The Behavioral Impact of Excessive Technology Exposure among Early Childhood Learners

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ABSTRACT

This study examined the behavioral impact of excessive technology exposure among early childhood learners aged 3–8 years in Valencia City, Bukidnon. Using a quantitative correlational design, data were collected from 30 parents through the SCREENS-Q and the Strengths and Difficulties Questionnaire (SDQ). The study identified commonly used digital devices, measured average daily screen time, and assessed behavioral development across four domains: conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior. Findings revealed that smartphones and televisions were the most frequently used devices, with an average screen time of 7.10 hours per day, exceeding recommended limits. Behavioral assessment indicated elevated levels of difficulties in conduct, hyperactivity, and peer interaction, while prosocial behavior was moderately developed. Correlational analysis using Spearman's rho showed a significant and very strong positive relationship between screen time and conduct difficulties, hyperactivity, and peer difficulties, and a very strong negative relationship with prosocial behavior ($p < .001$). This study presents preliminary evidence into the relationship of screentime across the four domains (conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior), suggesting that increased screen exposure is associated with higher behavioral difficulties and lower prosocial skills. Anchored in Social Learning Theory and Displacement Theory, the findings imply that excessive screen use may influence children's behavior through modeling and reduced engagement in developmentally appropriate activities, highlighting the need for regulated screen use.

Keywords: Screen time, conduct difficulties, hyperactivity, peer difficulties, prosocial behaviuor

INTRODUCTION

This part presents the background of the study, statement of the problem, objectives of the study, hypothesis of the study, significance of the study, scope and limitations of the study, and definition of terms used throughout the research.

Background of the Study

In today's digital age, technology has become an integral part of children's daily lives, influencing how they learn, play, and interact with their surroundings. Digital devices such as smartphones, tablets, televisions, and internet-based platforms are now commonly introduced during early childhood, both at home and in educational environments. Globally, the rapid integration of digital technologies into early childhood has become an emerging concern for educators, health professionals, and researchers (World Health Organization, 2019). While digital media can support creativity and learning when used appropriately, excessive and unregulated screen exposure may negatively affect children's cognitive, social, emotional, and behavioral development (American Academy of Pediatrics, 2016). International studies further indicate that many young children exceed the recommended daily screen time limits, which has been associated with attention deficits, reduced motivation for learning, limited social interaction, and difficulties in self-regulation.

Excessive screen exposure among young children has become increasingly evident due to the widespread availability of mobile devices and improved internet connectivity. Filipino children are frequently exposed to smartphones and tablets at an early age, often for entertainment, video streaming, and digital games. Empirical evidence suggests that screen time exceeding two hours per day is associated with reduced receptive and expressive language abilities among Filipino toddlers, highlighting potential risks to early learning and development (Dy et al., 2023). Although caregiver co-viewing may help mitigate some negative outcomes, unsupervised screen use remains a significant factor contributing to excessive digital consumption. While existing literature acknowledges these broad developmental risks, there remains a critical gap in localized research; few studies have systematically analyzed the specific behavioral correlates of screen media use among early childhood learners within the Philippine context. Understanding these behavioral outcomes is essential for supporting children's developmental needs, guiding effective parental practices, and informing early childhood educational interventions that are culturally and contextually relevant.

Anchored on Albert Bandura's Social Learning Theory (1977) and George Neuman's Displacement Theory (1988), this study determined the screen media consumption profile and behavioral development of early childhood learners in Poblacion, Valencia City, Bukidnon. Social Learning Theory explains how children acquire behaviors through observing and imitating digital media, while Displacement Theory highlights how excessive screen use reduces time for essential developmental activities such as play and social interaction. Together, these frameworks provide a basis for understanding how technology exposure influences children's attention, motivation, and social behavior. Specifically, the study sought to identify the types of digital devices frequently used by early childhood learners, determine the average daily duration of screen time among early childhood learners, examine whether there is a significant relationship between prolonged screen media consumption and the behavioral development of early childhood learners in terms of conduct difficulties, peer difficulties, hyperactivity, and prosocial behavior, and describe the level of behavioral development of early childhood learners in terms of conduct difficulties, peer difficulties, hyperactivity, and prosocial behavior.

Statement of the Problem

This study examines the behavioral impact of excessive technology exposure among early childhood learners in Valencia City, Bukidnon.

Specifically, it seeks to answer the following questions:

1. What types of digital devices do early childhood learners frequently use?
2. What is the average daily screen time of early childhood learners?
3. What is the level of behavioral development of early childhood learners in terms of conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior?
4. Is there a significant relationship between screen media consumption and the behavioral development of early childhood learners in terms of conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior?

Objectives of the Study

This study aimed to determine the behavioral impact of excessive technology exposure among early childhood learners. Specifically, it sought to:

1. Identify the digital devices frequently used by early childhood learners.
2. Determine the average daily screen time of early childhood learners.
3. Determine the level of behavioral development of early childhood learners in terms of conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior.

4. Determine whether there is a significant relationship between screen media consumption and the behavioral development of early childhood learners in terms of conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior.

Hypothesis of the Study

Null Hypothesis (H_0): There is no significant relationship between screen media consumption and the behavioral development of early childhood learners in terms of conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior.

Significance of the study

This study examines the behavioral effects of excessive screen media exposure among early childhood learners, a concern increasingly observed in both home and school environments.

For early childhood learners, the study provides important insights into how screen time relates to behavioral challenges, social interaction challenges, and overactive behavior. The findings can help caregivers and educators adopt practices that support children's cognitive, emotional, and social well-being. By promoting balanced and developmentally appropriate screen habits, the study ultimately supports children's school readiness and holistic development.

For Parents, the study offers evidence-based guidance on regulating and monitoring screen media use at home. Parents would gain a deeper understanding of appropriate screen time limits, the importance of content quality, and the value of parental engagement during media use. This knowledge can help them establish consistent routines, encourage interactive and educational screen practices, and reduce the risks of behavioral and attention-related problems in their children.

For Teachers, the study provides useful information on how screen exposure influences classroom behavior, learning engagement, and social interactions among young learners. Understanding these effects can support teachers in designing developmentally appropriate lessons, integrating educational technology more purposefully, and addressing behavioral concerns linked to screen media use. The findings may also guide teachers in communicating with parents about healthy media habits.

For School Administrators, Policymakers, and Other Stakeholders, the research offers valuable data that can inform the development of policies and programs related to technology use in early childhood settings. The results may support the creation of school guidelines on screen exposure, professional development initiatives for teachers, and parent education programs that emphasize responsible media use. Policymakers can also use the findings to design interventions and educational standards that align digital media practices with children's developmental needs.

Overall, this research serves as a comprehensive resource for understanding the behavioral impact of technology on young learners. By providing strategies that promote balanced and responsible screen media practices, the study supports the collective goal of fostering healthy development and positive learning outcomes for children in an increasingly digital world.

Scope and limitations of the study

This study focused on examining the behavioral impact of excessive technology exposure among early childhood learners aged 3–8 years old in selected households in Valencia City, Bukidnon. It covered children's patterns of screen media use, including the digital devices they commonly accessed and the amount of time spent on screen-based activities each day. It also described the level of children's behavioral development across key domains such as conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior, and determined how these behavioral outcomes varied in relation to their screen exposure. Data were obtained from parents as primary respondents using the SCREENS-Q and the Strengths and Difficulties Questionnaire (SDQ). A

quantitative correlational approach was employed to analyze the relationship between screen media consumption and behavioral development within the home setting.

This study recognized certain limitations in the conduct of the research. It was limited to 30 households in selected areas of Valencia City, Bukidnon, and included only children aged 3–8 years old who exhibited excessive screen exposure. Data were based on parent-reported responses gathered within the home setting, excluding children's behaviors in school and community environments. The study was also limited to the specific variables included in the research. Another limitation concerns the availability of localized literature. Research on technology exposure and its behavioral impact among Filipino early childhood learners remains limited, resulting in greater reliance on foreign studies to support the conceptual and theoretical grounding of this research. These limitations were acknowledged to ensure proper interpretation of the findings within the defined context of the study.

Definition of Terms

The following terms were operationally defined to ensure clarity and consistency in how they were used within the study, with each definition presented based on its relevance to the study's variables and measurement framework.

Behavioral Development refers to the observable behavioral characteristics of early childhood learners, as reflected in the following SDQ domains: conduct difficulties, hyperactivity/inattention, peer difficulties, and prosocial behavior. (Jiménez et al., 2022.)

