual learning platforms, online discussion groups, and multiplayer educational games provide avenues for peer engagement, collaborative problem-solving, and the enhancement of executive functions such as task-shifting, inhibitory control, and cognitive flexibility (Blume et al., 2020; Radesky et al., 2020). Nonetheless, these same platforms frequently introduce distractions through notifications, pop-ups, or updates from social media, which may heighten cognitive load, split attention, and lessen learning effectiveness (Panova and Lleras, 2016). Research suggests that adolescents who often multitask between educational content and digital entertainment exhibit diminished sustained attention and slower information processing speed, implying that excessive simultaneous interaction with multiple digital stimuli may jeopardize advanced cognitive abilities (Uncapher et al., 2017).

Moreover, digital technology influences metacognitive processes. Applications for note-taking, mind-mapping, and online research databases can aid in planning, organizing, and regulating oneself during learning tasks. When utilized thoughtfully, these tools enhance memory retention, improve problem-solving capabilities, and promote reflective thinking (Radesky et al., 2020). On the other hand, overdependence on digital prompts, notifications, or automated search functions can lead to "cognitive offloading," where adolescents rely excessively on technology for information storage or recall instead of engaging in active memory and rigorous evaluation skills (Risko and Gilbert, 2016; Selwyn, 2021).

Additionally, the impact of digital technology on attention, motivation, and executive function goes beyond formal educational settings. For example, engagement with gamified learning applications, social media challenges, and interactive multimedia platforms can enhance motivation and involvement; however, they may also condition adolescents to favor quick reactions over contemplative thought (Montag and Walla, 2021; Blume et al., 2020). The continuous partial attention spurred by constant notifications and the "always-on" nature of current devices can cause stress and diminish sustained cognitive performance (van der Schuur et al., 2019).

Therefore, digital technology presents a complex environment: it provides significant opportunities for cognitive enhancement while also imposing risks related to fragmented attention, reduced memory consolidation, and impaired cognitive flexibility.

Developmental neuroscience demonstrates continuing maturation of brain systems that support executive functions across adolescence; cognitive control, working memory, and task-switching generally improve with age, although the trajectory is complex and non-linear (Crone and Dahl, 2012). older adolescents may show improved baseline executive function but also different patterns of susceptibility to digital distraction compared with younger adolescents.

Collectively, these insights highlight the necessity for structured and mindful engagement with digital technology. Adolescents thrive when their screen time includes purpose-driven educational tasks and organized social cooperation, while unregulated or excessive use, especially of entertainment or social media, can undermine attention, memory, and higher-order cognitive competencies. It is essential to create interventions, digital literacy programs, and parental guidance that focus on deliberate usage, attention management, and self-regulation strategies to maximize cognitive results in the contemporary digital landscape.

2.3 Digital Technology Use and Social Functioning

Social functioning is the capacity of a person to connect, interact, and communicate in his social surroundings. Ability to perform in the social settings, maintain healthy relationships, participate in community activities, and assume social roles in the way societies dictate are important factors that contribute to overall well-being of an individual (Geurts et al., 2022). The ongoing digital age and the emergence of social media and online communication platforms has largely transformed the social landscape in terms of fostering social interactions (giving people new ways to connect) but also raising new problems at the individual identity level, mental health and social isolation. Digital technology, as Keles et al. (2020) remark, can promote as well as undermine social functioning as constant connection

and online community building go hand in hand with a decline in face-to-face communication, alienating social attachments, and social anxiety. The use of digital platforms can positively impact communication in various groups, yet high levels of virtual connection can also ruin in-person communication skills and perpetuate social withdrawal issues (Rose et al., 2022). More recent studies indicate that digital technology may support community and social support; however, overuse, especially of social media, has been linked to social withdrawal, internet addiction, and reduced engagement in real-life activities, all of which have been found to adversely affect emotional health and functional outcomes of any role (Tang et al., 2021). Moreover, more time spent on digital devices has led to the fear of cyberbullying, negative social comparison, and misconstruction of what is realistic. These threats validate the necessity to pursue additional research on the role of the widespread usage of digital technology in social functioning, particularly in young populations (Abi-Jaoude et al., 2020).

In addition to shaping fundamental communication skills, digital technology increasingly influences the identity formation, peer interactions, and social capital of adolescents. Online platforms offer young people the chance to explore their interests, build communities around shared identities, and seek affirmation in ways that were not feasible in the pre-digital era (Best et al., 2020). The ability to connect across distances allows youth to create diverse social networks, which can improve empathy, cultural understanding, and collaborative problem-solving (Ellison et al., 2017). However, the digital landscape also heightens exposure to social comparison. Adolescents frequently engage in upward comparisons, measuring their lives against carefully curated images of peers, which has been linked to reduced self-esteem, increased anxiety, and depressive symptoms (Shensa et al., 2018).

The term "digital social capital" has arisen to illustrate how online interactions contribute to developing resources like information, social support, and guidance from peers (Ellison et al., 2017). Studies indicate that moderate and structured use of social media can enhance perceived social support and promote collaborative learning among adolescents (Chen and Persson, 2020). In contrast, excessive use, especially the passive consumption of content over active engagement, is associated

with social withdrawal, reduced civic involvement, and greater susceptibility to peer pressure both online and offline (Kross et al., 2020; Tang et al., 2021).

Cyberbullying and online harassment are additional factors that impact social functioning. Regular exposure to online aggression is linked to social anxiety, avoidance of social situations, and challenges in building trust within relationshipsv(Vannucci et al., 2020). In the Pakistani context, cultural and gender norms may further influence digital social interactions. Boys typically enjoy more freedom in online environments, enabling them to create wider social networks, while girls may experience limitations that lead to differences in digital participation, peer support, and self-confidence (Haque et al., 2020; Ahmad and Iqbal, 2021).

Moreover, emerging studies emphasize the relationship between digital technology and prosocial behavior. Online platforms can be leveraged for volunteering, advocacy, and community involvement, promoting civic duty and teamwork in problem-solving (Best et al., 2020). Simultaneously, an overdependence on virtual connections may weaken face-to-face social skills, hinder empathy development, and restrict chances for meaningful in-person interactions (Rose et al., 2022). Such findings indicate that the quality, context, and moderation of digital engagement are vital factors influencing social outcomes.

Older adolescents tend to use social platforms for identity exploration, relationship maintenance, and broader social networking, whereas younger adolescents remain more reliant on close family or supervised contacts online. Empirical studies report age-graded differences in social outcomes associated with screen use: for example, social comparison and peer-related emotional impacts of social media often intensify in mid- to late-adolescence when peer status concerns become more salient.

In summary, adolescents' social functioning is affected by a complex relationship between digital access, usage patterns, peer dynamics, and cultural contexts. While technology provides unmatched opportunities for connections, inclusivity, and social support, excessive or unregulated use can lead to social anxiety, withdrawal, and emotional distress. Future research should continue to explore the

underlying mechanisms of these effects, particularly in underrepresented cultural contexts, to inform interventions that encourage healthy digital social engagement.

2.4 Digital Technology Use and Emotional Regulation

Emotional regulation can be defined as the mechanism through which individuals control their emotions, the timing they feel the emotions, and the extent they express their emotions. Two commonly accepted interventions in emotional regulation entail cognitive reappraisal, where one changes his or her interpretation of an emotion-eliciting stimulus, and expressive suppression, where an individual restrains his or her emotions (Aldao et al., 2022; Morawetz et al., 2020). Cognitive reappraisal is typically regarded as adaptive and is correlated to positive mental health outcomes, with expressive suppression being correlated with more psychological distress and poorer emotional functioning. The relations between emotional regulation and digital technology usage are not simple and one-dimensional. Even being overexposed to digital media, the social media, has been linked to higher levels of emotional dysregulation among adolescents. It could be based on the nature of these platforms that tend to encourage emotional comparison and social judgment (Kelly et al., 2018). The probability of challenging digital media consumption is also increased by poor emotional control, which supports maladaptive regulatory techniques (Keles et al., 2020). The availability and immediate access to the content provided in digital form may impair the maturation of self-control and delayed gratification, essential aspects of proper emotional regulation (Radesky et al., 2016). The frequent exposure to emotionally-charged or high-paced media can impede the process of cognitive reappraisal development because it teaches people to respond to emotions impulsively, as opposed to thoughtfully (Weinstein, 2018). Also, expressive suppression can be more widespread in online environments where non-verbal expressions of emotion are more limited, especially in adolescents worried about peer acceptance and online reputations (Marino et al., 2020). Although certain digital tools like mindfulness or mood-tracking apps may provide possible advantages in terms of emotional awareness and regulation, their irregular utilization hinders their positive effect. Moreover, digitized environments

based on algorithms tend to strengthen echo chambers, exposing us less to a variety of perspectives, which allows cognitive flexibility and reappraisal.

Younger children have fewer metacognitive skills to perform cognitive reappraisal and consequently, turn to expressive suppression more frequently. Adolescents, in contrast, are emotionally vulnerable, and easily influenced by each other so that they are more likely to become victims to the emotional requirements of digital technology (Crone and Dahl, 2012). Neuroscientific studies conducted recently reveal that teens who view emotionally charged digital content develop changes in the activity of brain areas that deal with emotional regulation, the prefrontal cortex and amygdala (Silvers et al., 2017). The moderating factor is parental involvement which is critical. Parental mediation, e.g. by discussing online experiences, has been linked to more adaptive strategies of emotional regulation, like cognitive reappraisal (Coyne et al., 2019). Conversely, the more permissive or careless the digital parenting is, the more dysregulated the emotional state of the child is (Domoff et al., 2019). Furthermore, recent studies reveal that children who experience less exposure to digital media are observed to possess better emotional control and resilience, and thus a developmental perspective is based on universally decreasing screen time on healthier development of emotion, cognition, and socialization (Twenge and Campbell, 2018).

Emotional regulation in teenagers is increasingly influenced by digital technology, affecting not only how emotions are communicated but also how they are felt and interpreted. In addition to cognitive reappraisal and expressive suppression, researchers have discovered other strategies, such as attentional deployment, situation selection, and emotional awareness, that are shaped by digital interactions (Gross Thompson, 2020). For instance, adolescents might deliberately seek out positive content or steer clear of upsetting online encounters as a form of attentional deployment, which can improve adaptive regulation when done thoughtfully but may encourage avoidance behaviors if practiced excessively (Compas et al., 2017).

Recent research suggests that social media platforms enhance emotional reactivity by showcasing carefully selected and emotionally charged content. Teenagers often

compare themselves to their peers and public figures, increasing their sensitivity to social judgment and promoting unhelpful regulatory habits such as rumination and emotional suppression (Odgers Jensen, 2020). The quick feedback—likes, comments, and shares—also activates the brain's reward system, frequently prompting impulsive reactions to emotional stimuli and hindering the development of reflective strategies like reappraisal (Sherman et al., 2016).

Neuroscientific studies bolster these behavioral insights. Functional MRI scans have revealed that adolescents who heavily use social media show heightened amygdala responses to negative content, along with decreased connectivity to the prefrontal cortex, indicating weakened top-down regulation of emotional reactions (Kross et al., 2021). This correlates with evidence that algorithmically tailored feeds may restrict exposure to a range of viewpoints, limiting chances for cognitive reframing and effective coping (Bakshy et al., 2015).

The role of parental involvement is a vital protective factor. Active mediation techniques, such as co-viewing, engaging in conversations about online experiences, and teaching digital literacy, have proven to promote effective emotional strategies and decrease reliance on suppression (Livingstone et al., 2021). On the other hand, either overly strict or highly permissive parenting may lead to secrecy and avoidance or lack of guidance, resulting in increased emotional dysregulation and dependency on digital media (Nesi and Prinstein, 2019). Notably, digital programs aimed at enhancing emotional awareness, including mindfulness apps, guided journaling, and gamified coping exercises, have demonstrated encouraging outcomes in self-reported emotional control and resilience, though these advantages require regular and structured engagement (Flett et al., 2020; Păsărelu et al., 2020).

Cultural context also plays a role in digital emotional regulation. In collectivist cultures such as Pakistan, social expectations that stress modesty and emotional restraint may intensify expressive suppression online, particularly among adolescent girls, while boys may have more freedom to express emotions digitally (Ahmad and Iqbal, 2021). These sociocultural variations emphasize the necessity for contextually aware interventions and highlight the influence of family, education, and community settings in fostering adaptive digital behavior.

Age is strongly related to emotion regulation capacities: older adolescents generally display more effective use of cognitive reappraisal and other adaptive strategies compared with younger adolescents, although sex and context moderate these patterns (Sanchis-Sanchis et al., 2020; Silvers et al., 2017). Research on digital media suggests that developmental stage interacts with online experiences to shape emotion-regulatory outcomes — younger adolescents may be more reactive to emotionally charged content and less skilled at reappraisal, while older adolescents have greater regulatory resources but also greater exposure to social media stressors that can elicit maladaptive regulation (rumination, suppression).

Overall, emotional regulation in adolescents is significantly influenced by digital technology, offering potential for both constructive and destructive results. Excessive exposure, algorithmic reinforcement, and social comparison can hinder the development of effective strategies such as cognitive reappraisal, whereas parental guidance, structured digital initiatives, and mindful participation create avenues to bolster resilience and emotional health. Grasping these dynamics is essential to support healthy emotional growth in an increasingly digital world for adolescents.

2.5 Demographic Differences in Digital Technology Use

Digital technology has different effects on young people depending on demographic conditions in different contexts, especially on developing countries. Digital penetration is growing among the youth, especially in Pakistan, where more than 64 percent of the population is aged below 30 (UNDP Pakistan, 2018). (Pakistan Telecommunication Authority, 2024) report shows that as of 2024, it has over 197 million cellular subscribers and over 129 million users have broadband access, which means a large reach of digital access (Pakistan Telecommunication Authority, 2024). Research indicates that more than 85 percent of Pakistani teenagers have access to smartphones and a sizable number access social media sites on a daily basis with YouTube, TikTok, and Instagram being the most well-liked ones (Pew Research Center, 2023). Potential cultural and religious norms may affect

the patterns of emotional expression, interpersonal behavior, and the use of technology in Muslim-majority states, in the country of Pakistan in particular (Ahmad and Iqbal, 2021). As an example, inequalities in the availability and use of digital technologies have been noted, with boys usually having more freedom over the use of the screen in comparison with girls (Haque et al., 2020). Moreover, sociocultural norms of accessibility and adherence to the modesty and restraint ethic might provide different emotional regulation strategies, impacting the regulation of digital experiences among adolescents. These situational and cultural processes are essential in determining how digital technology has diverse effects on cognitive, social, and emotional consequences in Pakistani young people.

Digital technology does not affect adolescents in a uniform manner; its impact is considerably influenced by demographic variables such as age, gender, socioeconomic status, geographic location, and cultural context. In countries like Pakistan, which are still in the developing stage, the rapid increase in digital penetration offers both advantages and challenges for the growth of youth. With over 64% of its total population being young people, Pakistan's youth demographic represents a significant portion that is engaging with digital media (UNDP Pakistan, 2018). Devices like smartphones and high-speed internet, along with social media platforms including YouTube, TikTok, and Instagram, are becoming increasingly integral to adolescents' social lives, educational pursuits, and entertainment options (Pew Research Center, 2023).