Conduct Difficulties refer to observable behaviors involving rule-breaking, defiance, and disruptive actions that affect a child's behavior. (Emerson et al., 2011)

Early Childhood Learners refer to children aged 3 to 8 years old who are in an important stage of early development where behavior and social skills are actively formed. (Early Childhood Education, 2025)

Excessive Screen Media Use refers to screen media use among children aged 3 to 8 years old that exceeds the recommended limit of two hours per day. (Muppalla et al., 2023)

Hyperactivity refers to excessive movement, restlessness, and difficulty staying focused or seated for a period of time. (Goodwin, 2019)

Peer Difficulties refers to difficulties in interacting, cooperating, and maintaining positive relationships with other children. (Boivin & Provost, 2024)

Prosocial Behavior refers to positive behaviors such as sharing, helping, cooperating, and showing care or concern for others. (Kakulte & Shaikh, 2023)

Screen Media Consumption refers to the amount of time, frequency, and type of screen-based activities children engage in. (Muppalla et al., 2023)

Technology refers to digital devices such as smartphones, tablets, televisions, and laptops used for media, learning, and entertainment. (University of Arkansas Grantham, 2025)

REVIEW OF RELATED LITERATURE

A substantial amount of research on early childhood exposure to digital technology highlights how screen-based media may affect children's behavioral and social–emotional development. This section reviews existing literature on excessive technology exposure and its behavioral consequences among early childhood learners, typically ages 3 to 8, focusing on attention span, hyperactivity and impulsivity, social interaction, emotional regulation, and behavioral problems linked to prolonged screen time, while also examining empirical studies on

screen use and developmental outcomes to clarify the current state of knowledge, identify gaps, and provide an empirical foundation for the present study in Poblacion, Valencia City, Bukidnon.

Digital Technology Use and Behavioral Outcomes among Preschool Children

A study published in Frontiers in Psychiatry examined the impact of digital technology use on the behavioral and sleep outcomes of preschool children aged 1.5 to 5 years. The research employed a cross-sectional design involving 288 participants, utilizing parental reports to assess children's technology usage, behavioral patterns, and sleep disturbances. Findings revealed that the majority of children engaged with digital devices for approximately 2 to 3 hours daily, with smartphones being the most commonly used medium and cartoons as the primary content consumed.

Critically, the study established that prolonged screen exposure particularly beyond 3 to 5 hours per day was significantly associated with negative behavioral outcomes, including increased negative affect and reduced effortful control among preschool children. Effortful control, which refers to a child's ability to regulate attention and behavior, was found to decrease in relation to ownership and frequent use of devices such as televisions and video games. Moreover, children exposed to longer durations of screen time exhibited poorer sleep quality, which further compounds behavioral difficulties due to the known relationship between sleep and emotional regulation.

From an analytical perspective, this study reinforces the argument that screen time is not merely a passive activity but a developmental factor influencing self - regulation and emotional stability in early childhood. The findings support the notion that excessive exposure to digital media may interfere with the development of executive functioning skills, particularly those related to attention control and behavioral inhibition. Additionally, the study highlights the mediating role of environmental and familial factors such as parental education and socioeconomic status, suggesting that screen time effects are embedded within broader ecological contexts.

In relation to the present study, these findings provide empirical support for examining behavioral development through structured domains such as those measured in the Strengths and Difficulties Questionnaire. Specifically, the observed decrease in effortful control and increase in negative affect align with domains such as hyperactivity and emotional symptoms, indicating that excessive screen exposure may manifest in measurable behavioral difficulties. Thus, this study substantiates the hypothesis that increased screen time is significantly associated with adverse behavioral outcomes among early childhood learners.

Excessive Electronic Media Exposure and Behavioral Problems among Preschool Children

Excessive electronic media exposure has been increasingly associated with the development of behavioral problems among preschool children. Previous studies have identified significant links between children's use of electronic media and behavioral issues, emphasizing the importance of understanding the long term relationship between media consumption and behavior in early childhood (Poulain et al., 2018). In addition, the use of electronic media has been shown to affect children's sleep patterns, resulting in later bedtimes, reduced sleep quality, and shorter sleep duration (Lund et al., 2021; Al Anazi and Al Harbi, 2022; Horiuchi et al., 2020). Poor sleep is a critical factor that may contribute to behavioral difficulties, as it directly influences emotional regulation and daily functioning.

Moreover, preschool children who are exposed to excessive amounts of electronic media have been found to exhibit behavioral problems that may affect their overall development (Ibrahim et al., 2022). Parental factors also play a significant role, as maternal emotional status has been identified as a contributing factor to children's excessive use of electronic devices, highlighting the importance of parental awareness and guidance in managing media exposure (Guo et al., 2021). These findings suggest that children's media use is not only an individual behavior but is also shaped by family and environmental influences.

Studies have further shown that electronic media exposure can influence multiple domains of child development, including social, cognitive, and behavioral aspects (Ray and Jat, 2010). While several studies indicate negative effects such as behavioral difficulties, speech delays, and poor well-being (Ibrahim et al., 2022; Kalaivani, 2018;

Ps, 1998), other research points to potential benefits, including improved communication skills and reduced fear in certain contexts when media use is moderate and supervised (Ambrose et al., 2014; Isong et al., 2014). This suggests that the effects of electronic media are not entirely negative but depend on the amount, type, and context of use.

Furthermore, excessive screen time has been linked to negative outcomes such as poor sleep patterns, delays in cognitive development, and social emotional difficulties (Horiuchi et al., 2020; Raman et al., 2017; Willis et al., 2022). However, moderate and guided use of electronic media may provide opportunities for early learning and social interaction (Freeman, 2014; Mogul et al., 2020). Parental influence remains a crucial factor, as parents' attitudes toward electronic media significantly shape children's screen time behaviors (Asplund et al., 2015).

Additional studies indicate that early exposure to electronic media, particularly television, may have varying effects on children's well being depending on usage patterns (Hinkley et al., 2014). Nevertheless, excessive exposure has consistently been associated with behavioral problems that affect children's social, cognitive, and physical development (Ibrahim et al., 2022). Similarly, electronic media use has been linked to children's psychological health and daily functioning (Akyar and Sapsağlam, 2019), while excessive engagement with media platforms such as social media and video games may negatively impact cognitive and psychosocial development (Patil et al., 2019).

In relation to the present study, these findings support the assumption that excessive screen time is associated with behavioral difficulties among preschool children. The evidence further suggests that both the quantity and quality of media exposure, as well as parental involvement, play significant roles in shaping children's behavioral outcomes. This reinforces the need to examine screen time in relation to specific behavioral domains to better understand its impact on early childhood development.

Effects of Excessive Screen Time on Children's Cognitive, Language, and Socio-Emotional Development

Muppalla et al. (2023) conducted an updated review on the effects of excessive screen time on child development, focusing on cognitive, language, and social-emotional domains. The authors explained that children today are increasingly exposed to digital screen media at very early ages, making screen use a growing public health concern due to its potential long-term developmental consequences. While screen media may provide educational benefits and support learning through digital tools and applications, excessive exposure and media multitasking have been linked to negative outcomes, particularly in executive functioning, attention control, and academic performance. Early and prolonged screen exposure was also associated with reduced classroom participation and lower academic achievement in later years.

In terms of language development, the study emphasized that excessive screen time reduces the frequency and quality of parent-child interactions, which are essential for vocabulary growth and communication skills. The impact of screen exposure is also influenced by contextual factors such as content quality, co-viewing with adults, and the level of interaction during media use. However, unregulated and prolonged screen exposure is generally associated with delays in language development and weaker communication abilities among young children.

Furthermore, the review highlighted that excessive screen use negatively affects social and emotional development, contributing to issues such as sleep disturbances, obesity, anxiety, depression, emotional reactivity, and behavioral problems. It may also impair children's ability to understand emotions, regulate behavior, and develop appropriate social skills, potentially leading to aggression and externalizing behaviors. Despite these risks, the authors noted that screen media can also offer positive effects when used appropriately, particularly in educational contexts and high-quality content designed for learning.

To address the negative impacts of screen exposure, Muppalla et al. (2023) recommended strategies such as setting screen time limits, using parental controls, encouraging alternative developmental activities, and promoting positive parental role modeling. Overall, the study concludes that while screen media can be beneficial when properly managed, excessive and unregulated use poses significant risks to children's cognitive,

language, and socio-emotional development, highlighting the importance of guided and balanced screen use in early childhood.

Screen Use Contexts and Their Effects on Cognitive and Psychosocial Development in Early Childhood Learning Environments

Clemente-Suárez et al. (2024) investigated the relationship between digital device usage and childhood cognitive development, with particular focus on its effects on cognitive abilities such as attention, memory, executive functions, problem-solving skills, and social cognition. The authors emphasized that the rapid and widespread integration of digital technologies into children's daily lives has outpaced scientific understanding of their long-term developmental consequences, making this a critical area of concern in contemporary child development research.

The study found that digital device usage has a dual impact on cognitive development, depending on the intensity, content, and context of use. On the positive side, appropriately structured and educational digital engagement can enhance cognitive processes by improving information processing skills, learning efficiency, and the ability to manage multiple stimuli. Interactive applications and well-designed educational content may also support early learning by promoting engagement and reinforcing knowledge acquisition. These findings suggest that digital devices, when used purposefully and under guidance, may serve as effective supplementary tools in childhood learning environments.

However, the authors also highlighted significant risks associated with excessive and unregulated screen exposure. Prolonged digital device use may contribute to cognitive overload, reduced attentional capacity, impaired executive functioning, and decreased ability to sustain focus on non-digital tasks. These effects are particularly concerning during early childhood, a critical developmental period when foundational cognitive skills are rapidly forming. The study further noted that frequent multitasking with digital media can interfere with cognitive control processes, making it more difficult for children to regulate attention and switch effectively between tasks.

Beyond cognitive outcomes, Clemente-Suárez et al. (2024) also examined the psychological and behavioral implications of digital device exposure. The findings suggest that excessive screen use may negatively affect emotional regulation, identity formation, and social cognition. Children with high levels of screen exposure may demonstrate increased vulnerability to maladaptive behavioral patterns, including reduced social interaction, weaker emotional understanding, and difficulty in developing appropriate interpersonal skills. These outcomes indicate that digital overexposure may disrupt the balance between cognitive stimulation and social learning experiences essential for healthy development.

The study further stressed that the developmental impact of digital devices is not determined solely by duration of use but is strongly influenced by contextual factors such as content quality, parental mediation, and the purpose of screen engagement. Guided use, where parents or caregivers actively participate or supervise digital interaction, was associated with more favorable developmental outcomes. In contrast, unsupervised and passive consumption of digital content was more consistently linked to negative cognitive and psychosocial effects.

In response to these findings, the authors recommended structured digital engagement strategies, including parental supervision, age-appropriate content selection, and balanced integration of screen time within children's daily routines. They also emphasized the importance of developing healthy digital habits early in life to mitigate potential long-term developmental risks. Overall, Clemente-Suárez et al. (2024) concluded that while digital devices can function as valuable educational tools, their benefits are maximized only when usage is intentional, regulated, and developmentally appropriate.

Digital Technology Exposure in Early Childhood Education and Its Implications for Child Development

Blackwell, Lauricella, and Wartella (2014) examined the factors influencing early childhood educators' digital technology use, focusing on how both intrinsic (personal) and extrinsic (environmental) factors shape technology

integration in early childhood education (ECE) settings. Using path modeling analysis of survey data from 1,234 early childhood educators, the study explored how teachers' attitudes, confidence, support systems, and institutional policies influence their use of digital technologies for children from birth to age four.

The findings revealed that teachers' attitudes toward the educational value of technology were the strongest predictor of actual classroom use. Educators who believed that digital tools enhance children's learning were more likely to integrate technology meaningfully into instructional practices. This indicates that personal beliefs about the effectiveness of technology play a central role in shaping classroom behavior, even more than access or training alone (Blackwell et al., 2014).

In addition to attitudes, teacher confidence in using technology and perceived support from the school environment were also significant predictors of technology use. Educators who felt more competent in using digital tools and who received adequate institutional support were more likely to incorporate technology into learning activities. The study further emphasized that school-level factors, particularly the presence of a clear technology policy, positively influenced teacher confidence, which in turn strengthened their attitudes toward technology use. This demonstrates that institutional structures play an important role in facilitating or limiting technology integration in early childhood classrooms (Blackwell et al., 2014).

The study also identified student socioeconomic status (SES) as an important contextual factor influencing teachers' attitudes. Educators working with lower-SES learners tended to have more positive perceptions of technology, viewing it as a tool to bridge educational gaps and enhance learning opportunities for disadvantaged children. This suggests that teachers may adapt their beliefs and practices based on the perceived needs and background of their students (Blackwell et al., 2014).

Moreover, teaching experience was found to have a negative relationship with attitudes toward technology use, indicating that more experienced educators may be less inclined to adopt or value digital tools compared to less experienced teachers. The study also highlighted that attitudes and confidence act as mediating factors between environmental conditions (such as support and policy) and actual technology use. This means that even if support systems are available, they may not directly influence classroom practice unless they positively affect teacher beliefs and self-efficacy (Blackwell et al., 2014).

Overall, Blackwell et al. (2014) concluded that digital technology integration in early childhood education is a complex process influenced by an interaction of personal beliefs, professional confidence, institutional support, and classroom context. The study emphasizes that access to technology alone is insufficient; effective integration requires addressing both intrinsic and extrinsic barriers. Strengthening teacher attitudes, improving confidence through training, and establishing supportive school policies are essential in promoting meaningful and developmentally appropriate use of digital tools in early childhood learning environments.

Screen Time and Risk of Behavioral Problems in Children Below Five Years

Ghosh Roy et al. (2024) conducted a cross-sectional study examining the association between screen time exposure and the risk of behavioral problems among children below five years of age. The study highlighted that increasing exposure to digital devices has become a common phenomenon in early childhood, raising concerns about its impact on behavioral and developmental outcomes. The authors emphasized that early childhood is a critical period for behavioral formation, making children highly vulnerable to environmental influences such as screen-based media.

The findings revealed that excessive screen time was highly prevalent among the participants, with 57.7% of children exceeding the recommended guidelines of one hour per day. A significant portion of children were also exposed to screen media before one year of age, indicating early and widespread digital exposure. The study further reported that 37.7% of the children were at risk of behavioral problems based on the Preschool Pediatric Symptom Checklist (PPSC), with higher mean behavioral scores observed among children with greater screen exposure (Ghosh Roy et al., 2024).

The study found a strong dose–response relationship between screen time and behavioral problems. Children with one to three hours of screen exposure had increased odds of behavioral issues, which further increased among those with three to five hours and was highest among children with more than five hours of daily screen time. This indicates that longer exposure to screen media significantly increases the likelihood of behavioral difficulties in early childhood. In addition, the use of multiple digital devices was also associated with higher risk of behavioral problems, suggesting that device variety may intensify exposure effects (Ghosh Roy et al., 2024).

Beyond screen duration, the study identified several related factors that contribute to behavioral outcomes. Children who spent less time with parents, experienced feeding difficulties, sleep disturbances, and showed restlessness when screen devices were removed were more likely to exhibit behavioral problems. These findings suggest that reduced caregiver interaction and increased screen dependency may jointly contribute to behavioral dysregulation in young children (Ghosh Roy et al., 2024).

The authors also noted that most children used screen devices primarily for entertainment purposes, such as watching cartoons, and in many cases, children themselves had control over content selection. This lack of parental regulation may expose children to inappropriate or overstimulating content, further contributing to behavioral issues. The study emphasized that early exposure to screen media may lead to habitual use patterns that persist into later childhood, increasing the risk of long-term developmental consequences (Ghosh Roy et al., 2024).

Overall, Ghosh Roy et al. (2024) concluded that excessive screen time is significantly associated with an increased risk of behavioral problems in children below five years. The study identified excessive screen exposure, use of multiple devices, and reduced parent-child interaction as significant predictors of behavioral difficulties. The authors recommended strict parental monitoring, adherence to screen time guidelines, and increased engagement in alternative developmental activities to mitigate the negative effects of screen exposure on early childhood behavioral development.

Use of Technological Devices in Children and Its Effects on Sleep and Behavioral Difficulties

Tremolada et al. (2025) examined the use of technological devices among children aged 3–11 years and its possible effects on sleep patterns and behavioral difficulties. The study investigated the prevalence, patterns, and developmental implications of digital device use, focusing particularly on emotional and behavioral outcomes as well as sleep-related effects. Findings highlighted that technological devices such as tablets, smartphones, and computers are widely used among children, with tablets being the most frequently utilized device and recreational activities (e.g., watching videos, playing games) being the dominant form of engagement.

The study found that the use of technological devices typically begins at an early age, around six years old or even earlier, indicating an increasing trend of early digital exposure. It also revealed gender and age differences in usage patterns, with boys generally spending more time on tablets and exhibiting higher levels of attention-deficit/hyperactivity disorder (ADHD)-related behaviors compared to girls. Additionally, older children showed greater use of digital devices, particularly for recreational and internet-based activities, suggesting that screen engagement increases with age (Tremolada et al., 2025).

In terms of behavioral outcomes, the study reported significant associations between increased screen use—particularly tablet usage—and higher levels of behavioral problems, including inattention, hyperactivity, and difficulties in peer relationships. Children with higher screen exposure were also found to have more challenges in emotional and behavioral regulation. The findings further indicated that greater screen time is linked to poorer participation in extracurricular activities and weaker social relationships, suggesting that excessive device use may limit opportunities for social development and interaction (Tremolada et al., 2025).