However, access to digital technology is not distributed equitably. Young people in urban areas typically have better connectivity and access to advanced devices compared to those in rural regions, who might struggle with connectivity issues or lack digital literacy (Siddiqui and Aslam, 2021). Disparities in socioeconomic status also affect digital engagement: adolescents from wealthier households are more inclined to utilize advanced devices and access a wider array of educational resources online, while those from lower-income families may depend on basic devices and entertainment-centric content, which could potentially exacerbate educational and social disparities (Farooq et al., 2022).

Gender-related differences in digital participation are also prominent in Pakistan.

Research highlights that cultural expectations, safety issues, and parental restrictions result in boys having greater freedom in using smartphones and social media than girls, who often face stricter monitoring and social limitations (Haque et al., 2020; Ahmed and Qureshi, 2022). These differences carry consequences for cognitive, social, and emotional outcomes, as boys and girls may interact with different content types and develop unique digital tendencies that influence their attention, social interactions, and emotional control.

Cultural and religious beliefs further influence digital behaviors. Adolescents in predominantly Muslim societies like Pakistan are frequently taught to practice modesty, respect, and restraint, impacting how they present themselves online and engage with peers digitally (Ahmad and Iqbal, 2021). For example, girls might restrict the nature of the content they share or steer clear of platforms deemed socially unacceptable, while boys may feel freer to explore various forms of digital expression. Such culturally influenced behaviors shape not only social interactions but also the emotional effects of digital engagement, including reactions to peer comparisons, cyberbullying, and exposure to sensitive social topics (Shaikh and Ali, 2021).

Moreover, parental involvement and guidance are crucial in shaping digital experiences. Adolescents who receive proactive mediation—such as technology co-use, setting usage restrictions, and discussing online behavior—exhibit better outcomes in cognitive skills, emotional regulation, and social competencies (Livingstone et al., 2021; Nesi and Prinstein, 2019). In contrast, a lack of supervision or overly lenient parenting can heighten the risks associated with excessive screen time, unwanted content exposure, and emotional instability.

As digital technologies continue to become a fundamental part of everyday life, it is essential to grasp the demographic and cultural distinctions at play. Research tailored to the specific context is vital for recognizing both the advantages and risks linked to digital engagement among adolescents in Pakistan and comparable developing nations. Customizing interventions to account for socioeconomic, gender, and cultural dimensions can improve digital literacy, encourage healthier usage habits, and alleviate the possible adverse effects on cognitive, social, and emotional growth.

2.6 Theoretical Framework

Social Cognitive Theory (SCT), originally developed by Bandura (1986), conceptualizes a model of triadic reciprocal determinism where human behavior and development are influenced by the continuous interaction of personal factors, behaviors, and environmental influences. The theory further emphasizes that individual factors, environmental conditions, and behavioral patterns exert reciprocal influences on one another over timec(Schunk et al., 2021). Within the context of digital technology use among adolescents, SCT provides a valuable framework for understanding how personal dispositions, online behaviors, and the digital environment mutually shape psychological and social outcomes. This theory is widely used in digital media studies to explain how adolescents' experiences with technology are influenced by their internal thoughts, emotional states, and the social environment in which they occur (Coyne et al., 2023).

In this context, the use of digital technology during adolescence can be seen as a behavioral variable that primarily measures how often devices are used, multitasking habits, and the type of interaction involved (e.g., social media, game-based activities, or learning platforms). Nevertheless, according to the principles of the reciprocal determinism, this behavior is closely connected to both personal factors (e.g., self-efficacy to control screen time, intrinsic motivation to use digital technologies either to learn or to entertain, etc.) and environmental factors (e.g., parental mediation, peer norms, school technology policy, access to digital infrastructure, and so forth) (Bandura, 2001; Nesi et al., 2022). The combination of these forces offers an in-depth prism through which the use of digital technology by adolescents can be linked to developmental outcomes.

SCT is especially applicable in relation to the cognitive outcomes of the use of digital technology by adolescents. The theory emphasizes observational learning, whereby adolescents base their thinking processes and problem-solving skills on the behaviors that they have observed in other online users, popular influencers, or online learning systems (Bandura, 2001). Online spaces are rich with models of observational learning and offer the possibility of task-switching at a high speed,

which may facilitate or interfere with executive control depending on the use patterns (Uncapher and Wagner, 2018). As an example, attention might be split by constant notifications, and the ability to multitask, and cognitive flexibility and better processing speeds could be fostered by structured education apps (Wilmer et al., 2017).

SCT is also explanatory of how adolescents can relate socially within the online world. Adolescents learn social behavior through observing peers or other influencers (from online interactions), acculturate to norms through peer approval, and extend them to the real world (Uhls et al., 2017). Evidence shows that healthy relationships online can improve social connectedness and even promote prosocial attitudes, whereas bullying or unrealistic values of peers through the internet have the potential to burden relationships and devalue family structure (Frison and Eggermont, 2020). In the same way, negative modelling, namely to cyberbullying or exclusion, may strengthen societal withdrawal or incompetent coping behaviours (Wright and Wachs, 2020). The findings indicate reciprocal determinism, whereby online peer relationships influence the social skills of adolescents and these adolescent behaviors, consequently, impact the recreation of those digital social spaces.

Emotional regulation is another area that SCT explains effectively. Adolescents often turn to digital media for managing their moods, expressing emotions, and handling stress (Brailovskaia and Margraf, 2020). Online platforms offer both beneficial tools (such as seeking support online or reinterpreting stress through informative content) and harmful options (like numbing their feelings through endless scrolling) that influence their emotion regulation methods (Brailovskaia and Margraf, 2020; Nesi and Prinstein, 2015). Observational learning allows them to adopt emotion regulation techniques demonstrated by peers or online influencers, while their beliefs in self-efficacy affect their ability to step back from harmful material or control their emotional reactions to feedback found online (Zimmerman and Schunk, 2021). Yet, intensive upward social comparison—often seen on visually driven platforms—tends to intensify negative feelings such as envy and symptoms of depression (Nesi and Prinstein, 2015; Boer et al., 2020). These dynamics illustrate how personal, behavioral, and environmental factors interact with each other to influence emotional outcomes in adolescents' online experiences.

By contextualizing digital technology use within the model of reciprocal determinism proposed by SCT, this research emphasizes the interplay between adolescents' motivations, their technology usage behaviors, and their social contexts, all of which collectively shape cognitive, social, and emotional growth. This establishes SCT as an appropriate framework for investigating how daily digital interactions impact crucial elements of adolescents' functioning.

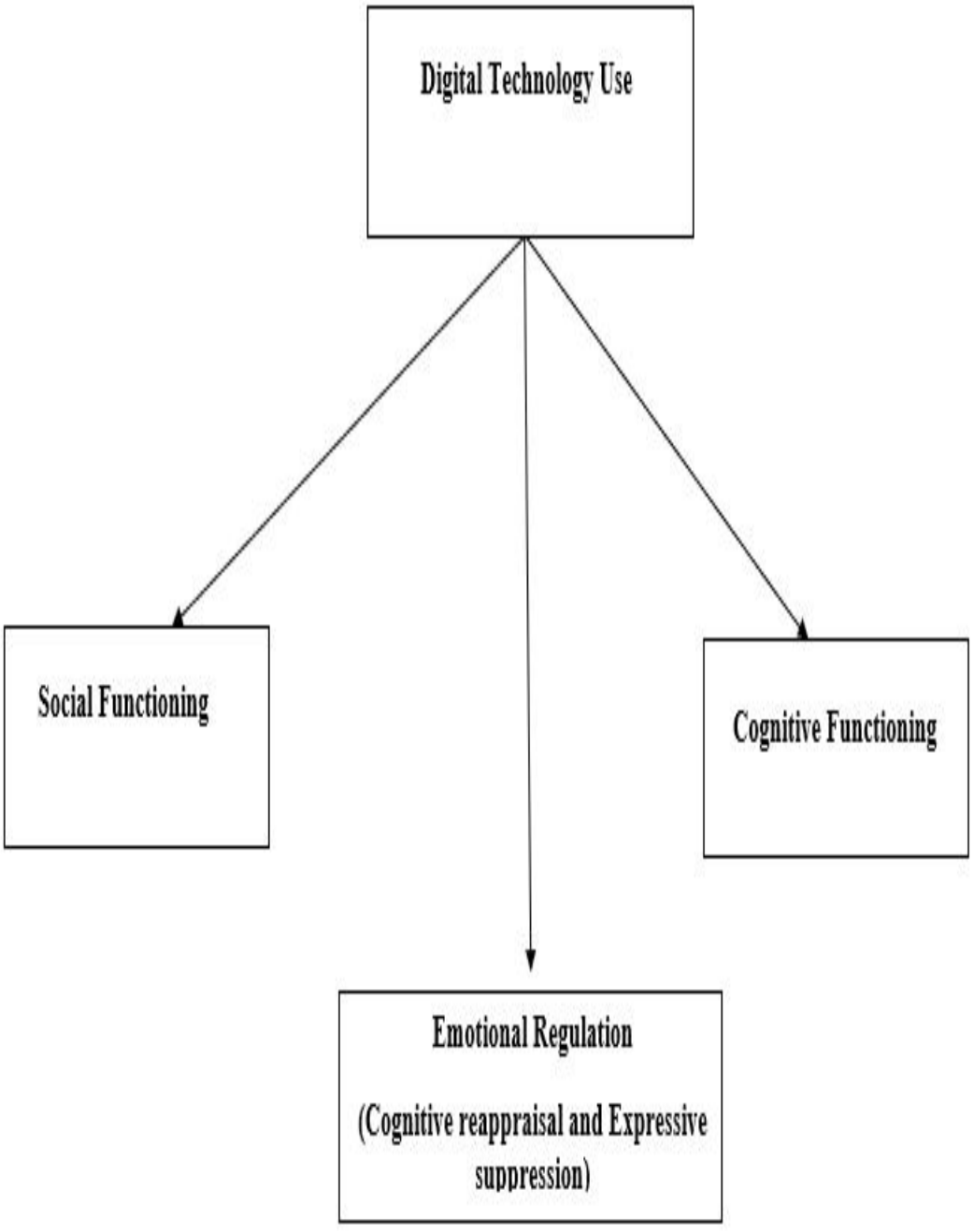


FIGURE 2.1: Conceptual Model of the Study

2.7 Rationale

The rapid growth of digital technology in the everyday lives of children and adolescents demands a thorough investigation of its potential impacts on their cognitive, social, and emotional growth. This concern is particularly significant in countries like Pakistan, where digital adoption is rapidly increasing across various socio-economic groups (Authority, 2023). Technology has transformed how young individuals think, engage, and manage their emotions; therefore, it is essential to explore how these changes occur within Pakistan's unique cultural and educational framework. While global studies have raised alarms about excessive screen time, problematic internet behaviors, and issues with emotional regulation (Huang et al., 2022; Twenge and Campbell, 2018), there is a conspicuous lack of empirical research focusing on these dynamics in Pakistan. On one side, online platforms and digital tools offer avenues for learning, creativity, and social engagement. Conversely, they are also associated with challenges such as diminished attention spans, social isolation, and difficulties in emotional development (Kuss and Griffiths, 2017; Radesky et al., 2020). Additionally, variations in digital literacy, parenting styles, and access to mental health services among Pakistani families complicate the understanding of the impact digital technology has on adolescents (Dilshad and Rafique, 2020).

Recent reports emphasize that uncontrolled digital exposure and increasing screen time among young people in Pakistan are linked to escalating mental health issues (UNICEF, 2023). In this context, the current study addresses a critical gap in the literature by investigating how the use of digital technology affects cognitive abilities, social skills, and emotional regulation in Pakistani adolescents. The outcomes of this research will be grounded in cultural relevance and offer practical applications. They may guide educators and parents in formulating evidence-based approaches that promote healthy digital behaviors while minimizing risks. Moreover, the findings can assist healthcare professionals in identifying and screening adolescents who may be vulnerable to cognitive, emotional, or social challenges related to excessive digital consumption. Insights from this study could also contribute to the development of psychoeducational and counseling initiatives aimed

at fostering balanced technology use among youth. By building upon previous studies (Khalid et al., 2019; UNICEF, 2023), this research enhances the expanding body of work on digital media and adolescent development in developing nations.

2.8 Research Objectives for the Study

i. To examine the association between digital technology use, cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression) among adolescents.

ii. To examine the relationship between age and digital technology use, cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression) among adolescents.

iii. To examine gender differences in digital technology use, cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression) among adolescents.

iv. To examine whether adolescents with excessive digital technology use differ significantly from those with limited use in their cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression)

2.9 Hypotheses

H1: There will be a significant correlation between digital technology use and cognitive functioning, social functioning, and emotional regulation (Cognitive reappraisal and Expressive suppression) among adolescents.

H2: There will be a significant correlation between age and digital technology use, cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression) among adolescents.

H3: There will be significant gender differences in digital technology use, cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression) among adolescents.

H4: Adolescents with excessive digital technology use will differ significantly from those with limited technology use in cognitive functioning, social functioning, and emotional regulation (cognitive reappraisal and expressive suppression).

Chapter 3

Research Methodology

3.1 Research Design

This study adopts a quantitative and cross-sectional design to examine the relationship between digital technology use (predictor variable) and cognitive functioning, social functioning, and emotional regulation (outcome variables) in adolescents. Data was collected at a single time point, enabling an efficient examination of variations across age groups and technology usage levels (Wiersma and Jurs, 2005).

3.1.1 Sampling Procedure

Convenience sampling was used to recruit adolescents (ages 13–18) from schools, colleges, and community groups. The age limit of 13-18 years was selected because it ensures the reliability and interpretability of results, as the standardized instruments used in the present study (e.g., DAST, CASAFS, ERQ) were developed and validated specifically for populations aged 13 years and above.

3.1.2 Time Horizon, Study Setting and Data Collection Procedures

Before data collection, ethical approval was obtained from the Departmental Ethics Review Committee of Capital University of Science and Technology. Permission was also granted by the administrations of participating schools.

The purpose, voluntary nature, and confidentiality of the study were explained to all participants. Because participants were minors (aged 13–18 years), both parental consent and participant assent were required. Parents or guardians signed a Consent Form, and adolescents provided written assent before participation.

Data was collected in group sessions during school hours. The researcher explained the procedure, assured anonymity, and remained available for clarification. Each questionnaire took approximately 15–20 minutes to complete. No identifying information was recorded. Participants were informed of their right to withdraw at any time and to skip any question they found uncomfortable. After completion, they were debriefed and thanked for their participation.

All ethical principles of informed consent, confidentiality, voluntary participation, and minimal risk were strictly observed in accordance with APA (2017) ethical standards.