Regarding sleep, the study found a significant negative relationship between screen time and sleep duration. Increased use of computers and digital devices during the day was associated with reduced sleep hours in

children. This suggests that prolonged exposure to screens may interfere with healthy sleep patterns, which are essential for cognitive and emotional development during childhood (Tremolada et al., 2025).

The study also emphasized the importance of contextual and family-related factors in shaping children's digital behavior. Parental education, socioeconomic status, and monitoring practices were found to influence children's screen time. Higher parental education levels were associated with reduced screen exposure, while lower socioeconomic conditions were linked to increased smartphone use among children. Moreover, the study highlighted that parental engagement and guidance play a critical role in regulating children's digital habits and mitigating negative developmental outcomes (Tremolada et al., 2025).

Overall, Tremolada et al. (2025) concluded that while digital devices are widely integrated into children's daily lives, excessive and unregulated use is significantly associated with behavioral difficulties, sleep disturbances, and reduced social functioning. The study emphasized the importance of parental mediation, structured use of technology, and age-appropriate guidelines to promote healthier developmental outcomes in children.

Screen Media Use and Its Impact on Health, Development, and Behavior in Children Under Five Years

Ponti (2023) conducted an updated evidence-based review on screen media exposure among children younger than five years, focusing on its effects on developmental, psychosocial, and physical health outcomes. The study emphasized that screen time has become deeply embedded in early childhood environments, especially following the COVID-19 pandemic, which significantly increased children's exposure to digital devices at home. Screen media was defined as time spent using television, computers, gaming systems, and mobile devices such as smartphones and tablets (Ponti, 2023).

The review highlighted that nearly all children are exposed to screens by the age of two, and a large proportion exceed recommended screen time limits. It further noted that early screen exposure is often habitual and tends to persist into later childhood, suggesting long-term behavioral patterns may be established during early developmental stages. Most preschool children's screen use involves television, tablets, and video platforms, with average daily exposure often exceeding recommended limits (Ponti, 2023).

In terms of developmental impacts, Ponti (2023) found that screen media use has both potential benefits and risks. On the positive side, high-quality, age-appropriate, and interactive digital content may support early language development, literacy skills, cognitive stimulation, and prosocial learning. Co-viewing with caregivers and the use of educational applications can enhance vocabulary acquisition, attention, and memory development. Interactive media, such as video chats and guided learning apps, may also provide meaningful learning experiences when used appropriately and with adult involvement (Ponti, 2023).

However, the study emphasized that excessive or unregulated screen exposure is associated with significant developmental risks. Increased screen time was consistently linked to delayed language acquisition, reduced vocabulary development, and weaker grammar skills in preschool children. It also negatively affects executive function skills such as attention, impulse control, and working memory, particularly due to reduced parent–child interaction and limited real-life communication experiences (Ponti, 2023).

Behaviorally and psychosocially, Ponti (2023) reported that excessive screen use is associated with increased externalizing behaviors, emotional dysregulation, and reduced self-regulation skills. Higher screen exposure in early childhood was linked to greater emotional lability, attention difficulties, and reduced social competence. Children with higher screen time also showed weaker peer relationships and lower participation in social and extracurricular activities, suggesting that screen use may displace essential social learning opportunities (Ponti, 2023).

The review also highlighted strong associations between screen exposure and sleep disturbances. Increased screen time, particularly before bedtime or in bedroom environments, was linked to reduced sleep duration, delayed sleep onset, and poorer sleep quality. These sleep disruptions may further contribute to behavioral difficulties, cognitive impairment, and emotional instability in young children (Ponti, 2023).

Family and environmental factors were also identified as significant influences on children's screen behavior. Parental screen habits were found to strongly predict children's screen use, with "technoference" (parental device use interrupting interactions) reducing the quality and quantity of parent–child engagement. Additionally, excessive reliance on screens as a calming or distracting tool may hinder the development of self-regulation skills in children (Ponti, 2023).

Overall, Ponti (2023) concluded that while digital media can provide educational and developmental benefits when used appropriately, excessive screen exposure during early childhood poses significant risks to cognitive, behavioral, social-emotional, and physical development. The study strongly recommended minimizing screen time, ensuring mindful and supervised use, and promoting parental modeling and engagement to support healthy development in young children.

The Impact of Digital Devices on Children's Health

Presta et al. (2024) conducted a systematic literature review entitled The Impact of Digital Devices on Children's Health, which examined the effects of prolonged digital device exposure on children aged 2 to 12 years. Based on 40 studies involving 75,540 participants, the review synthesized evidence on both physical and mental health outcomes associated with screen use. The findings consistently indicate that excessive exposure to digital devices is linked to multiple negative health consequences among children. In terms of physical health, higher screen time was associated with reduced physical activity levels, increased sedentary behavior, and unfavorable body composition outcomes such as higher body mass index (BMI) and adiposity. Children with greater screen exposure were also less likely to meet recommended physical activity guidelines, highlighting the displacement of active behaviors by screen-based activities.

The study further emphasized the impact of digital device use on sleep, reporting that increased screen time contributes to shorter sleep duration, delayed bedtime, poorer sleep quality, and reduced sleep efficiency. These disruptions were particularly evident among children who used digital devices before bedtime. In addition to physical health effects, the review identified significant behavioral and socioemotional problems linked to excessive screen exposure, including conduct problems, hyperactivity, inattention, emotional dysregulation, and reduced self-regulation skills. Media multitasking and exposure to inappropriate content were also associated with greater behavioral difficulties and psychological distress.

Moreover, cognitive and academic outcomes were negatively affected, with findings showing lower academic performance, reduced attention span, and poorer verbal and learning development among children with higher screen time. Motor development was also impacted, as prolonged digital device use was associated with delays in fine motor skills, reduced sensory processing, and poorer manual dexterity. The review also noted that during the COVID-19 pandemic, screen time significantly increased due to e-learning and home confinement, which further intensified negative outcomes such as sleep disturbances, behavioral issues, reduced physical activity, and ocular problems like eye strain.

Overall, Presta et al. (2024) concluded that prolonged and excessive use of digital devices has a broad negative impact on children's physical, cognitive, emotional, and social development. The study highlights the importance of regulating screen time and promoting healthier digital habits, especially in early childhood, to minimize adverse developmental outcomes.

World Health Organization Guidelines on Screen Time, Physical Activity, and Sleep for Early Childhood Development

The World Health Organization (WHO) provides global guidelines on physical activity, sedentary behavior, and sleep for children under five years of age, emphasizing the importance of establishing healthy lifestyle habits during early childhood. According to the WHO (2020), young children require a balanced routine that includes adequate physical activity, limited sedentary screen-based behavior, and sufficient sleep to support optimal growth and development. The guidelines recommend that children aged 2 to 4 years engage in at least 180 minutes of physical activity throughout the day, with a variety of intensities including moderate to vigorous

movement. At the same time, sedentary screen time should be limited to no more than one hour per day, and less is encouraged, as increased exposure to screens is associated with negative developmental outcomes. For children under two years old, the WHO strongly recommends avoiding screen time altogether, except for video chatting, due to potential impacts on cognitive and socio-emotional development.

In addition to physical activity and screen exposure, the WHO highlights the importance of adequate sleep as a critical component of child health. Children aged 2 to 4 years are recommended to have 10 to 13 hours of good-quality sleep, including naps, on a regular basis. Insufficient sleep, often linked with excessive screen use, has been associated with behavioral problems, reduced attention span, and impaired physical and cognitive development. The guidelines also emphasize the interconnectedness of these behaviors, noting that high screen time often displaces physical activity and reduces sleep duration, thereby increasing the risk of unhealthy growth patterns such as overweight and obesity.

Overall, the WHO guidelines underscore that early childhood is a crucial period for establishing healthy behavioral patterns. Excessive exposure to digital devices during this stage may contribute to sedentary lifestyles, sleep disturbances, and developmental delays. Therefore, caregivers are encouraged to regulate screen time, promote active play, and ensure adequate sleep to support holistic child development. These recommendations serve as a foundational reference for understanding how lifestyle behaviors in early childhood influence long-term health outcomes.

Digital Media Exposure in Early Childhood and Its Effects on Cognitive, Behavioral, and Health Development
Infants, toddlers, and preschool-aged children are increasingly growing up in environments where digital media is a dominant part of daily life. According to the Council on Communications and Media (Hill et al., 2016), children aged 0–5 years are exposed to various forms of technology such as television, mobile devices, interactive applications, and digital platforms at earlier and more frequent rates than previous generations. While these technologies are often viewed as tools for learning and engagement, research continues to examine their developmental implications during early childhood, a critical stage of rapid brain development and behavior formation.

A central concern in early childhood development is the limited capacity of infants and toddlers to learn effectively from digital media without adult mediation. Hill et al. (2016) emphasize that children younger than two years require direct interaction with caregivers for optimal cognitive, language, motor, and socio-emotional development. At this stage, children struggle with symbolic understanding and have difficulty transferring information learned from screens into real-world contexts. Although some studies show that toddlers can learn simple words or concepts from interactive or video-based media under guided conditions, such learning is significantly enhanced only when adults actively co-view and reinforce content. Without this interaction, the educational value of screen exposure remains limited.

For preschool-aged children, research presents a more balanced view of digital media use. Well-designed educational programs, such as Sesame Street, have been shown to improve literacy, cognitive skills, and social understanding among children aged 3 to 5 years. However, Hill et al. (2016) highlight that most commercially available “educational” applications lack evidence-based design and often focus on rote learning rather than higher-order cognitive skills. Furthermore, executive functions such as self-regulation, attention control, and flexible thinking are more effectively developed through unstructured play, peer interaction, and responsive adult engagement rather than through digital platforms.

Beyond cognitive development, excessive media exposure has been consistently associated with adverse health and behavioral outcomes. Research indicates that high levels of screen time during early childhood are linked to increased risk of obesity, reduced sleep duration, and delays in cognitive and socio-emotional development. These outcomes are influenced by factors such as sedentary behavior, exposure to food advertising, reduced physical activity, and decreased parent–child interaction during screen use. Additionally, the presence of screens in bedrooms and media use before bedtime have been associated with shorter sleep duration and poorer sleep quality in young children.

Behavioral development is also significantly affected by early and excessive media exposure. Studies cited by Hill et al. (2016) show associations between high screen time and delays in language development, reduced attention span, and difficulties in emotional regulation. These effects are often linked to decreased opportunities for social interaction and play-based learning, which are essential for developing communication and interpersonal skills. Moreover, children exposed to inappropriate or violent content are more likely to exhibit behavioral difficulties, particularly when parental mediation is limited.

Parental media use further contributes to children's screen habits and developmental outcomes. Heavy use of mobile devices and television by parents has been shown to reduce verbal and emotional interactions with children, thereby weakening early communication and bonding. Since children often model caregiver behavior, parental screen habits strongly influence children's own media consumption patterns. This underscores the importance of parental guidance and active co-viewing in mitigating potential negative effects of digital media.

In response to these concerns, the American Academy of Pediatrics recommends limiting screen exposure to no more than one hour per day for children aged 2 to 5 years, prioritizing high-quality content, and encouraging co-viewing between parents and children. For infants under 18 to 24 months, screen use should be minimized except for video communication, which may support social connection when guided by adults. These recommendations emphasize the importance of balancing digital media use with adequate sleep, physical activity, social interaction, and play-based learning.

Overall, existing literature highlights that while digital media may offer limited educational benefits when properly designed and supervised, excessive and unguided exposure during early childhood is consistently associated with negative developmental, behavioral, and health outcomes.

Screen Time Exposure and Its Directional Association with Early Childhood Developmental Outcomes

Excessive screen exposure has become a major developmental concern in early childhood due to its potential influence on cognitive, behavioral, and socio-emotional development. In a longitudinal cohort study conducted by Madigan, Browne, Racine, et al. (2019), the relationship between screen time and developmental outcomes among children aged 24, 36, and 60 months was examined using data from 2,441 mother–child pairs. Findings from this study provide strong empirical evidence that higher levels of screen exposure in early childhood are significantly associated with poorer developmental performance over time.

Madigan et al. (2019) found that increased screen time at 24 months was significantly associated with lower scores on developmental screening tests at 36 months, and similarly, higher screen time at 36 months predicted poorer developmental outcomes at 60 months. Importantly, the study revealed a directional relationship, showing that early screen exposure predicted later developmental delays, while the reverse relationship—where developmental delays lead to increased screen time—was not statistically supported. This suggests that screen exposure is more likely to be a contributing factor rather than merely a consequence of developmental difficulties.

The study further emphasizes that early childhood is a critical period of rapid brain development, during which children require rich interpersonal interaction and active engagement with their environment. According to Madigan et al. (2019), excessive screen use may reduce opportunities for essential developmental experiences, such as language interaction, social play, and motor skill practice. When children spend prolonged time engaging with screens, they are less likely to participate in caregiver-child interactions that are crucial for developing communication, emotional regulation, and problem-solving skills.

Additionally, the findings highlight that screen time may interfere with developmental learning opportunities by displacing activities that support growth, such as reading, physical play, and social interaction. The authors explain that reduced caregiver engagement during screen exposure limits verbal and non-verbal exchanges, which are essential for language acquisition and socio-emotional development. Over time, this reduction in meaningful interaction may contribute to delays in cognitive and behavioral development.

The study also situates screen exposure within a broader ecological framework, identifying that developmental outcomes are influenced by multiple contextual factors, including household income, maternal mental health, sleep duration, and reading exposure. However, even after accounting for these variables, screen time remained a significant predictor of poorer developmental outcomes, reinforcing its independent role in early childhood development.

In response to these findings, Madigan et al. (2019) recommend that pediatricians and caregivers adopt structured media management strategies, such as limiting screen time, creating family media plans, and prioritizing interactive and face-to-face engagement. These recommendations align with broader pediatric guidelines emphasizing moderation and the importance of balancing digital media use with developmental needs.

Overall, this study provides strong longitudinal evidence that excessive screen time during early childhood is associated with measurable delays in developmental milestone achievement. It underscores the importance of early regulation of media exposure to support optimal cognitive, behavioral, and socio-emotional development in young children.

Digital Media Exposure and Its Influence on Child Development and Family Interaction

Digital media has become deeply integrated into the daily lives of children, reshaping family interaction patterns and child development experiences. Webb (2023) emphasizes that screen time has become increasingly common in modern households, with children exposed to televisions, smartphones, tablets, and other digital devices at earlier ages than ever before. This growing exposure has raised concerns regarding its developmental implications, particularly during early childhood when foundational cognitive, emotional, and social skills are rapidly developing.

One of the key concerns highlighted in the literature is the displacement of essential developmental experiences due to excessive screen use. Webb (2023) explains that when children spend significant time on screens, they may have fewer opportunities for face-to-face interaction, imaginative play, and active engagement with their environment. These missed opportunities can limit the development of language skills, attention control, and social competence, which are typically strengthened through direct interaction with caregivers and peers.

The literature also emphasizes the role of family dynamics in shaping children's media use. Parental involvement is identified as a critical factor influencing how children engage with digital devices. When parents actively co-view or guide media use, screen time may become more meaningful and educational. However, when media use is unregulated or used as a substitute for interaction or behavior management, it may reduce meaningful parent–child communication and weaken relational bonding within the household.

Furthermore, Webb (2023) highlights that digital media use is not solely an individual child behavior but is embedded within broader family practices. Parents' own screen habits significantly influence children's media consumption patterns, suggesting that modeling behavior plays an important role in shaping early media exposure. This indicates that interventions aimed at reducing excessive screen time must also address parental media behavior and family routines.

The study also recognizes that not all screen time is inherently harmful. The quality and context of media use are important determinants of its developmental impact. Educational content and shared media experiences can support learning and strengthen family engagement when appropriately guided. However, the literature consistently cautions that excessive or unsupervised screen exposure remains associated with reduced developmental opportunities and weaker interpersonal interaction.

Overall, Webb (2023) concludes that while digital media is now an unavoidable part of childhood environments, its influence on development depends heavily on how, when, and why it is used. Balanced and intentional media use, combined with strong parental involvement, is essential to ensuring that screen exposure does not interfere with critical developmental processes in early childhood.

Excessive Screen Time and Emotional–Behavioral Problems Among Children and Adolescents

Screen time has increasingly been recognized as a significant factor associated with mental health outcomes in childhood and adolescence. In a large cross-sectional study using data from the United States National Health Interview Survey (NHIS) 2022, Yu et al. (2025) examined the relationship between screen exposure and emotional and behavioral difficulties among 4,932 children and adolescents aged 6 to 17 years. The study utilized the Strengths and Difficulties Questionnaire (SDQ) to assess mental health outcomes and categorized participants into normal and abnormal functioning groups based on behavioral indicators.

Findings from Yu et al. (2025) revealed that a substantial proportion of participants (approximately 70.05%) reported screen time exceeding two hours per day. After adjusting for potential confounding variables, excessive screen time was significantly associated with increased emotional symptoms, conduct problems, peer relationship difficulties, and overall behavioral difficulties. Specifically, children with excessive screen exposure were more likely to experience emotional symptoms (OR = 1.75), conduct problems (OR = 1.73), peer relationship issues (OR = 1.46), and higher total difficulty scores (OR = 1.72), all of which were statistically significant.

These findings suggest a consistent association between high levels of screen use and poorer emotional and behavioral functioning in children and adolescents. The study highlights that excessive engagement with digital devices may interfere with the development of emotional regulation, social interaction skills, and appropriate behavioral responses. This is particularly important during developmental stages where children are learning to manage emotions, build relationships, and adapt socially within their environments.