3.1.3 Sampling Characteristics

A total sample of 300 adolescents aged 13–18 (N=300) was recruited based on statistical power analysis and previous recommendations for correlational and multivariate research, 300 participants were selected as it ensures adequate power for detecting medium effects (Cohen, 1992) and this number ensures sufficient statistical power (¿ .80) for all planned analyses and aligns with recommendations of Hair et al. (2010), who suggest a participant-to-item ratio of at least 5:1 to 10:1 for multivariate studies. Therefore, the selected sample of 300 adolescents provides both statistical adequacy and practical representation for the target population.

3.1.4 Inclusion Criteria

i. Participants included were adolescents aged 13-18 years.

ii. Participants included had access to digital technology such as smartphones, gaming, tablets, or computers.

3.1.5 Exclusion Criteria

i. Adolescents with physical or mental disability that hindered their participation in the study were not included.

ii. Adolescents with significant physical or sensory impairments (e.g., blindness, severe hearing loss) that might interfere with the assessments were not included.

3.2 Assessment Measures

3.2.1 Demographic Information Sheet

A demographic information sheet was used to gather background details from participants. It included variables such as age (in years), gender (male, female, other), grade, family structure, number of siblings, average daily digital technology use (in hours), type of devices used (e.g., smartphone, tablet, computer, gaming console).

3.2.2 Digital Addiction Scale for Teenagers

The Digital Addiction Scale for Teenagers (DAST) developed by Seema et al. (2021), consists of a 10-item self-report scale that was used to evaluate general digital addiction among adolescents (aged 11 to 19 years). It is based on a 5-point Likert scale with the higher scores indicating more digital addiction. participants can be divided into 'excessive' and 'limited' users based on their DAST cluster score patterns, with higher cluster averages (approximately 39–50) signifying excessive use and lower cluster averages (around 23–30) indicating limited use. The DAST has strong psychometric properties with internal consistency (Cronbach's alpha 0.84), which indicates that the items reliably measure the same construct. Furthermore, it has excellent test-retest reliability ($r = 0.85$ in a two-week span of time), therefore demonstrating response stability over time. Confirmatory factor analysis gives support to the construct validity of the scale as it indicates a unidimensional structure of the scale with factor loadings ranging between 0.40 and 0.70 (Seema et al., 2021). The DAST is a valuable tool for recognizing varying degrees of digital dependency among adolescents, providing insight into the patterns of technology engagement. Its simplicity and strong psychometric backing make it suitable for both research and practical screening purposes in educational and clinical contexts, helping stakeholders implement timely interventions.

3.2.3 Trail Making Test

The Trail Making Test (TMT) is a common cognitive test used in assessing cognitive performance, specifically, it assesses one's executive functioning, attention, processing speed, and cognitive flexibility. In TMT-A, participants link numbered circles in a sequential manner (1-2-3...), and in TMT-B, they switch between letters and numbers (1-A-2-B...). Each section's completion time is noted; longer completion times are indicative of poorer cognitive performance (Reitan, 1955). The TMT has proven to be very valid and reliable in a variety of demographics. Strong consistency across time is indicated by test-retest reliability, which has been shown to have coefficients ranging from 0.76 to 0.89 (Bowie and Harvey, 2006). Additionally, the exam exhibits strong construct validity, as seen by its strong correlation with other assessments of executive function and processing speed. The TMT has been extensively validated across diverse populations, demonstrating strong test–retest reliability and criterion validity for assessing executive functioning (Reitan, 1955; Bowie and Harvey, 2006). As the TMT is a performance-based measure rather than a self-report scale, internal consistency coefficients are not applicable.

3.2.4 Child and Adolescent Social and Adaptive Functioning Scale

It is a self-report measure to assess social functioning in four areas of four: school performance, peer relationships, family relationships and home duties/self-care developed by Price et al. (2002). The scale consists of 24 items, rated on a 4-point Likert scale from 1 ("never") to 4 ("always"), with a fifth option ("does not apply to me") available for family-related items. Higher total scores (ranging from 24 to 96) indicate better social functioning, while subscale scores range from 6 to 24. CASAFS has demonstrated strong psychometric properties, including good internal consistency (Cronbach's alpha ¿ 0.80) and test-retest reliability (Price et al., 2002). It also has construct validity, with higher scores on social functioning negatively relating to depressive symptoms and positively relating to the overall

psychological well-being (Price et al., 2002). There is widespread use of the scale in both clinical and research-type settings to measure social adjustment and adaptive functioning in children and adolescents.

3.2.5 Emotion Regulation Questionnaire

Emotional regulation was assessed using the Emotion Regulation Questionnaire developed by Gross and John (2003). This self-report measure evaluates two key emotional regulation strategies: cognitive reappraisal (modifying how one thinks about a situation to alter its emotional impact) and expressive suppression (inhibiting the outward expression of emotions). The ERQ consists of 10 items, with 6 items assessing cognitive reappraisal and 4 items assessing expressive suppression. Participants respond using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating greater use of the respective strategy. The ERQ-CA has demonstrated good internal consistency, with Cronbach's alpha reported as .79 for cognitive reappraisal and .73 for expressive suppression in adolescent populations (Gullone and Taffe, 2012). The Emotion Regulation Questionnaire is a validated tool and has demonstrated strong construct validity and internal consistency across diverse adult and adolescent samples.

3.2.6 Ethical Considerations

Before collecting data, approval by the ethics committee, which is part of the faculty of management social sciences at CUST (Capital University of Science and Technology), was sought and obtained to ensure all of our procedures were consistent with the highest standards of ethics in research.

3.2.7 Data Analyses

Statistical Package for Social Sciences (SPSS, Version 21) was used for statistical analysis for a sample of 300 adolescents. Descriptive statistics were calculated at the preliminary stage. The demographic variables were summarized with frequencies and percentages, and the study variables (digital technology use, cognitive functioning, social functioning, and emotional regulation) were summarized with

the means, standard deviations, skewness, and kurtosis. Descriptive statistics and the Shapiro-Wilk test were used to test the normality of the data. The reliability of scales was analyzed using Cronbach's alpha. A series of inferential statistics was done in order to address the study's hypotheses. Spearman rho correlations were performed to investigate the associations between age, digital technology use (DAST), and the outcome variables. The Mann-Whitney U test was used to assess gender differences in study variables and how limited technology users differ from excessive technology users on cognitive functioning, social functioning, and emotional regulation.

Chapter 4

Results

This chapter presents the results of the current study that examined the relationship between digital technology use, cognitive functioning (attention, cognitive flexibility, processing speed), social functioning (school performance, peer relationships, family relationships, and home duties/self-care), and emotional regulation (cognitive reappraisal and expressive suppression) among adolescents. The study employed a cross-sectional design. The total sample consisted of 300 adolescents recruited through convenience sampling. The following tables summarize the demographic characteristics of the participants.

Table 4.1: Descriptive Statistics of Continuous Demographic Variables of study participants (N = 300

Variable	**N**	**Min**	**Max**	**Mean**	**SD**
Age of respondents	300	13	18	15.15	1.60
Class/Grade	300	4	14	8.64	2.13
Number of siblings	300	0	7	3.05	1.56

Note. N= number of participants, SD= standard deviation

Table 4.1 shows the descriptive statistics of continuous demographic variables. The respondents' ages ranged from 13 to 18 years, with a mean of 15.15 years (SD = 1.60). The participants were enrolled in either 4 to 14 grades, and the average

grade level of the participants was 8.64 (SD = 2.13). The reported number of siblings was between none and seven, with a mean of 3.05 siblings (SD = 1.56).

TABLE 4.2: Frequencies and Percentages of Categorical Demographic Variables of study participants (N = 300)

Variable	**Categories**	**f**	**%**
Gender	Male	161	53.7
	Female	139	46.3
Family structure	Nuclear	163	54.3
	Joint	137	45.7
Daily screen time	3–4 hours	92	30.7
	4–5 hours	72	24.0
	5–6 hours	74	24.7
	6–7 hours	62	20.7
Primary device used	Phone	196	65.3
	Tablet/iPad	69	23.0
	Computer	18	6.0
	Gaming consoles	17	5.7
Digital technology usage	Limited use	156	52.0
	Excessive use	118	39.3

Note. f = Frequency, % = Percentage.

Table 4.2 presents the demographic characteristics of the participants. The sample was relatively balanced in terms of gender and family structure. Most adolescents reported using mobile phones as their primary device, followed by tablets/iPads. Daily screen time was clustered around 3–6 hours, with smaller groups

reporting higher use. The largest proportion of participants were middle adolescents, and in terms of digital technology use, more than half reported limited use, while a substantial proportion reported excessive use.

TABLE 4.3: Reliability analyses of the digital addiction scale for teenagers, the child and adolescent social and adaptive functioning scale, and the emotion regulation questionnaire subscales (N = 300).

Scale / Subscale	**N**	**M**	**SD**	α	**Range**	
					Actual	**Potential**
DAST	10	31.60	11.97	.94	12–50	10–50
CASAFS	24	66.23	15.26	.90	36–93	24–96
ERQ-CS	6	24.30	10.77	.86	6–42	6–42
ERQ-ES	4	18.04	8.58	.90	4–28	4–28

Note. DAST= Digital Addiction Scale for Teenagers; CASAFS= Child and Adolescent Social and Adaptive Functioning Scale; ERQ-CS= Emotion Regulation Questionnaire – Cognitive Reappraisal; ERQ-ES= Emotion Regulation Questionnaire – Expressive Suppression.

Table 4.3 shows reliability and descriptive statistics of the study variables. DAST, CASAFS, and ERQ subscales were found to have good to excellent internal consistency (a =.86-.94). Because the ERQ conceptualizes emotion regulation as two complementary and connected strategies instead of a unidimensional construct (Gross and John, 2003), the conceptualization of reliability was determined separately (as subscales) and not as a summative measure. The ranges of actual scores were similar to the possible ranges, indicating that the variation in responses was sufficient. The internal consistency was not used to determine the reliability of the Trail Making Test (TMT) since the test is a neuropsychological test of performance, not a scale with interrelated items (Strauss et al., 2006).

TABLE 4.4: Descriptive statistics of the digital addiction scale for teenagers, the Trail Making Test, the Child and Adolescent Social and Adaptive Functioning Scale, and the Emotion Regulation Questionnaire subscales (N = 300)

Variable	**M**	**SD**	**Skew**	**Kur**	**Min**	**Max**	**Range**	**K-S**
DAST	31.60	11.97	0.03	-1.55	12	50	38	.00
ERQ-CR	4.05	1.79	-0.11	-1.24	1	7	6	.00
ERQ-ES	4.51	2.14	-0.28	-1.45	1	7	6	.00
CASAFS	66.23	15.26	-0.08	-1.16	36	93	57	.00
TMT-diff	92.29	78.50	0.74	-0.91	-37	267	304	

Note. Skew= skewness; Kurt= kurtosis; Min= minimum, Max=maximum, DAST=digital addiction scale for teenagers; TMT-diff= trail making test; CASAFS =the child and adolescent social and adaptive functioning scale; ERQ-CR=emotion regulation =cognitive reappraisal; ERQ-ES=emotion regulation-expressive suppression

Table 4.4 shows the descriptive data for all scales and subscales. Cognitive functioning was assessed using the difference score between TMT-B and TMT-A (TMT-diff), which is a common measure of executive control and set-shifting ability (Sánchez-Cubillo et al., 2009). The value of the kolmogrov-smirnov test, skewness, and kurtosis in the table above give details of the non-normal distribution of data. Thus, non-parametric analyses were deemed appropriate.

FIGURE 4.1: Histogram with superimposed normal curve for Digital Addiction (DAST) (N = 300)

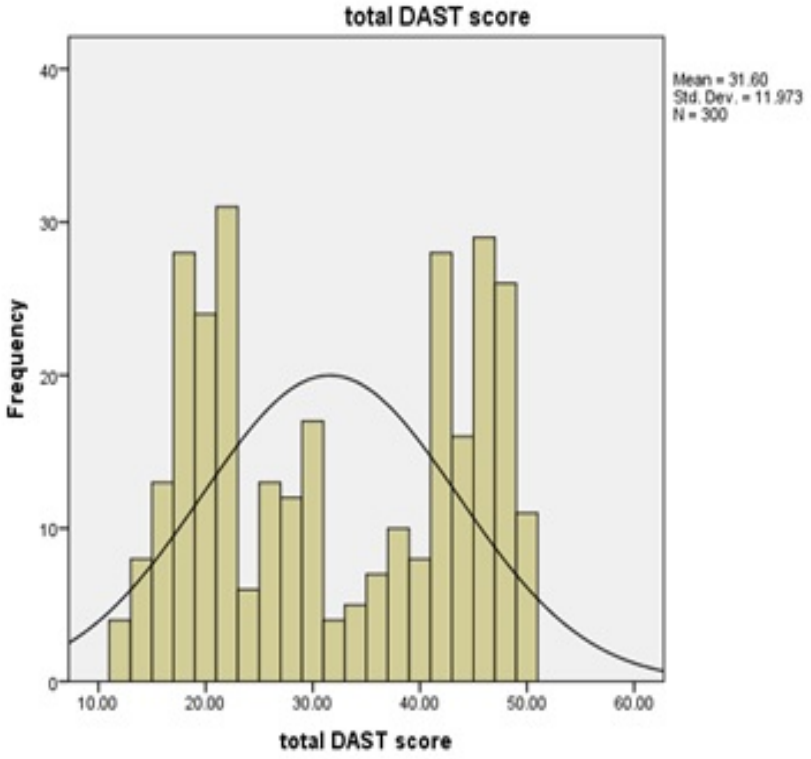


FIGURE 4.2: Histogram with superimposed normal curve for Trail Making Test Difference Score (TMT-diff) (N = 300)

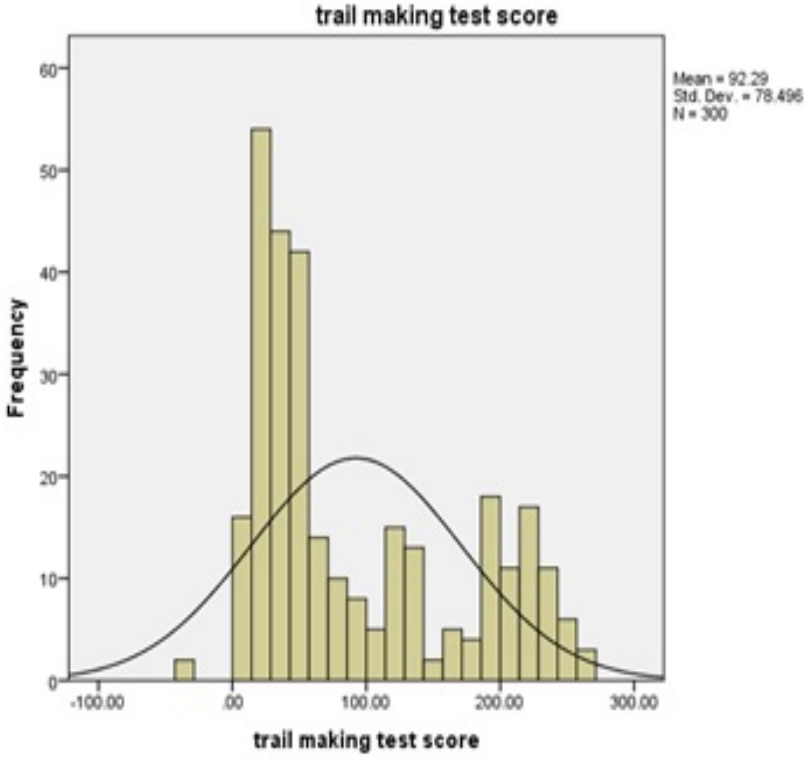


FIGURE 4.3: Histogram with superimposed normal curve for Cognitive Assessment of Social Functioning Scale (CASAFS) (N = 300)