Yu et al. (2025) further emphasize that screen time may contribute to behavioral difficulties through multiple pathways, including reduced physical activity, disrupted sleep patterns, and decreased face-to-face social interaction. These factors may collectively influence a child's ability to develop healthy coping mechanisms and interpersonal skills. However, the authors also note that the cross-sectional nature of the study limits causal interpretation, meaning that while screen time is strongly associated with behavioral difficulties, it cannot be definitively concluded as the sole cause.

Despite this limitation, the study reinforces the importance of guided and regulated screen use among children and adolescents. The authors recommend that caregivers and professionals provide structured guidance on digital device usage and remain attentive to potential behavioral and emotional challenges linked to excessive screen exposure.

Overall, the findings of Yu et al. (2025) contribute to a growing body of literature indicating that excessive screen time is associated with increased emotional and behavioral problems among young individuals. This underscores the importance of monitoring digital media use and promoting balanced lifestyle habits to support healthy psychological and social development.

Excessive Screen Time and Early Screen Exposure as Determinants of Health-Related Quality of Life and Behavioral Problems in Preschool Children

The increasing integration of digital media into early childhood environments has raised concerns regarding its impact on children's overall well-being and behavioral development. Xiang et al. (2022) conducted a large cross-sectional study involving 4,985 preschool children aged 3 to 6 years in Chengdu, China, to examine the independent and interactive effects of excessive screen time and early screen exposure on health-related quality of life (HRQOL) and behavioral problems.

Findings revealed that a substantial proportion of children were exposed to high levels of screen use, with 34.8% exceeding 1 hour of daily screen time and 11.9% having initiated screen exposure before the age of two. After adjusting for multiple confounding variables, including demographic, socioeconomic, and parental factors, the study found that both excessive screen time and early screen exposure were significantly associated with lower

HRQOL scores across all domains. These included emotional, physical, social, and school functioning, indicating a broad negative impact on children's overall quality of life.

In addition to reduced HRQOL, Xiang et al. (2022) found that excessive screen time was significantly associated with increased behavioral problems, including conduct issues, learning difficulties, psychosomatic complaints, impulsivity, and hyperactivity. Similarly, early exposure to screen-based media before the age of two was independently associated with emotional and behavioral difficulties, even after controlling for screen duration and other confounders. These findings suggest that not only the amount of screen exposure but also the timing of first exposure plays a critical role in shaping developmental outcomes.

Importantly, the study also identified a significant interaction between excessive screen time and early screen exposure. Children who experienced both risk factors exhibited poorer emotional functioning and higher levels of conduct problems compared to those exposed to only one or neither factor. This indicates a compounding effect, where early exposure may increase vulnerability to the negative consequences of prolonged screen use later in childhood.

The authors explain that these associations may be attributed to several developmental mechanisms. Excessive screen exposure may reduce opportunities for physical activity, social interaction, and cognitive engagement, all of which are essential for healthy development. Additionally, early screen exposure may interfere with critical periods of brain development, particularly in the first two years of life when neural networks undergo rapid growth and organization. Disruption during this period may have long-term effects on emotional regulation, behavior, and cognitive functioning.

Xiang et al. (2022) further emphasize that screen use may displace essential developmental activities such as play, reading, and caregiver interaction. This displacement limits children's opportunities to develop social-emotional skills and may contribute to poorer psychosocial well-being. Moreover, attention difficulties associated with excessive screen use may further exacerbate behavioral problems and reduce quality of life.

Despite its strengths, including a large sample size and adjustment for multiple confounding variables, the study acknowledges limitations such as its cross-sectional design, reliance on parent-reported data, and lack of detailed information on content quality and co-viewing practices. These limitations suggest that further longitudinal research is needed to establish causal relationships and better understand the mechanisms underlying these associations.

Overall, the study provides strong evidence that both excessive screen time and early screen exposure are significant and interacting risk factors for reduced health-related quality of life and increased behavioral problems in preschool-aged children. These findings reinforce international guidelines recommending limited and developmentally appropriate screen use during early childhood and highlight the importance of early intervention and parental guidance in managing children's media exposure.

Screen Time Exposure and Psychological Well-Being Among Children and Adolescents

Screen-based media use has become a dominant activity among children and adolescents, raising growing concerns regarding its impact on psychological well-being. In a large population-based study using data from the 2016 U.S. National Survey of Children's Health (NSCH), Twenge and Campbell (2018) examined associations between screen time and a broad range of psychological well-being indicators among 40,337 children aged 2 to 17 years. The study included multiple forms of screen exposure such as television, video games, smartphones, tablets, and computers, providing a comprehensive assessment of digital media use.

Findings revealed a consistent negative association between screen time and psychological well-being across multiple domains. Children and adolescents who spent more time using screen media demonstrated lower levels of emotional stability, self-control, curiosity, and social functioning. High screen users were more likely to experience difficulties in emotional regulation, such as being easily upset, argumentative, and difficult to calm.

They also showed reduced ability to complete tasks, lower curiosity, and greater difficulty forming and maintaining friendships.

Importantly, Twenge and Campbell (2018) found that adolescents with high screen exposure (7 or more hours per day) were more than twice as likely to be diagnosed with depression or anxiety and more likely to receive mental health treatment compared to those with low screen use. Moderate screen use was also associated with lower psychological well-being, indicating that even non-extreme levels of exposure may have measurable effects. In contrast, non-users and low users of screen media generally did not differ significantly in well-being outcomes, suggesting that adverse effects become more evident beyond minimal exposure levels.

The study further highlights that the strength of association between screen time and psychological well-being was greater among adolescents than younger children. This may be attributed to adolescents' increased engagement with smartphones, social media, and online communication platforms, which can displace face-to-face interaction, reduce sleep quality, and contribute to problematic technology use. Peer relationships, which are highly significant during adolescence, may also be negatively affected when digital interaction replaces in-person socialization.

Twenge and Campbell (2018) explain that screen time may influence psychological well-being through several mechanisms. These include reduced physical activity, disrupted sleep patterns, decreased face-to-face social interaction, and increased exposure to emotionally stimulating or stressful digital content. Additionally, excessive screen use may interfere with the development of self-regulation and attention control, which are essential for emotional and behavioral stability.

Although the study is cross-sectional and cannot establish causality, the authors note that previous longitudinal and experimental studies support the directionality of effects from increased screen time to reduced psychological well-being. These findings suggest that screen exposure is a meaningful factor that may contribute to mental health challenges in children and adolescents, rather than being merely a consequence of pre-existing difficulties.

Overall, the study provides strong evidence that higher screen time is associated with lower psychological well-being across childhood and adolescence. It underscores the importance of monitoring digital media use and highlights the need for guidelines that promote balanced screen habits to support emotional, social, and behavioral development.

Digital Media Exposure and Its Developmental Impacts on Children and Adolescents

The American Academy of Pediatrics (AAP) Council on Communications and Media, through the technical report by Reid Chassiakos et al. (2016), provides a comprehensive overview of children's and adolescents' engagement with digital media and its implications for development, health, and behavior. The report emphasizes that today's youth are deeply immersed in both traditional and digital media environments, with early exposure beginning as early as infancy due to the widespread availability of mobile devices.

The literature highlights that digital media presents both benefits and risks depending on the content, duration, and manner of use. On the positive side, digital media can support early learning, exposure to educational content, social connection, and access to health-related information. Interactive platforms, such as educational applications and video chat tools, may enhance learning when guided by caregiver interaction, particularly in early childhood development stages.

However, the report also underscores significant developmental and health risks associated with excessive or inappropriate media use. These include sleep disturbances, attention problems, obesity, depressive symptoms, and delays in cognitive and socio-emotional development. Excessive screen exposure is also linked to reduced parent–child interaction, which is essential for language development and emotional bonding in early childhood.

For school-aged children and adolescents, digital media use introduces additional concerns such as cyberbullying, exposure to inappropriate content, privacy risks, sexting, and behavioral modeling of risky behaviors. Social media, while offering opportunities for communication and support, can also contribute to mental health challenges such as depression and low self-esteem, particularly when used passively or for social comparison.

The report further highlights the role of parental guidance and media modeling in shaping children's media habits. Children whose parents actively regulate and co-use media tend to demonstrate healthier media behaviors. As such, the AAP strongly recommends the creation of a Family Media Use Plan, which promotes balanced screen time, encourages healthy routines (sleep, physical activity, and nutrition), and fosters open communication about media use within families.

In conclusion, the literature suggests that digital media is a double-edged tool in child development. While it can enhance learning and connectivity, unregulated or excessive use poses significant developmental and health risks. Therefore, balanced, guided, and developmentally appropriate media use is essential for supporting the well-being of children and adolescents.