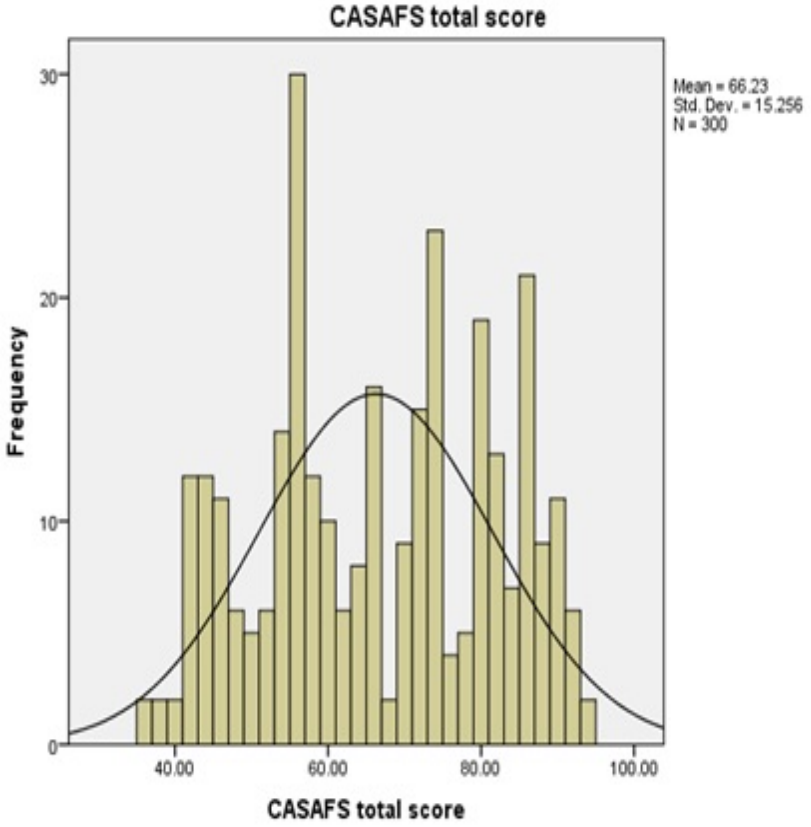


FIGURE 4.4: Superimposed normal curves for the Emotion Regulation Questionnaire (ERQ) subscales, Cognitive Reappraisal (CR) and Expressive Suppression (ES) (N = 300)

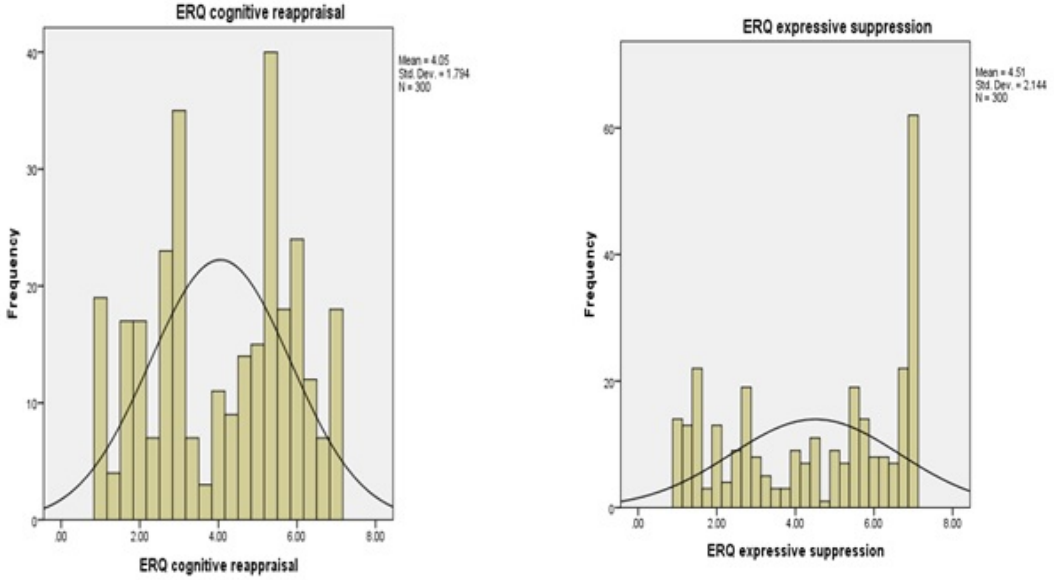


TABLE 4.5: Spearman rho Correlation between Digital Technology Use, Cognitive Functioning, Social Functioning, and Emotional Regulation (N=300)

Variables	**DAST**	**TMT-diff**	**CASAFS**	**ERQ-CR**	**ERQ-ES**
1. DAST	–				
2. TMT-diff	.780**	–			
3. CASAFS	-.716**	-.694**	–		
4. ERQ-CR	-.727**	-.647**	.733**	–	
5. ERQ-ES	.713**	.682**	-705**	-.716**	–

Note. **p < .01 (2-tailed); DAST=digital addiction scale for teenagers; TMT-diff= trail making test; CASAFS =the child and adolescent social and adaptive functioning scale; ERQ-CR=emotion regulation =cognitive reappraisal; ERQ-ES=emotion regulation-expressive suppression.

Table 4.5 shows the relationships between digital addiction (DAST), cognitive functioning (TMT-diff), social functioning (CASAFS), and emotion regulation (ERQ-CR, ERQ-ES). Digital addiction was positively associated with cognitive difficulties (ρ = .780, p < .001) and expressive suppression (ρ = .713, p < .001), and negatively associated with social functioning (ρ= -.716, p < .001) and cognitive reappraisal (ρ = -.727, p < .001). The cognitive difficulties had negative associations with social functioning (ρ = -.694, p < .001) and cognitive reappraisal (ρ = -.674, p < .001), and positive associations with expressive suppression (ρ = .682, p<.001). Cognitive reappraisal was positively related to social functioning (ρ = .733, p < .001), whereas expressive suppression was negatively related to social functioning (ρ = -.705, p < .001). Lastly, there was a very strong negative correlation between reappraisal and suppression (ρ = -.716, p <.001).

TABLE 4.6: Spearman rho Correlation between age and Digital Technology Use, Cognitive Functioning, Social Functioning, and Emotional Regulation (N=300)

Variables	Age	DAST	ERQ-CR	ERQ-ES	CASAFS	TMT-diff
Age	-	.147*	-.094	.118*	-.087	.148*
DAST	-	-	-.726**	.713**	-.716**	.780**
ERQ-CR	-	-	-	-.716**	.733**	-.647**
ERQ-ES	-	-	-	-	-.705**	.682**
CASAFS	-	-	-	-	-	-.694**
TMT-diff	-	-	-	-	-	-

Note. * $p < .05$, ** $p < .01$ (2-tailed); DAST = Digital Addiction Scale for Teenagers; TMT-diff = Trail Making Test difference score; CASAFS = Child and Adolescent Social and Adaptive Functioning Scale; ERQ-CR = Emotion Regulation – Cognitive Reappraisal; ERQ-ES = Emotion Regulation – Expressive Suppression.

Table 4.6 illustrates the relationship between age and study variables. The age was positively linked to digital technology use (ρ=.147, p<.05), expressive suppression (ρ=.118, p<.05), and cognitive functioning as measured by the Trail Making Test (ρ=.148, p<.05). This means that as age increases, the use of digital technology, expressive suppression, and cognitive difficulty tend to increase. However, age showed no significant relationship with cognitive reappraisal (ρ=-.094) or social functioning (ρ=-.087). Overall, these findings suggest that older adolescents generally report slightly higher technology use, expressive suppression, and cognitive difficulty, while their links with reappraisal and social functioning are not significant.

TABLE 4.7: Mann–Whitney U Test Comparing Gender Differences on Digital Technology Use, Cognitive Functioning, Social Functioning, and Emotional Regulation (N = 300)

Variable	Gender (Mean Ranks)		U	p
	Male (n = 161)	Female (n = 139)		
DAST	157.25	142.69	10103.50	.147
TMT-diff	153.70	146.79	10674.00	.491
CASAFS	147.25	154.27	10666.00	.484
ERQ-CR	148.06	153.33	10796.00	.599
ERQ-ES	156.28	143.81	10259.50	.212

Note. n = number of participants; U = Mann–Whitney U statistic; DAST = Digital Addiction Scale for Teenagers; TMT-diff = Trail Making Test difference score; CASAFS = Child and Adolescent Social and Adaptive Functioning Scale; ERQ-CR = Emotion Regulation – Cognitive Reappraisal; ERQ-ES = Emotion Regulation – Expressive Suppression.

Table 4.7 shows the results of Mann–Whitney U tests examining gender differences across the study variables. The results indicated that males and females did not differ significantly in digital technology use, cognitive functioning, social functioning, or emotional regulation (cognitive reappraisal and expressive suppression), with all p values greater than .05. Although male adolescents had slightly higher mean ranks on digital technology use and expressive suppression, and females had slightly higher mean ranks on social functioning and cognitive reappraisal, these differences were not statistically significant. Overall, the findings suggest that there are no significant gender differences among the study variables.

TABLE 4.8: Mann–Whitney U Test Comparing Limited and Excessive Digital Technology Users on Cognitive, Social, and Emotional Functioning (N = 274)

Variable	Digital Technology Use (Mean Ranks)		U	p
	Limited Users (n = 156)	Excessive Users (n = 118)		
TMT-diff	83.28	209.18	746.00	<.001
CASAFS	188.54	70.03	1242.50	<.001
ERQ-CR	186.42	72.83	1573.00	<.001
ERQ-ES	87.92	203.04	1470.00	<.001

Note. n = number of participants; U = Mann–Whitney U statistic; TMT-diff = Trail Making Test difference score; CASAFS = Child and Adolescent Social and Adaptive Functioning Scale; ERQ-CR = Emotion Regulation – Cognitive Reappraisal; ERQ-ES = Emotion Regulation – Expressive Suppression.

Table 4.8 shows the results of Mann–Whitney U tests comparing adolescents with limited and excessive digital technology use across study variables. The results revealed significant group differences on all measures (p ¡ .001). Adolescents with excessive technology use scored significantly higher on the Trail Making Test, indicating greater cognitive difficulties, and also reported higher expressive suppression, reflecting poor emotion regulation, as compared to the limited users. Conversely, adolescents with limited technology use reported better social functioning and greater use of cognitive reappraisal strategies. Overall, these findings suggest that excessive digital technology use is associated with poorer cognitive and social outcomes and less adaptive emotion regulation among adolescents.

Chapter 5

Discussion

5.1 Discussion

The current study aimed to examine the relationship between digital technology use and three key developmental areas in adolescents: cognitive functioning, social skills, and emotional regulation. The study was based on the Social Cognitive Theory (Bandura, 1986) and investigated the interaction of personal (e.g., self-regulation, cognitive and emotional skills), environmental (e.g., cultural and family contexts), and behavioral (e.g., technology use) factors in influencing the development of adolescents. More precisely, the research hypothesized correlations and group differences in relation to age, gender, and the use of technologies of differing intensity.

Some significant correlations were found between digital addiction and cognitive difficulties, poorer social functioning, and maladaptive strategies for emotion regulation (low reappraisal, high suppression). The relationship between the study variables and age was also significant for some: cognitive difficulty, expressive suppression, and digital technology use were positively correlated with age. However, social functioning and cognitive reappraisal showed no significant relationship with age. Interestingly, the difference by gender was not very substantial, indicating that the effect of digital technology is relatively similar among men and women in this sample. There were significant differences in group comparisons: excessive technology users consistently performed worse in cognitive, social, and emotional

domains than those with limited technology use. Overall, these findings highlight the widespread influence of digital technology on adolescent adjustment and the subtle ways in which usage patterns and developmental stages affect outcomes.

5.1.1 Relationship Between Digital Technology Use and Cognitive Functioning

The study found strong positive correlations between digital technology use and cognitive functioning. This supported hypothesis 1, which stated that digital technology use will be significantly correlated with the study variables. The association between digital addiction and cognitive difficulties, as reflected in the performance on the Trail Making Test (TMT), was strong and positive. Adolescents who reported excessive use of technology experienced difficulties with attention, processing speed, and cognitive flexibility. This result aligns with earlier data that link heavy screen time and multitasking to attentional overload, divided thinking, and executive control deficits (Baumgartner et al., 2020a; Ophir et al., 2009). These results highlight how excessive screen time is linked to poor cognitive performance among adolescents, in which unregulated use of screens is becoming a widespread behavior.

Adolescents who frequently switch between apps, screens, and online platforms may experience chronic divided attention, resulting in poorer performance on tasks requiring sustained focus. Moreover, the dopamine-reward cycle associated with digital engagement may reinforce rapid stimulus-seeking behavior, consequently weakening the ability to persist on slow, effortful cognitive tasks like the TMT (**?**) (Firth et al., 2019).

These findings align with research suggesting that adolescents' brains, which are still undergoing maturation in regions responsible for inhibitory control and cognitive flexibility (Casey et al., 2019), may be particularly vulnerable to the effects of heavy screen exposure. In the Pakistani context, where academic pressures are high and digital multitasking during study time is common, excessive technology use may further compromise the development of cognitive control. Thus, the significant relationships found in this study point to an increasing need for structured digital literacy and self-regulation training among youth.

5.1.2 Relationship Between Digital Technology Use and Social Functioning

Digital addiction has a strong negative correlation with social adjustment (CASA-FS) in terms of social functioning. Adolescents who are more addicted to digital devices reported worse school performance, poorer peer relationships, and increased problems in family and self-management areas. This is consistent with previous studies showing that excessive use of digital devices reduces face-to-face communication and community interaction, leading to social withdrawal and lower relationship quality (Abi-Jaoude et al., 2020; Keles et al., 2020). This study provides further evidence in a cultural context where connections with family and community are typically central to adolescent development. The findings also emphasize that increased use of digital technology is associated with declining social functioning among adolescents.

Another dimension worth considering is the quality, rather than merely the quantity, of adolescents' digital interactions. Excessive screen use may not only displace meaningful in-person interactions but may also expose adolescents to online environments characterized by comparison, cyberbullying, or superficial connections (Nesi et al., 2018). These experiences can undermine adolescents' sense of belonging, self-esteem, and interpersonal trust.