Screen Viewing Time and Its Association with Social-Emotional Development in Preschool Children with Developmental, Behavioral, or Emotional Issues

Screen viewing time (SVT) has become a significant concern in early childhood development due to its potential effects on children's social-emotional functioning. In a study conducted by Kiing et al. (2023), patterns of SVT and its relationship with social-emotional development were examined among preschool children with developmental, behavioral, or emotional (DBE) issues in Singapore. The study involved 225 children aged 0–5 years who were referred to a developmental pediatric clinic. Findings revealed that children in this population were exposed to an average of 138 minutes of daily screen time, which is substantially higher than recommended international guidelines that discourage screen exposure for children under two years old.

The study further identified that screen time was introduced at a very early age, with a mean onset of 13.8 months. Notably, one-third of the children were exposed to screen viewing time during their first year of life. A key reason for early introduction was to facilitate feeding routines, highlighting the use of screens as a behavioral management tool during mealtimes. This practice reflects a growing trend in caregiving strategies where digital devices are used to regulate children's behavior in daily routines.

In terms of social-emotional development, the study utilized the Devereux Early Childhood Assessment-Clinical (DECA-C) tool to measure protective factors such as initiative and self-control, as well as behavioral concerns including attention problems, aggression, and emotional regulation difficulties. Results indicated that higher past screen exposure was significantly associated with poorer social-emotional outcomes, particularly increased aggression, reduced attention span, and higher overall behavioral concerns. These findings suggest that excessive early screen exposure may interfere with the development of self-regulation and emotional control during critical early childhood years.

The study also highlighted contextual and environmental factors influencing screen use. Children enrolled in preschool settings had lower screen time compared to those not enrolled, suggesting that structured environments may reduce exposure. Additionally, higher parental education levels were associated with lower screen time, indicating the role of parental awareness and socioeconomic factors in regulating media exposure. Conversely, children living in multi-caregiver environments, such as with grandparents or siblings, demonstrated varying patterns of screen use, emphasizing the influence of household dynamics.

Overall, Kiing et al. (2023) provide strong evidence that excessive and early screen exposure is associated with negative social-emotional outcomes in young children with developmental and behavioral concerns. The study underscores the importance of early intervention, parental guidance, and public health education in reducing screen time, particularly during infancy and toddlerhood, to support healthier emotional and behavioral development.

Framework

Theoretical Framework

This study is anchored on two theories that explain the relationship between technology exposure and children's behavioral development: Albert Bandura's Social Learning Theory (1977) and Neuman's Displacement Theory (1988). Both provide a foundation for understanding how excessive technology exposure shapes behavior during early childhood.

Social Learning Theory (Albert Bandura, 1977)

According to Albert Bandura, children learn by observing, imitating, and modeling the behaviors of others within their environment. With the increasing accessibility of digital media, children are now exposed not only to real-life models but also to symbolic models presented through screens, such as television shows, games, and online videos. Prolonged exposure to such media can influence children's behavior by shaping how they perceive acceptable actions and interactions. In the absence of adult supervision, they may internalize aggressive, inattentive, or impulsive behaviors observed from screen content. This theory supports the idea that children's behavior can be directly molded by the content and context of their technology use.

Displacement Theory (Neuman, 1988)

The Displacement Theory posits that time spent engaging in one activity reduces the time available for other meaningful experiences. When young children devote excessive hours to screens, it often replaces crucial developmental activities such as play, communication, and socialization. These experiences are vital for nurturing empathy, cooperation, and self-regulation. As a result, excessive technology exposure can displace interactive and imaginative play, leading to reduced social skills, decreased motivation, and weakened attention control. This theory provides a behavioral explanation of how excessive screen use disrupts normal developmental patterns and contributes to maladaptive behaviors.

Together, these theories explain both the mechanism (through observation and imitation) and the consequence (displacement of developmental experiences) of excessive technology use on behavior. They guide the present study in analyzing how technology exposure shapes the attention, motivation, and social behaviors of early childhood learners.

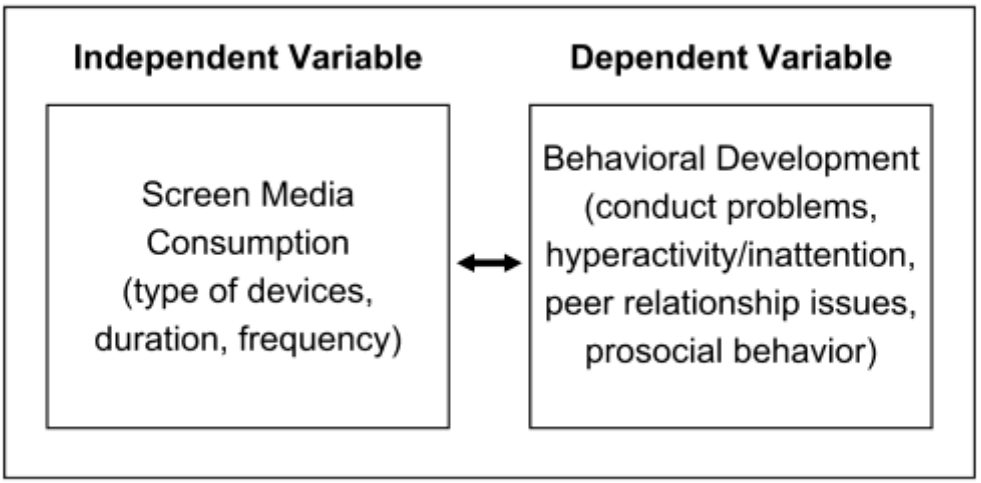

Figure 1. Conceptual Framework of Independent and Dependent Variables in Children's Screen Exposure and Behavioral Outcomes

CONCEPTUAL FRAMEWORK

The conceptual framework of the study examines the relationship between screen media consumption and behavioral development among early childhood learners, where screen media consumption is treated as the independent variable and behavioral development as the dependent variable. The screen media consumption variable includes the type of device used, the screen activities engaged in, the daily duration of screen use, and the frequency of exposure, while the behavioral development variable consists of conduct difficulties, peer difficulties, hyperactivity, and prosocial behavior.

This framework is designed to analyze whether variations in screen media consumption are associated with differences in behavioral development outcomes. By adopting this structure, the study utilizes inferential statistical methods to determine the presence and significance of relationships between variables, providing a clear and organized basis for examining how screen-related habits relate to behavioral characteristics and ensuring alignment with the study's research questions and objectives.

METHODOLOGY

This part presents the methodology employed in the study, including the research design, locale of the study, respondents of the study, sampling procedure, research instrument, data gathering procedure, scoring procedure, statistical technique, and ethical considerations that were used in examining the behavioral impact of excessive technology exposure among early childhood learners.

Research Design

The study utilized a quantitative, correlational research design to examine the behavioral impact of excessive screen use among early childhood learners aged 3 to 8 years. This approach was selected to assess the relationship between screen media exposure and behavioral outcomes. The design emphasizes numerical data derived from standardized survey instruments to ensure systematic measurement and empirical analysis of technology's influence on early childhood behavior.

Locale of the Study

The study was conducted in selected households in Valencia City, a highly urbanized area in the province of Bukidnon. The city reflects a blend of agricultural lifestyle and modern living, where widespread access to smartphones, televisions, tablets, and internet-enabled devices is common in many households. The city was chosen as the study site because it represents a community experiencing rapid digital growth, where children are increasingly exposed to smartphones, tablets, televisions, and internet-enabled devices within everyday home settings, making it an ideal location to examine screen media use and behavior.

Respondents of the Study

The respondents of the study were primarily the parents along with their children aged 3–8 years old residing in selected households in Valencia City, Bukidnon. The parent respondents, consisting of twenty-two (22) females and eight (8) males, served as the primary respondents due to their direct involvement in supervising and monitoring their children's daily screen time and behavioral development within the home environment, making them credible and reliable sources of data. Meanwhile, the 30 children, composed of eighteen (18) males and twelve (12) females, served as the subjects of the observation. Only parents and children who met the criteria were considered as respondents.

Sampling Procedure

The study employed purposive sampling to select respondents based on specific inclusion criteria aligned with the objectives of the study. This sampling technique allowed the researchers to intentionally identify individuals relevant for the study. Only parents with children aged 3–8 years old whose children had access to digital devices

such as smartphones, tablets, televisions, or computers were included as respondents. In addition, only children who met the age requirement and had excessive screen exposure were considered, ensuring that the respondents were suitable and closely aligned with the purpose of the study.

Research Instrument

The study utilized two primary instruments: (1) the SCREENS-Q and (2) the Strengths and Difficulties Questionnaire (SDQ).

The SCREENS-Q was adapted from a standardized questionnaire developed and validated in European population-based child cohort studies. It is designed to assess children's screen exposure in home and daily living contexts, including the types of digital technologies commonly used by children such as smartphones, televisions, tablets or iPads, laptops or computers, and gaming consoles, as well as the frequency and duration of their use.