In collectivistic societies like Pakistan, social functioning is heavily shaped by family cohesion, community expectations, and structured roles within the household. Excessive engagement with digital technology may reduce adolescents' participation in family routines or cultural practices, which are essential for social development. The strong negative correlation between digital addiction and CASAFS scores suggests that digital overuse may interfere with responsibilities such as academic engagement, sibling support, household contribution, and respectful communication. This highlights that digital addiction is not only an individual-level concern but one that has meaningful consequences for family and community functioning.

5.1.3 Relationship Between Digital Technology Use and Emotion Regulation-Cognitive Reappraisal

Emotion regulation was also identified as a key area affected by technology use. Digital addiction was negatively linked to cognitive reappraisal. In other words, adolescents who rely more on digital technology are less likely to use adaptive coping strategies like reframing stressful events. This finding aligns with previous research showing that digital (especially social media) platforms tend to promote quick, superficial emotional reactions rather than mindful processing (Weinstein, 2018; Marino et al., 2020). The strong negative correlation of digital addiction with less use of adaptive emotional coping strategies among adolescents is an alarming consequence of unregulated use of digital devices.

5.1.4 Relationship Between Digital Technology Use and Emotion Regulation Expressive Suppression

Conversely, digital addiction was strongly positively correlated with expressive suppression, indicating greater reliance on maladaptive emotional control strategies. This means that digitally more addicted adolescents suppress their emotions rather than reframing the stressful situation to act in an emotionally acceptable way. As suppression is linked to increased stress, interpersonal difficulties, and reduced psychological well-being (Aldao et al., 2022), these results highlight the emotional risks of excessive digital use during adolescence.

The strong associations between digital technology use and maladaptive emotion regulation underscore the psychological costs of excessive online engagement. Digital platforms—particularly social media—are known to amplify emotional intensity through constant exposure to emotionally charged content, social comparison, and rapid feedback loops (**?**) (Marengo et al., 2021). Adolescents who rely heavily on these environments may begin to lose opportunities to practice reflective coping, instead defaulting to suppression or impulsive expression.

Moreover, digital environments allow adolescents to curate idealized versions of themselves, which may reduce their willingness to openly express their emotions in real-life settings. Suppression, although sometimes socially adaptive in digital

interactions, becomes problematic when generalized to offline relationships, as it is linked to increased stress, interpersonal strain, and symptoms of anxiety or depression (Gross, 2015).

The current study's findings thus contribute to a growing body of literature suggesting that digital technology may inadvertently shape how young people experience and manage their emotions—not necessarily by increasing negative emotions directly, but by reducing opportunities to develop healthier regulatory habits.

5.1.5 Interrelationship of Cognitive, Social and Emotional Processes

Lastly, theoretical expectations were confirmed by the intercorrelations of the study variables. Reappraisal was positively correlated with better social functioning, and suppression was correlated with worse social functioning, whereas cognitive difficulties were correlated with stronger suppression and weaker reappraisal. These trends imply that cognitive, social, and emotional mechanisms are not independent but closely interrelated, and that digital addiction has a cascading impact on various areas of adolescent adaptation.

5.1.6 Relationship Between Age and Study Variables

Spearman correlations revealed that age had small but significant positive associations with digital technology use, expressive suppression, and cognitive difficulties. This suggests that older adolescents may experience more technologically saturated environments, higher academic pressures, and greater social media exposure, contributing to increased digital use and associated challenges, as it is a stage characterized by enhanced autonomy, peer interactions, and academic pressures (Twenge et al., 2018; Pew Research Center, 2023).

However, age was not significantly related to social functioning or cognitive reappraisal, indicating that these domains remain relatively stable across early to late adolescence in this sample. These results partially support Hypothesis 2 (H2), demonstrating age-linked differences in some—but not all—study variables.

The selective associations between age and certain variables further highlight developmental nuances. Older adolescents may have greater autonomy, access to

personal devices, and stronger peer-oriented motivations for digital engagement, explaining the higher DAST and expressive suppression scores. However, the lack of age differences in reappraisal or social functioning suggests that emotional and social competencies may be influenced more by environmental and familial factors than by age alone.

In Pakistan, adolescents across all age groups experience similar digital environments, academic pressures, and social expectations. Also the penetration of smartphones and social media among youth is extensive, with over 85% of teenagers having access to smartphones (Pakistan Telecommunication Authority, 2024). This almost universal exposure likely reduces developmental variations in the impact of technology, even if levels of usage increase with age.

This cultural stability may buffer against developmental differences that are often seen in Western samples. Thus, while digital use increases with age, its impact on functioning may remain relatively uniform across adolescence. These findings align with previous studies that emphasize heightened technology usage during late adolescence but propose that psychosocial and cognitive outcomes remain relatively stable across developmental stages (Livingstone et al., 2021; Keles et al., 2020).

5.1.7 Gender Differences in Digital Technology Use and Functioning

The Mann–Whitney U results indicated no significant gender differences in digital technology use, cognitive functioning, social functioning, or emotional regulation. Both male and female adolescents exhibited comparable levels across all variables, suggesting that technology's impact is broadly similar across genders in this sample. This finding does not support Hypothesis 3 (H3).

Although prior studies have found gendered patterns of technology use (Rideout and Robb, 2019; Twenge and Martin, 2020), recent global trends suggest a narrowing of gender gaps as access to smartphones and digital platforms becomes more universal (Anderson and Vogels, 2022). In Pakistan, equal access to mobile devices for school, communication, and entertainment may further reduce gender-based disparities. However, the absence of significant differences in this study

implies that, within the Pakistani adolescent context, technology usage and its related consequences may have become less influenced by gender. The increasing prevalence of smartphones and social media access for both genders likely reduces the distinctions in how digital tools are employed. One potential interpretation is that cultural dynamics in Pakistan, where both boys and girls increasingly depend on digital platforms for learning, entertainment, and social interaction, foster an equitable environment regarding exposure. Additionally, the current study measured overall technology use rather than modality-specific engagement (e.g., gaming vs. social media), which may explain the absence of gender differences. Future research might be enhanced by breaking down technology use into specific categories to investigate whether subtle gendered usage patterns (e.g., academic versus recreational) have differing effects on outcomes.

5.1.8 Differences Between Limited and Excessive Digital Technology Users

Clear and significant differences were found across all functional domains between adolescents classified as limited versus excessive users of digital technology. These findings strongly support Hypothesis 4 (H4). One of the most notable findings of this research was the distinct difference between adolescents who use digital technology sparingly versus those who use it excessively. In every assessed area—cognitive functioning, social functioning, and emotional regulation—those who used technology excessively showed significantly worse outcomes than their counterparts who used it minimally.

5.1.8.1 Cognitive Functioning

Excessive users performed significantly worse on the Trail Making Test, indicating lower sustained attention, slower processing speed, and reduced cognitive flexibility. These findings correspond with earlier research showing that digital overuse contributes to attentional fragmentation and executive functioning deficits (Baumgartner et al., 2017; Cain and Mitroff, 2011). The higher mean rank of excessive

users on the trail making test also highlights that they have poor cognitive performance as compared to limited users, whose mean ranks were lower, indicating that less digital addiction is linked to better cognitive performance.

5.1.8.2 Social Functioning

Excessive users also exhibited significantly poorer social functioning, with markedly lower CASAFS scores than limited users. The lower mean rank of excessive users indicates that they have lower social skills in areas of peer and family relationships, self-care, and academic settings, whereas the higher mean rank of limited users indicates that they have better social and adaptive functioning in these areas. This suggests that excessive screen time may displace real-life responsibilities and weaken family and peer relationships—patterns well-documented in previous research (Kuss and Griffiths, 2017; Twenge et al., 2018).

5.1.8.3 Emotion Regulation

Consistent with correlational findings, excessive users were less likely to use cognitive reappraisal and more likely to rely on expressive suppression. This pattern reflects maladaptive emotional coping and aligns with existing literature linking intense digital engagement to emotional dysregulation (Gross and John, 2003; Nesi and Prinstein, 2015).

The striking magnitude of differences between limited and excessive users highlights that the intensity of digital engagement, not merely access, is central to adolescent functioning. The large gaps in cognitive and social functioning suggest that excessive digital use may behave similarly to other behavioral addictions, with escalating use, withdrawal-like symptoms, and interference in daily life (Kuss and Griffiths, 2017). Overall, the magnitude and consistency of these group differences provide compelling evidence that excessive digital technology engagement is associated with broadly poorer cognitive, social, and emotional outcomes.

Chapter 6

Conclusion

The current research aimed to explore the impact of digital technology usage on three interconnected developmental areas of adolescents—cognitive functioning, social functioning, and emotional regulation—through the lens of Social Cognitive Theory. The results indicated that high levels of engagement with digital technologies were notably linked to adverse effects across these areas, implying that the swift growth of digital life has both enhanced and complicated the developmental landscape for today's youth.

Cognitive difficulties such as decreased attention, slower processing speed, and lower cognitive flexibility were noted among those with increased digital involvement. Social functioning was similarly affected, with adolescents exhibiting excessive use patterns showing diminished adaptability in relationships with peers, in school, and within families. Emotional regulation stood out as a particularly sensitive area, with maladaptive strategies like expressive suppression becoming more prevalent among heavy users, whereas adaptive strategies such as cognitive reappraisal were used less frequently.

A key feature of this research is that these relationships were not consistent across all adolescents. Patterns related to age revealed that older adolescents engaged more with technology than their younger peers, reflecting both developmental appropriateness and greater autonomy in digital environments. However, gender did not emerge as a distinguishing factor, indicating that the effects of digital technology on psychological functioning transcend gender among adolescents. The

persistent observation that heavy users recorded poorer outcomes across cognitive, social, and emotional dimensions highlights the necessity of examining not just the mere use of technology by adolescents, but also the intensity and nature of its incorporation into their daily routines.

This research adds to the global literature by providing culturally relevant evidence from Pakistan, where empirical investigations into digital technology and adolescent development are sparse. A significant portion of the current scholarship in this domain is rooted in Western contexts, which risks neglecting the influence of cultural values, family dynamics, and socioeconomic factors that shape adolescents' digital experiences in non-Western settings. By concentrating on Pakistani adolescents, the research underscores the need to contextualize studies on digital media, revealing that while overarching issues of overuse and negative outcomes may be universally recognized, the subtleties of expression, coping strategies, and adaptation are influenced by local contexts.

In addition to contributing to academic discussions, these findings hold considerable practical implications. The outcomes advise caution against categorizing technology as simply beneficial or detrimental; rather, its impact seems largely contingent on how it is used, the frequency of use, and its intended purpose. Balanced, organized, and educational use of technology can foster growth, while excessive or unregulated use tends to impair developmental outcomes. This duality highlights the role of parents, educators, and mental health practitioners in mediating adolescents' paths toward healthier digital habits.

Furthermore, the research emphasizes the need to cultivate digital literacy skills, which empower adolescents to critically assess content, monitor their own usage, and use technology in ways that facilitate rather than obstruct their development. In summary, this study highlights the intricate and multifaceted influence of digital technology on adolescent development. By emphasizing the cognitive, social, and emotional vulnerabilities associated with overuse, while also acknowledging the possibilities provided by purposeful and constructive engagement, it presents a nuanced perspective on the impact of the digital age.

Collectively, the findings provided strong support for Hypothesis 1 (H1), confirming significant associations between digital technology use and cognitive, social, and emotional variables. Hypothesis 2 (H2) received partial support, with age showing selective associations. Hypothesis 3 (H3) was not supported, as gender differences were non-significant. Hypothesis 4 (H4) was strongly supported, with excessive users performing significantly worse across all domains compared to limited users.

6.1 Limitations

Although this study provides important insights into the connection between digital technology use and the cognitive, social, and emotional functioning of adolescents, several limitation exist. These limitations not only emphasize areas where caution is necessary in interpreting the results, but they also suggest directions for enhancing future research in this swiftly changing area.

A significant limitation is the study's cross-sectional design, which limits the capacity to make causal inferences. Despite finding notable associations between technology use and developmental outcomes, the data do not permit definitive conclusions regarding whether excessive technology use results in poorer functioning or if adolescents with pre-existing cognitive, social, or emotional challenges are predisposed to use digital devices more. For instance, adolescents experiencing attention difficulties might be drawn to multitasking in digital settings, while socially isolated individuals may depend heavily on social media for connectivity. Longitudinal and experimental approaches would be essential to untangle these bidirectional relationships and clarify the sequence of effects over time.

A second study-specific limitation relates to the measurement of digital technology use. The study assessed technology engagement through the DAST, which captures overall problematic use rather than differentiating types of digital activities (e.g., gaming, educational use, social media, passive browsing). This was a deliberate choice to maintain focus on global technology addiction; however, it limited the ability to identify which specific digital behaviors were most strongly linked to cognitive, social, or emotional outcomes. It is possible that certain forms of technology use (such as academic or skill-based engagement) may not carry the

same risks as problematic use, but the study design did not allow for this distinction. The decision to categorize adolescents into "limited" and "excessive" users is another design-based limitation. This categorization was necessary for group comparison analysis, yet it may have obscured important variation within each group. Adolescents classified as "excessive users" may differ in their motivations, patterns of use, and contextual factors, but these nuances were not captured.

Another limitation involves the use of self-report measures. Participants were asked to provide information about their own technology use and psychological functioning, which may introduce biases such as social desirability, faulty recall, or selective reporting. Adolescents might have downplayed their time spent online or overstated their social skills to seem more favorable. Although self-reports offer vital subjective insights, the lack of objective indicators—such as tracking screen time, observational data, or reports from teachers or parents—means that results should be interpreted with care. Utilizing a multimethod approach would significantly improve the reliability and validity of future research.

The study also utilized convenience sampling, drawing participants from selected schools and communities. While this method proved practical and efficient, it restricts the generalizability of the findings. The adolescents involved in this sample may not accurately reflect the diverse cultural, socioeconomic, and educational backgrounds throughout Pakistan. For example, rural youth with limited access to high-speed internet or those from lower-income families may experience very different digital interactions compared to their urban, middle-class counterparts. The lack of representativeness diminishes the ability to extend conclusions to the wider adolescent population.

Moreover, the study did not adequately consider important contextual and moderating variables that likely influence how technology affects development. Variables such as parental supervision, family dynamics, peer support, and personal traits like resilience or personality were not systematically assessed, although they may mitigate or amplify the effects of digital technology.

Additionally, socioeconomic status could play an important role, as differences in access to devices and the quality of content may lead to unequal developmental

outcomes. Without acknowledging these factors, the findings may oversimplify the complex interactions between digital engagement and adolescent functioning.

Finally, the study primarily assessed digital technology use in terms of frequency and overall level (e.g., excessive vs. limited usage), without sufficiently differentiating the kinds of digital activities. Not all types of technology use are comparable: time invested in educational apps or skill-based games may yield very different results compared to time spent on passive scrolling or online gaming. The lack of detailed classifications hinders a nuanced understanding of how specific digital behaviors uniquely impact cognitive, social, and emotional domains.

In conclusion, these limitations highlight the necessity of exercising caution when interpreting the findings. They also reveal promising avenues for future research, including longitudinal designs, objective measurement instruments, diverse sampling methods, and more nuanced assessments of digital behavior. By addressing these shortcomings, future studies can create a more comprehensive representation of how digital technology interacts with the developmental paths of adolescents.

6.2 Implications

The outcomes of this study hold substantial implications that span theoretical and practical aspects. By exploring how digital technology influences cognitive processes, social interactions, and emotional management in adolescents, this study not only enhances academic insights but also presents practical recommendations for parents, educators, and professionals.

6.3 Theoretical implications

A key theoretical contribution of this study lies in advancing the application of Social Cognitive Theory (Bandura, 1986) to the context of adolescent digital technology use. While SCT has been widely used to explain interactions between personal, behavioral, and environmental factors, there has been limited empirical work examining these reciprocal influences within the rapidly evolving digital landscape.

The close links between technology use and cognitive challenges, diminished social adaptation, and poor emotion regulation establish that digital environments

should be viewed as the potent socializing factor, which influences the behavior and inner processes of adolescents. This research identifies the digital technology as a relevant environmental factor.

In today's adolescent context, digital technology emerged as a significant environmental factor impacting cognitive results such as focus and processing speed, social aspects like adaptability and peer relationships, and emotional regulation techniques. The connections revealed in this research underscore a key premise of the theory: individuals learn and adapt not just through direct experiences but also through observation and reinforcement within their surroundings. For instance, excessive use of digital platforms may reinforce unhelpful behaviors like emotional suppression or social withdrawal, while moderate and intentional usage may promote more positive outcomes. By demonstrating these reciprocal dynamics, the study aids in refining theoretical frameworks that explain how technology influences developmental paths.

The findings suggest that technology overuse is not only a behavior but also a factor that interacts with personal attributes (e.g., cognitive flexibility, emotion regulation skills). This supports SCT's assumption that behavior is both shaped by and shapes personal functioning.

The positive relationship between age and digital use, alongside the absence of gender differences, refines SCT's applicability by showing how cultural norms, widespread device access, and demographic factors condition technology-related learning environments.

6.4 Practicial Implications

The study findings have a number of practical implications based on the direct statistical outcomes. Since the use of digital technology was significantly linked with worse cognitive functioning, worse social functioning, and less adaptive emotional regulation, the findings provide evidence that adolescents who use digital technology excessively or uncontrollably could be at a greater developmental risk.

The highly significant positive correlation between digital use and cognitive problems suggests that tracking trends of technology use, including multitasking or

excessive use, might prove to be more significant than attention to screen time itself. Activities that enhance focus and executive ability could be helpful in the educational environment, as adolescents with lower cognitive ability also experience lower social adaptation and less cognitive reappraisal.

The negative correlation between social functioning and the use of digital devices is substantial, which means that adolescents who use digital platforms intensively might communicate and interact with peers less effectively in person. Educational institutions can thus contribute to the healthy development by providing the opportunity to organize peer cooperation and minimize unnecessary digital distractions in the classroom.

There is also a notable finding that the higher the digital use of adolescents, the more they are dependent on expressive suppression and less on cognitive reappraisal, which demonstrates the necessity of emotional regulation training, in particular for those adolescents who demonstrate high dependence on digital devices. Interventions and counseling in schools to help build healthier emotional coping strategies could help counteract the effects of this study. Practitioners who engage with adolescents can use the digital use patterns as a component of regular assessments because excessive users in the present study always demonstrated worse results in the cognitive, social, and emotional areas.

Lastly, due to the small but significant relationships between age and technology use and cognitive functioning, interventions can be developmentally focused, with older adolescents being advised on coping with technology multitasking and emotional online stressors. Overall, the implications underline the importance of considering the overuse of digital as one of the possible signs of more general functional trouble, depending on the patterns directly observed in the study.

6.5 Recommendations

The conclusions of this study, in conjunction with the methodological limitations mentioned previously, lead to several significant suggestions for upcoming research and practice. In terms of research, future investigations would significantly benefit from utilizing longitudinal approaches to gain a clearer understanding of how the use of digital technology impacts the cognitive, social, and emotional growth of

adolescents over time. Such approaches would enable researchers to go beyond the correlational insights discussed here and investigate the directionality of effects—for instance, whether excessive engagement leads to cognitive and social challenges, or if adolescents who are already facing difficulties in these areas are more likely to depend on digital platforms.

Additionally, the precision of future studies could be improved by integrating objective measures of technology engagement, such as device-use monitoring applications or digital logs, in combination with self-reported assessments. This study only examined general problematic usage; therefore, future research should also differentiate between various kinds of digital activities, since academic use, gaming, social media interaction, and passive browsing may have different impacts on adolescent functioning.

Incorporating contextual factors such as parenting styles, peer influence, emotional health, socioeconomic status, and access to digital resources would further enhance understanding of the elements that influence adolescents' digital behavior. Expanding the demographic diversity of participants, particularly by including rural, low-income, and less digitally connected adolescents, would also increase the applicability of research findings, particularly within the Pakistani context.

In educational contexts, the findings highlight the necessity of incorporating digital literacy, strategies for managing attention, and skills for regulating emotions into the school curriculum. Educators should be trained to recognize early indicators of problematic digital behavior and collaborate with school counselors to provide prompt assistance. Purposeful pedagogical use of technology, such as organized digital projects, interactive learning resources, and collaborative online tools, may encourage students to engage with technology positively, mitigating its potential to distract or overwhelm.

For families, the research emphasizes the importance of active involvement in guiding adolescents' digital practices. Families might consider maintaining open communication regarding online experiences, establishing clear and consistent guidelines for screen time, and modeling balanced technology usage themselves. Creating shared offline routines, like tech-free family meals or screen-free times before

going to sleep, may further encourage healthy boundaries and enhance adolescents' emotional and social wellness.

Lastly, mental health practitioners should integrate digital wellness into therapeutic practices, especially for adolescents exhibiting signs of excessive technology use or maladaptive emotional regulation behaviors such as expressive suppression. Programs focusing on mindfulness, cognitive reappraisal, emotional coping mechanisms, and resilience-building can assist adolescents in replacing unproductive behaviors with more adaptive strategies. Group-based initiatives within schools or community centers may also be effective avenues for promoting healthier digital engagement.

In summary, these recommendations highlight the importance of collective efforts among researchers, educators, parents, and practitioners. By joining forces, stakeholders can cultivate balanced digital habits and create environments that help adolescents use technology in ways that promote—rather than obstruct—their cognitive, social, and emotional development.

References

Abi-Jaoude, E., Naylor, K. T., and Pignatiello, A. (2020). "Smartphones, social media use, and youth mental health" . *CMAJ*, 192(6):E136–E141.

Ahmad, I. and Iqbal, M. (2021). "Influence of Islamic culture on the online behavior of adolescents in Pakistan" . *Journal of Islamic Social Sciences*, 38(2):145–158.

Ahmed, R. and Qureshi, M. (2022). "Gender differences in digital technology use among adolescents in Pakistan: A sociocultural perspective" . *Asian Journal of Social Psychology*, 25(3):210–226.

Aldao, A., Dixon-Gordon, K. L., and De Los Reyes, A. (2022). "Emotion regulation strategies and psychopathology: A transdiagnostic perspective" . *Annual Review of Clinical Psychology*, 18:187–211.

Anderson, M. and Jiang, J. (2018). "Teens, social media & technology 2018" . Technical report, Pew Research Center.

Anderson, M. and Vogels, E. A. (2022). "Teens, social media and technology 2022" . Technical report, Pew Research Center.

Anderson, V. A., Anderson, P., Northam, E., Jacobs, R., and Mikiewicz, O. (2021). "Development of executive functions through late childhood and adolescence in an Australian sample" . *Developmental Neuropsychology*, 46(2):142–156.

Authority, P. T. (2023). "Annual report 2022-23" . Technical report, Pakistan Telecommunication Authority.

Bandura, A. (1986). *"Social foundations of thought and action: A social cognitive theory"*. Prentice-Hall.

Bandura, A. (2001). "Social cognitive theory of mass communication" . *Media Psychology*, 3(3):265–299.

Baumgartner, S. E., Lemmens, J. S., Weeda, W. D., and Huizinga, M. (2020a). "The relationship between media multitasking and executive function in early adolescents" . *Journal of Early Adolescence*, 40(1):4–25.

Baumgartner, S. E., Schuur, W., Lemmens, J. S., and te Poel, F. (2017). "The relationship between media multitasking and attention problems in adolescents: Results of two longitudinal studies" . *Human Communication Research*, 44(1):3–30.

Baumgartner, S. E., Weeda, W. D., van der Heijden, L. L., and Huizinga, M. (2020b). "The relationship between media multitasking and executive function in early adolescents" . *The Journal of Early Adolescence*, 40(3):354–380.

Bediou, B., Adams, D. M., Mayer, R. E., Tipton, E., Green, C. S., and Bavelier, D. (2018). "Meta-analysis of action video game impact on perceptual, attentional, and cognitive skills" . *Psychological Bulletin*, 144(1):77–110.

Best, P., Manktelow, R., and Taylor, B. (2020). "Online communication, social media and adolescent wellbeing: A systematic narrative review" . *Children and Youth Services Review*, 95:1–12.

Blume, C., Hasselhorn, M., and Schneider, W. (2020). "Digital game-based learning and executive functions in adolescents: A review" . *Computers in Human Behavior*, 112:106394.

Boer, M., Stevens, G. W. J. M., Finkenauer, C., de Looze, M. E., and van den Eijnden, R. J. J. M. (2020). "Social media use intensity, social media use problems, and mental health among adolescents: Investigating directionality and mediating processes" . *Computers in Human Behavior*, 116:106645.

Bowie, C. R. and Harvey, P. D. (2006). "Administration and interpretation of the Trail Making Test" . *Nature Protocols*, 1(5):2277–2281.

Brailovskaia, J. and Margraf, J. (2020). "The relationship between burden caused by coronavirus (COVID-19), addictive social media use, sense of control and anxiety" . *Current Psychology*, 42(1):1–8.

Cain, M. S. and Mitroff, S. R. (2011). "Distractor filtering in media multitaskers" . *Perception*, 40(11):1183–1192.

Casey, B. J., Tottenham, N., Liston, C., and Durston, S. (2019). "Imaging the developing brain: What have we learned about cognitive development?" . *Trends in Cognitive Sciences*, 23(12):999–1010.

Chaudron, S., Di Gioia, R., Gemo, M., and Holloway, D. (2021). "Young children (0–8) and digital technology: A qualitative study across Europe" . Technical report, Publications Office of the European Union.

Chen, W. and Persson, A. (2020). "Digital media and social capital in adolescents: A cross-national study" . *Information, Communication Society*, 23(12):1778–1795.

Christakis, D. A. and Moreno, M. A. (2018). "Impact of technology on child development: Research brief" . *JAMA Pediatrics*.

Coyne, S. M., Rogers, A. A., Nelson, D. A., and Stockdale, L. A. (2023). "Adolescents' digital technology use and adjustment: A critical review of the literature" . *Journal of Adolescence*, 97:85–98.

Coyne, S. M., Rogers, A. A., Zurcher, J. D., Stockdale, L., and Booth, M. (2019). "Does time spent using social media impact mental health?: An eight year longitudinal study" . *Computers in Human Behavior*, 104:106160.

Craig, S. L. and McInroy, L. B. (2014). "You can form a part of yourself online: The influence of new media on identity development and coming out for LGBTQ youth" . *Journal of Gay & Lesbian Mental Health*, 18(1):95–109.

Crone, E. A. and Dahl, R. E. (2012). "Understanding adolescence as a period of social–affective engagement and goal flexibility ". *Nature Reviews Neuroscience*, 13(9):636–650.

Diamond, A. (2020). "Executive functions: Insights into ways to help more children thrive" . *Zero to Three Journal*, 40(3):18–24.

Dilshad, R. and Rafique, R. (2020). "Relationship between internet addiction and mental health among university students in Pakistan" . *Pakistan Journal of Psychological Research*, 35(2):367–386.

Domoff, S. E., Harrison, K., Gearhardt, A. N., Gentile, D. A., Lumeng, J. C., and Miller, A. L. (2019). "Development and validation of the Problematic Media Use Measure: A parent report measure of screen media "addiction" in children" . *Psychology of Popular Media Culture*, 8(1):2–11.

Elhai, J. D., Levine, J. C., and Hall, B. J. (2019). "The relationship between social media use and anxiety: A meta-analysis" . *Current Opinion in Psychology*, 36:132–137.

Elhai, J. D., Yang, H., Fang, J., Bai, X., and Hall, B. J. (2021). "Depression and anxiety symptoms are related to problematic smartphone use severity in Chinese young adults: Fear of missing out as a mediator" . *Addictive Behaviors*, 112:106664.

Ellison, N., Vitak, J., Gray, R., and Lampe, C. (2017). "Cultivating social resources on social network sites: Facebook relationship maintenance behaviors and their role in social capital processes" . *Journal of Computer-Mediated Communication*, 22(4):203–218.

Farooq, M., Sadaf, R., and Rehman, A. (2022). "Socioeconomic disparities and digital engagement in Pakistani adolescents: Implications for learning and social development" . *Journal of Educational Technology*, 19(4):59–75.

Flett, J. A. M., Hayne, H., Riordan, B. C., Thompson, L. M., and Conner, T. S. (2020). "Mindfulness-based interventions for adolescent digital media users: A systematic review" . *Journal of Youth and Adolescence*, 49(9):1834–1852.

Frison, E. and Eggermont, S. (2020). "Toward an integrated and differential approach to the relationships between loneliness, different types of Facebook

use, and adolescents' depressed mood" . *Communication Research*, 47(5):701–728.

George, M. J. and Odgers, C. L. (2023). "Social media and adolescent well-being: A narrative review of longitudinal studies" . *Child Development Perspectives*, 17(1):16–22.

Geurts, J. J. G., van Haren, N. E. M., and van Os, J. (2022). "Social functioning in psychiatric disorders: A review of recent research" . *European Psychiatry*, 64(1):e75.

Granic, I., Lobel, A., and Engels, R. C. M. E. (2014). "The benefits of playing video games" . *American Psychologist*, 69(1):66–78.

Gross, J. J. (2015). "Emotion regulation: Current status and future prospects" . *Psychological Inquiry*, 26(1):1–26.

Gross, J. J. and John, O. P. (2003). "Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being" . *Journal of Personality and Social Psychology*, 85(2):348–362.

Gullone, E. and Taffe, J. (2012). "The Emotion Regulation Questionnaire for Children and Adolescents (ERQ–CA): A Psychometric Evaluation" . *Psychological Assessment*, 24(2):409–417.

Haque, A., Khan, Z. H., and Zaman, A. (2020). "Gender digital divide and its impact on youth in Pakistan: A sociocultural analysis" . *Pakistan Journal of Gender Studies*, 19:89–106.

Huang, C., Zhang, Y., and Lin, C. (2022). "Internet use and adolescent mental health: A meta-analysis" . *Journal of Adolescence*, 94:120–132.

Hussain, A. and Sultan, S. (2021). "Internet addiction and academic achievement among adolescents in Pakistan" . *Pakistan Journal of Psychological Research*, 36(2):243–260.

Javed, F. and Malik, F. (2022). "Social media use and emotional dysregulation among Pakistani adolescents" . *Journal of Behavioral Sciences*, 32(1):59–75.

Keles, B., McCrae, N., and Grealish, A. (2020). "A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents" . *International Journal of Adolescence and Youth*, 25(1):79–93.

Kelly, Y., Zilanawala, A., Booker, C., and Sacker, A. (2018). "Social media use and adolescent mental health: Findings from the UK Millennium Cohort Study" . *EClinicalMedicine*, 6:59–68.

Khalid, R., Tariq, R., and Anjum, A. (2019). "The digital habits of Pakistani youth: Patterns, concerns and parental mediation" . *Journal of Behavioural Sciences*, 29(2):65–81.

Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D., Lin, N., et al. (2020). "Social media and well-being: Pitfalls, progress, and next steps" . *Current Directions in Psychological Science*, 29(2):86–92.

Kuss, D. J. and Griffiths, M. D. (2017). "Social networking sites and addiction: Ten lessons learned" . *International Journal of Environmental Research and Public Health*, 14(3):311–320.

Lauricella, A. R., Wartella, E., and Rideout, V. J. (2020). "Young children's screen time across four countries" . *Journal of Children and Media*, 14(2):177–194.

Livingstone, S. (2019). *"Children and the internet: Great expectations, challenging realities"* . Polity Press, 2 edition.

Livingstone, S. and Helsper, E. J. (2007). "Gradations in digital inclusion: Children, young people and the digital divide" . *New Media Society*, 9(4):671–696.

Livingstone, S., Stoilova, M., and Nandagiri, R. (2021). "Children's data and privacy online: Growing up in a digital age" . *Media, Culture Society*, 43(6):1022–1039.

Loh, K. K. and Kanai, R. (2016). "How has the Internet reshaped human cognition?" . *Neuroscientist*, 22(5):506–520.

Luckin, R., Holmes, W., Griffiths, M., and Forcier, L. B. (2016). *"Intelligence unleashed: An argument for AI in education"* . Pearson Education.

Lupton, D. (2020). *"The digitally engaged patient: Self-monitoring and self-care in the digital health era"* . Wiley.

Marino, C., Gini, G., Vieno, A., and Spada, M. M. (2020). "The associations between problematic Facebook use, psychological distress and well-being among adolescents and young adults: A systematic review and meta-analysis" . *Journal of Affective Disorders*, 267:140–149.

Meier, A. and Reinecke, L. (2021). "Computer-mediated communication, social media, and mental health: A meta-review" . *Communication Research*, 48(8):1182–1209.

Montag, C. and Walla, P. (2021). "Carried away by digital distractions: Exploring the impact of smartphone use on cognition and emotion" . *Frontiers in Psychology*, 12:626302.

Morawetz, C., Bode, S., Baudewig, J., and Heekeren, H. R. (2020). "The effect of cognitive reappraisal on emotional experience: A meta-analysis of fMRI studies" . *Neuroscience Biobehavioral Reviews*, 116:315–325.

Negroponte, N. (1995). *"Being digital"* . Alfred A. Knopf.

Nesi, J., Choukas-Bradley, S., and Prinstein, M. J. (2022). "Transformation of adolescent peer relations in the social media context: Part 1—A theoretical framework and application to dyadic peer relationships" . *Clinical Child and Family Psychology Review*, 25:3–23.

Nesi, J. and Prinstein, M. J. (2015). "Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms" . *Journal of Abnormal Child Psychology*, 43(8):1427–1438.

Nesi, J. and Prinstein, M. J. (2019). "Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms" . *Journal of Abnormal Child Psychology*, 47(2):355–367.

Nesi, J., Prinstein, M. J., and Telzer, E. H. (2018). "Digital media use and the development of peer relationships and social skills in adolescence" . *Current Directions in Psychological Science*, 27(6):413–418.

Odgers, C. L. and Jensen, M. R. (2020). "Adolescent mental health in the digital age: Facts, fears, and future directions" . *Journal of Child Psychology and Psychiatry*, 61(3):336–348.

OECD (2021). *"21st-century readers: Developing literacy skills in a digital world"* . OECD Publishing.

Ophir, E., Nass, C., and Wagner, A. D. (2009). "Cognitive control in media multitaskers" . *Proceedings of the National Academy of Sciences*, 106(37):15583–15587.

Orben, A., Dienlin, T., and Przybylski, A. K. (2020). "Social media's lasting effect on adolescent life satisfaction" . *Proceedings of the National Academy of Sciences*, 117(21):10226–10228.

Pakistan Telecommunication Authority (2024). "Annual Telecom Indicators Report 2023-24" . Technical report, Pakistan Telecommunication Authority.

Panchal, U., Salazar de Pablo, G., Franco, M., Moreno, C., Parellada, M., Arango, C., and Fusar-Poli, P. (2021). "The impact of COVID-19 lockdown on child and adolescent mental health: A systematic review" . *European Child Adolescent Psychiatry*, 31:1–27.

Panova, T. and Lleras, A. (2016). "Avoiding the distraction: Online multitasking and cognitive load in adolescents" . *Computers in Human Behavior*, 55:31–32.

Pew Research Center (2023). "Social media use in emerging economies" . Technical report, Pew Research Center.

Prensky, M. (2001). "Digital natives, digital immigrants" . *On the Horizon*, 9(5):1–6.

Price, C. S., Spence, S. H., Sheffield, J., and Donovan, C. (2002). "The development and psychometric properties of a measure of social and adaptive

functioning for children and adolescents" . *Journal of Clinical Child Adolescent Psychology*, 31(1):111–122.

Przybylski, A. K. and Weinstein, N. (2019). "Digital screen time limits and young people's psychological well-being: Evidence from a population-based study" . *Journal of Pediatrics*, 205:218–224.e1.

Păsărelu, C. R., Andersson, G., Dobrean, A., and Szentagotai, A. (2020). "Internet-delivered cognitive behavior therapy for anxiety and depression in adolescents and young adults: A systematic review and meta-analysis" . *Clinical Psychology Review*, 81:101904.

Radesky, J. S., Kistin, C. J., Zuckerman, B., Nitzberg, K., Gross, J., and Silverstein, M. (2016). "Patterns of mobile device use by caregivers and children during meals in fast food restaurants" . *Pediatrics*, 133(4):e843–e849.

Radesky, J. S., Schaller, A., Yeo, S. L., Weeks, H. M., and Durnez, J. (2023). "Patterns of digital media use among children and adolescents: A review of evidence and policy recommendations" . *Pediatrics*, 151(3):e2022058467.

Radesky, J. S., Schumacher, J., and Zuckerman, B. (2020). "Mobile and interactive media use by young children: The good, the bad, and the unknown" . *Pediatrics*, 135(1):1–3.

Reitan, R. M. (1955). "The relation of the Trail Making Test to organic brain damage ". *Journal of Consulting Psychology*, 19(5):393–394.

Rideout, V. and Robb, M. B. (2019). "The Common Sense Census: Media Use by Tweens and Teens, 2019" . Technical report, Common Sense Media.

Rideout, V. J. (2016). "The Common Sense Census: Media use by kids age zero to eight" . Technical report, Common Sense Media.

Risko, E. F. and Gilbert, S. J. (2016). "Cognitive offloading" . *Trends in Cognitive Sciences*, 20(9):676–688.

Rose, C. A., Espelage, D. L., and Monda-Amaya, L. E. (2022). "Technology and youth social engagement: Implications for social development" . *Child and Adolescent Psychiatric Clinics of North America*, 31(1):15–30.

Rosen, L. D., Carrier, L. M., and Cheever, N. A. (2013). "Facebook and texting made me do it: Media-induced task-switching while studying" . *Computers in Human Behavior*, 29(3):948–958.

Schunk, D. H., DiBenedetto, M. K., and Schunk, J. E. (2021). "Social cognitive theory" . In Hattie, J. and Anderman, E. M., editors, *International guide to student achievement*, pages 23–31. Routledge, 2 edition.

Seema, S., Soosai-Nathan, L., Lah, S., and Veeravalli, S. (2021). "Development and validation of the Digital Addiction Scale for Teenagers" . *Journal of Psychoeducational Assessment*, 39(8):1035–1053.

Selwyn, N. (2021). *"Education and technology: Key issues and debates"* . Policy Press.

Shaikh, M. and Ali, S. (2021). "Cultural influences on adolescent online behavior in Muslim-majority societies" . *Computers in Human Behavior*, 120:106734.

Shanmugasundaram, R. and Tamilarasu, M. (2023). "The cognitive impact of digital technology: Attention, memory, and executive functions in the digital age" . *Frontiers in Cognition*, 2:1203077.

Shensa, A., Sidani, J. E., Dew, M. A., Escobar-Viera, C. G., and Primack, B. A. (2018). "Social media use and depression and anxiety symptoms: A cluster analysis" . *American Journal of Health Behavior*, 42(2):116–128.

Siddiqui, M. and Aslam, R. (2021). "Digital divide in rural and urban Pakistan: Challenges for adolescent learning" . *Asian Education and Development Studies*, 10(2):175–192.

Silvers, J. A., Insel, C., Powers, K. E., Franz, P., Helion, C., Martin, R. E., et al. (2017). "Adolescents' regulation of emotion during social interactions: Behavioral and neural correlates" . *Developmental Cognitive Neuroscience*, 25:64–74.

Steinberg, L. (2014). *"Age of opportunity: Lessons from the new science of adolescence"* . Houghton Mifflin Harcourt.

Steinberg, L. and Morris, A. S. (2001). "Adolescent development" . *Annual Review of Psychology*, 52(1):83–110.

Strauss, E., Sherman, E. M. S., and Spreen, O. (2006). *"A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary"* . Oxford University Press, 3 edition.

Sánchez-Cubillo, I., Periáñez, J. A., Adrover-Roig, D., Rodríguez-Sánchez, J. M., Ríos-Lago, M., Tirapu, J., and Barceló, F. (2009). "Construct validity of the Trail Making Test: Role of task-switching, working memory, inhibition/interference control, and visuomotor abilities" . *Journal of the International Neuropsychological Society*, 15(3):438–450.

Tang, S., Werner-Seidler, A., Torok, M., Mackinnon, A., and Christensen, H. (2021). "The relationship between social media use and psychological distress among adolescents and young adults: A systematic review" . *Psychological Medicine*, 51(6):987–1006.

Twenge, J. M. (2019). *"iGen: Why today's super-connected kids are growing up less rebellious, more tolerant, less happy–and completely unprepared for adulthood"* . Atria Books.

Twenge, J. M. and Campbell, W. K. (2018). *"The narcissism epidemic: Living in the age of entitlement"* . Atria Books.

Twenge, J. M. and Martin, G. N. (2020). "Gender differences in associations between digital media use and psychological well-being: Evidence from three large datasets" . *Journal of Adolescence*, 79:91–102.

Twenge, J. M., Martin, G. N., and Spitzberg, B. H. (2018). "Trends in US adolescents' media use, 1976–2016: The rise of digital media, the decline of TV, and the (near) demise of print". *Psychology of Popular Media Culture*, 7(4):329–345.

Uhls, Y. T., Ellison, N. B., and Subrahmanyam, K. (2017). "Benefits and costs of social media in adolescence" . *Pediatrics*, 140(S2):S67–S70.

Uncapher, M. R., Thieu, M. K., and Wagner, A. D. (2017). "Media multitasking and cognitive control in adolescents: Behavioral and neural implications" . *Trends in Cognitive Sciences*, 21(6):51–63.

Uncapher, M. R. and Wagner, A. D. (2018). "Minds and brains of media multitaskers: Current findings and future directions" . *Proceedings of the National Academy of Sciences*, 115(40):9889–9896.

UNDP Pakistan (2018). "Pakistan National Human Development Report: Unleashing the Potential of a Young Pakistan" . Technical report, United Nations Development Programme.

UNICEF (2023). "Digital lives of adolescents in Pakistan: Risks and opportunities" . Technical report, UNICEF.

Valkenburg, P. M. and Piotrowski, J. T. (2017). *"Plugged In: How Media Attract and Affect Youth"* . Yale University Press, New Haven, CT. Online edn, Yale Scholarship Online, 21 Sept. 2017.

Valkenburg, P. M., van Driel, I. I., and Beyens, I. (2022). "The associations of active and passive social media use with well-being: A critical scoping review" . *New Media & Society*, 24(2):530–549.

van der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., and Valkenburg, P. M. (2019). "Media multitasking and attention problems in adolescents" . *Journal of Youth and Adolescence*, 48(2):403–414.

Van Der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., and Valkenburg, P. M. (2019). "The consequences of media multitasking for youth: A review" . *Computers in Human Behavior*, 53:204–215.

Van Dijck, J., Poell, T., and De Waal, M. (2018). *"The platform society: Public values in a connective world"* . Oxford University Press.

Vannucci, A., Flannery, K. M., and Ohannessian, C. M. (2020). "Social media use and anxiety in emerging adults" . *Journal of Affective Disorders*, 207:163–170.

Verduyn, P., Gugushvili, N., Massar, K., Täht, K., and Kross, E. (2021). "Social comparison on social networking sites" . *Current Opinion in Psychology*, 36:32–37.

Weinstein, E. (2018). "The social media see-saw: Positive and negative influences on adolescents' affective well-being" . *New Media Society*, 20(10):3597–3623.

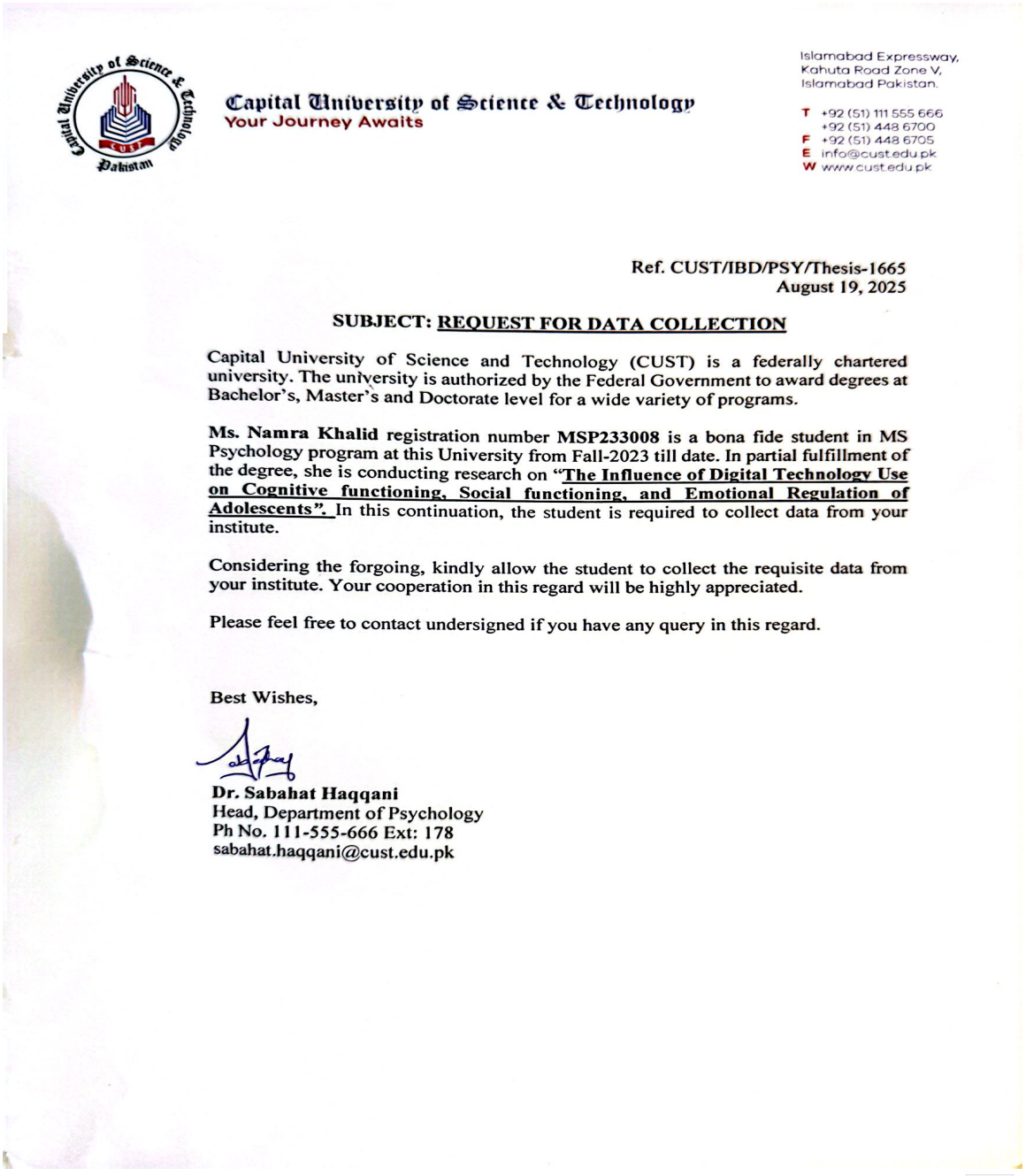
Wiersma, W. and Jurs, S. G. (2005). *"Research methods in education: An introduction"* . Pearson/Allyn Bacon, 8th edition.

Wilmer, H. H., Sherman, L. E., and Chein, J. M. (2017). "Smartphones and cognition: A review" . *Frontiers in Psychology*, 8:605.

Wright, M. F. and Wachs, S. (2020). "Adolescents' psychological consequences of cyberhate involvement: The moderating role of peer group social standing" . *International Journal of Environmental Research and Public Health*, 17(2):433.

Zimmerman, B. J. and Schunk, D. H. (2021). "Self-efficacy and social cognitive theory" . In Schunk, D. H. and Greene, J. A., editors, *Handbook of self-regulation of learning and performance*, pages 83–95. Routledge, 2 edition.

Appendix A



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SUBJECT: REQUEST FOR DATA COLLECTION

Capital University of Science and Technology (CUST) is a federally chartered university. The university is authorized by the Federal Government to award degrees at Bachelor's, Master's and Doctorate level for a wide variety of programs.

Ms. Namra Khalid registration number **MSP233008** is a bona fide student in MS Psychology program at this University from Fall-2023 till date. In partial fulfillment of the degree, she is conducting research on "**The Influence of Digital Technology Use on Cognitive functioning, Social functioning, and Emotional Regulation of Adolescents".** In this continuation, the student is required to collect data from your institute.

Considering the forgoing, kindly allow the student to collect the requisite data from your institute. Your cooperation in this regard will be highly appreciated.

Please feel free to contact undersigned if you have any query in this regard.

Best Wishes,

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August 19, 2025

RESEARCH ETHICS COMMITTEE CERTIFICATE OF REVIEW AND SUPPORT

This is to certify that Project titled: ***"The Influence of Digital Technology Use on Cognitive functioning, Social functioning, and Emotional regulation of Adolescents."*** submitted by Scholar: **Namra Khalid MSP233008** and supervised by: **Dr. Ishrat Yousaf** ***reviewed*** by the Research Ethics Committee of Faculty of Management and Social Science, meets the requirements of the American Psychological Association's Ethical guidelines for Human Research and is **REVIEWED** and **APPROVED** by Research Ethics Committee of Faculty of Management and Social Sciences.

It is the Scholar's responsibility to ensure that all researchers associated with this project are aware of the conditions of approval and which documents have been approved.

The Scholar is required to notify the Research Ethics Committee in case of any amendment in the project, specifically:

- Any significant change to the project and the reason for that change, including an indication of ethical implications (if any)
- Serious adverse effects on participants and the actions taken to address those effects
- Any other unforeseen events or unexpected developments that merit notification
- The inability of the Principal Investigator to continue in that role, or any other change in research personnel involved in the project
- A delay of more than 12 months in the commencement of the project; and,
- Termination or closure of the project.

Dr. Sabahat Haqqani

Convener, Research Ethics Committee
Faculty of Management and Social Sciences
Capital University of Science and Technology
Islamabad

Appendix B

PARENT/GUARDIAN CONSENT FORM

This study is being conducted by Namra Khalid (MS Psychology Student) under the supervision of Dr. Ishrat Yousaf at Capital University of Science and Technology. Your child is invited to take part in a short study involving questionnaires that will take about 10–20 minutes. Participation is voluntary, answers will be kept confidential, and there are no risks involved.

For any questions, contact: namrabutt786.nb@gmail.com.

Consent:

By signing below, you indicate that: You have read and understood the study information, and you consent for your child to participate voluntarily.

Parent/Guardian Name: _____

Signature: _____ Date: _____

Child's Name: _____ Age: _____

ADOLESCENT ASSENT FORM

You are invited to take part in a short study where you will answer some questions and do simple activities lasting about 10–20 minutes. There are no right or wrong answers, and you can skip any question or stop at any time. Your answers will stay private, and no one outside the research team will know your name.

Do you agree to take part in this study? (Please tick one)

☐ Yes, I agree

☐ No, I do not agree

Signature: _____ Date: _____

Demographic questionnaire

Please fill in the following details about yourself:

Age (in years): _____

Grade/Class: _____

No of siblings: _____

Gender: Male ☐ Female ☐ Other ☐

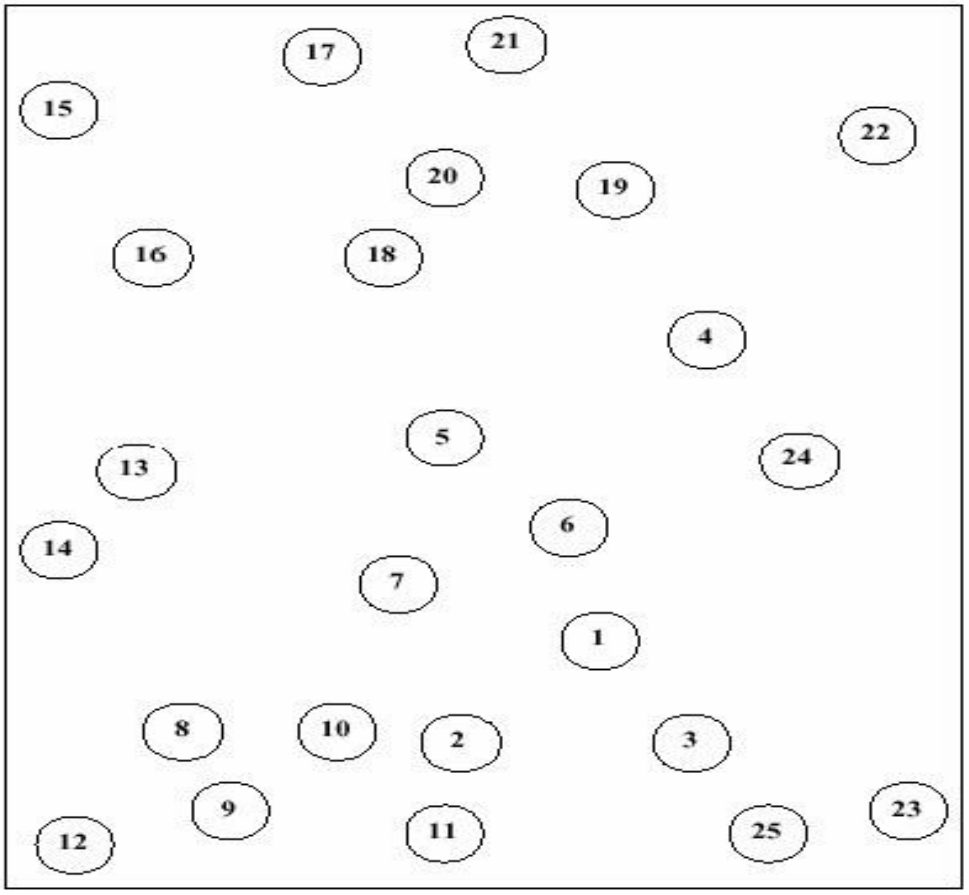
Family Structure: Nuclear ☐ Joint ☐ Other ☐

Daily Screen Time (hours): 3–4 ☐ 4–5 ☐ 5–6 ☐ 6–7 ☐

Primary Device Used: phone ☐ Tablet/iPads ☐ Computer ☐ Gaming Console (PlayStation/Other) ☐

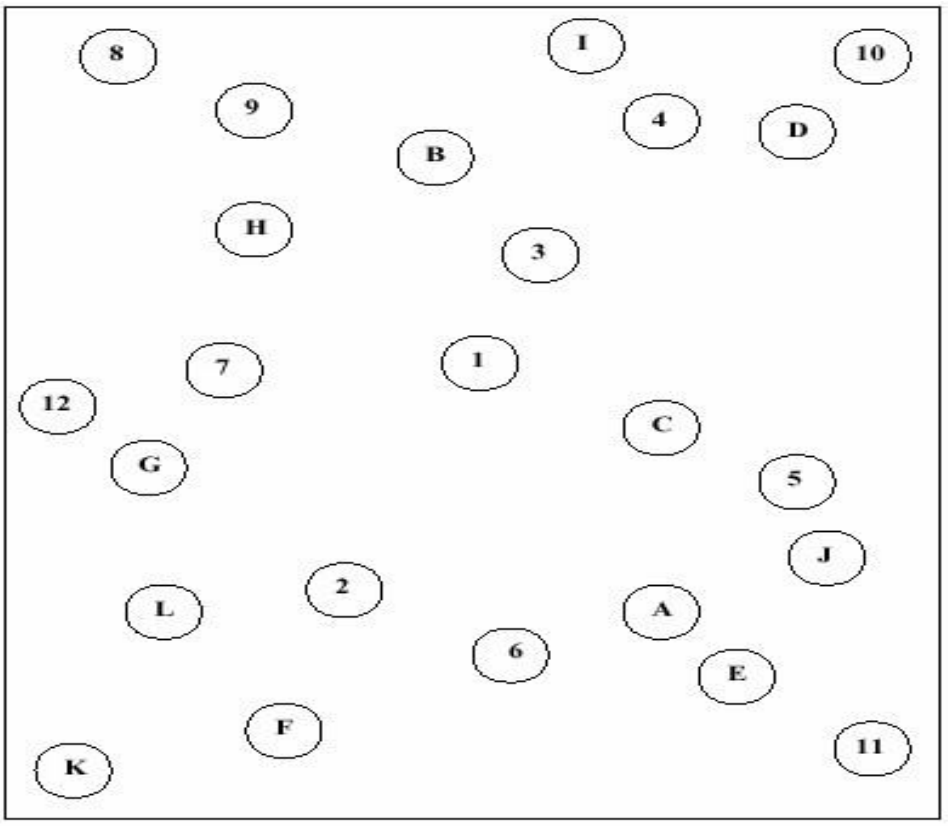
Survey questionnaire 1-Part A

Instructions: Draw lines to connect the numbers in ascending order. Connect the circles as quickly as possible, without lifting the pen or pencil



Survey questionnaire 1-Part B

Instructions: lines to connect the circles in an ascending pattern, but with the added task of alternating between the numbers and letters (i.e., 1-A-2-B-3-C, etc.). Connect the circles as quickly as possible, without lifting the pen or pencil



Survey questionnaire 2

		never	rarely	sometimes	often	Very often
1	I feel bored if I cannot use my digital device.					
2	I feel uneasy when I do not know what my friends are saying on social media.					
3	I am grumpy if I cannot use digital devices.					
4	I end up spending more time using my digital device than initially planned.					
5	As soon as I put my device away, I feel the urge to use it again.					
6	I keep an eye on the digital device even when I talk to someone.					
7	I use a digital device while eating.					
8	I keep an eye on my digital device during lessons.					
9	I play or chat on my device while walking on the street.					
10	I play or chat on my device when in bed before falling asleep.					

Total score: _____

Survey questionnaire 3

	Never	Some-times	Often	Always	
1. I get good marks in Maths/Arithmetic					
2. I go out to places with my friends					
3. I have a good relationship with my mother					Does Not Apply To Me
4. I help around the house					
5. I get good marks in Science					
6. I have friends of the opposite sex					
7. I have a good relationship with my father					Does Not Apply To Me
8. I keep my room and belongings tidy					
9. I get good marks in Social Science and/or History					
10. I go to parties or school dances					
11. I get on well with brother(s)/ sister(s) (if you have any)					Does Not Apply To Me
12. I keep my clothes clean and tidy					
13. I get good marks in reading/writing/English					
14. I have at least one or two special friends					

	Never	Some-times	Often	Always
15. I get on well with my relatives				
16. I shower and keep myself clean				
17. I have trouble with my school work				
18. I spend most of my spare time alone				
19. I have fights with my parent(s)				
20. I help with the cooking at home				
21. I am successful at my school work				
22. I have difficulty making friends				
23. I have an adult who I can talk to if I have a problem				
24. I help with the clearing up after meals				

Survey questionnaire 4

Instructions: Please check the corresponding number that indicates how much you agree with each item by using the following scale:
1 = Strongly Disagree
2 = Disagree
3 = Slightly Disagree
4 = Neutral
5 = Slightly Agree
6 = Agree
7 = Strongly Agree

		1	2	3	4	5	6	7
1	When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.							
2	I keep my emotions to myself.							
3	When I'm faced with a stressful situation, I think about it in a way that helps me stay calm.							
4	I control my emotions by not expressing them.							
5	When I want to feel less negative emotion (such as sadness or anger), I change my thoughts.							
6	I control my emotions by changing the way I think about the situation I'm in.							
7	When feeling positive emotions, I am careful not to express them.							
8	When I'm faced with a situation that could upset me, I think about it in a way that helps me stay calm.							
9	I control my emotions by changing what I think about.							
10	When I feel negative emotions, I make sure not to express them.							