The Strengths and Difficulties Questionnaire (SDQ), originally developed by Robert Goodman in the United Kingdom (University of Southampton), is a widely used international standardized child behavioral screening tool composed of 20 items organized into four behavioral domains: (1) conduct problems, (2) hyperactivity/inattention, (3) peer relationship problems, and (4) prosocial behavior, with each domain containing five items. Each item is answered using a 3-point Likert scale (0 = Not True, 1 = Somewhat True, 2 = Certainly True), for the assessment of children's behavior across different domains.

Data Gathering Procedure

Prior to the commencement of the study, formal informed consent was secured from the parents. They were fully informed about the purpose of the study, the instruments to be used, the nature of their children's participation, and their role as the primary respondents, along with the measures implemented to ensure confidentiality and participant welfare. Subsequently, data collection proceeded only after the signed informed consent forms were obtained.

Afterwards, the SCREENS-Q was first administered, followed immediately by the Strengths and Difficulties Questionnaire (SDQ). The respondents were given adequate time to complete the SDQ. Once completed, the questionnaires were collected, checked for completeness, and organized for data analysis.

Statistical Technique

Descriptive statistics, particularly the mean and standard deviation, were used to describe and assess the data collected from the SCREENS Questionnaire (SCREENS-Q) and the Strengths and Difficulties Questionnaire (SDQ), specifically in terms of participants' level of screen media exposure and behavioral outcomes.

For the SCREENS-Q, mean scores were computed to determine the level and frequency of participants' screen media use. These computed means were interpreted using a predefined quantitative scale to provide a structured classification of screen exposure patterns.

Similarly, for the SDQ, mean scores were calculated to describe behavioral patterns across key domains, including conduct problems, hyperactivity, peer relationship problems, and prosocial behavior.

Inferential Statistics were utilized to determine the significance and strength of the relationship between screen media exposure and behavioral development among early childhood learners.

Spearman's Rho correlation was employed to examine the relationship between screen media use and behavioral development among early childhood learners. This non-parametric measure of rank correlation was used when the assumptions of normality and linearity were not met. Spearman's Rho was appropriate for ordinal data, non-normally distributed data, or when the relationship between variables was monotonic but not necessarily linear. It was also suitable for small sample sizes and less sensitive to outliers compared

to parametric tests. All statistical analyses were performed using Jamovi statistical software to ensure accuracy, consistency, and systematic organization in data analysis and interpretation.

Scoring Procedure

The scoring procedure in this study was based on the Strengths and Difficulties Questionnaire (SDQ) and the SCREENS Questionnaire (SCREENS-Q) to assess behavioral outcomes and screen media exposure among early childhood learners.

For the SDQ, each item was scored using a three-point Likert scale: 0 – Not True, 1 – Somewhat True, and 2 – Certainly True. Scores were summed to obtain domain scores for Conduct Difficulties, Hyperactivity, Peer Difficulties, and Prosocial Behavior, as well as the Total Difficulties Score. The interpretation of scores followed standard SDQ classification. For Conduct Difficulties and Peer Difficulties, scores of 0–2 were classified as Normal, 3 as Borderline, and 4–10 as Abnormal. For Hyperactivity, scores of 0–5 were interpreted as Normal, 6 as Borderline, and 7–10 as Abnormal. For Prosocial Behavior, scoring was reversed, wherein 6–10 was classified as Normal, 5 as Borderline, and 0–4 as Abnormal. For the Total Difficulties Score, 0–13 was interpreted as Normal, 14–16 as Borderline, and 17–40 as Abnormal.

In addition, mean scores per domain were computed to describe the average responses of the respondents. These were interpreted using the following scale: 0.00–0.66 (Low), 0.67–1.33 (Moderate), and 1.34–2.00 (High). For selected items requiring dichotomous responses, a two-point scale was applied (0 – No, 1 – Yes) and included in the analysis. For screen media exposure, the original SCREENS-Q categories (30 minutes–1 hour, 1–2 hours, and more than 2 hours) were initially scored as 0, 1, and 2, respectively. However, all respondents fell under the highest category, resulting in a lack of variability. Thus, the actual reported daily screen time in hours was used and reclassified into 2–4 hours (Low), 5–8 hours (Moderate), and 9–12 hours (High), with corresponding scores of 0, 1, and 2. This scoring procedure ensured standardized classification and appropriate variability for statistical analysis.

Ethical Consideration

The study adhered to established ethical standards throughout the research process in accordance with Republic Act No. 10173 (Data Privacy Act of 2012). Informed consent was obtained from the parents prior to participation. All collected data were treated with strict confidentiality, and the identities of the participants were kept anonymous. Data were securely handled in compliance with the provisions of RA 10173 on data protection, ensuring that access was properly regulated and safeguarded. The safety, dignity, and well-being of the respondents were prioritized at all times. These ethical measures ensured transparency in the conduct of the study and upheld the integrity of the research process.

RESULTS AND DISCUSSIONS

This section presents, analyzes, and interprets the data gathered in the study, organized according to the research questions. The results are systematically presented using appropriate statistical tools such as frequency counts, percentages, and other relevant measures to ensure clarity, accuracy, and reliability of the findings.

Furthermore, this section provides a comprehensive discussion of the results by relating them to the objectives of the study and existing literature. Patterns, trends, and significant observations are examined to give deeper meaning to the data. The interpretations aim to explain the implications of the findings and how they contribute to a better understanding of the variables under investigation.

Type of Device	Frequency n=30	Percentage (%)
Smartphone	30	100
Tablet/iPad	22	73.33
Laptop/Computer	20	66.67

Television	30	100
Gaming Console	8	26.67

Table 1. Types of Digital Devices Used by the Early Childhood Learners

The findings indicated that respondents in this study are primarily engaged with smartphones, televisions, tablets or iPads, laptops or computers, and to a lesser extent, gaming consoles. The central role of smartphones and televisions suggests that children's media exposure is anchored in highly accessible, screen-based technologies that are integrated into daily family routines. These devices are often used for entertainment, background viewing, and caregiving support, making them a constant presence in the home environment. At the same time, the presence of tablets and laptops points to growing exposure to more interactive and education-oriented digital platforms, which may be used for watching videos, playing games, or engaging with learning apps introduced by parents or caregivers.

This pattern implied that screen-based activities are no longer occasional but are becoming a routine and even expected part of early childhood environments. When children are frequently engaged with multiple digital devices, their cumulative and fragmented screen exposure may increase, potentially affecting attention regulation, impulse control, and the quality of play. Instead of long, uninterrupted periods of physical activity or imaginative play, children may rotate between short bursts of viewing on a television, scrolling or tapping on a smartphone, or interacting with a tablet, which can contribute to a more passive and distracted style of engagement. The relatively limited use of gaming consoles, in contrast, suggests that children's digital engagement is more oriented toward general media consumption and versatile devices rather than specialized interactive gaming, which may reflect family preferences, cost, or availability rather than a strong interest in console-based play.

From a developmental perspective, the widespread use of these devices raises important questions about how they shape early learning and socialization. On one hand, smartphones, tablets, and educational apps can provide access to stories, songs, and simple learning activities that support vocabulary, number recognition, and following instructions. On the other hand, when screen use replaces or competes with face-to-face interaction, outdoor play, and hands-on exploration, it may reduce opportunities for rich language input, emotional attunement, and physical development. The dominance of smartphones and televisions, in particular, may reinforce passive viewing habits, while the presence of tablets and laptops suggests that children are also learning to navigate user interfaces and interactive content at a very young age.

These insights resonated with recent literature on early childhood screen exposure. Ponti (2023) observed that increased screen use among preschool-age children may interfere with language development, communication skills, and social interaction, highlighting the need for mindful and intentional use of digital media rather than unregulated exposure. In the same way, Presta et al. (2024) found that prolonged engagement with digital devices is associated with lower levels of physical activity, disrupted sleep patterns, and other health-related concerns in young children.

Together, these studies underscore why the widespread use of smartphones, televisions, tablets, and laptops in early childhood may amplify overall screen exposure and reduce the time and space available for active, social, and developmentally supportive experiences. This pattern calls for family-level, educational, and policy-level strategies that promote balanced media use, prioritize non-screen activities, and ensure that digital tools complement rather than replace core developmental processes.

Table 2. Average Daily Duration of Screentime of the Early Childhood Learners

No. of Respondents	**Actual Average Hours**	**Qualitative Interpretations**
5	4	Low
5	5	Moderate

5	6	Moderate
3	7	Moderate
3	8	Moderate
3	9	High
2	10	High
2	11	High
2	12	High
Overall Average	**7.1**	**Moderate**

Legend: 2hrs-4hrs - Low, 5 hrs - 8 hrs- Moderate, 9 hrs - 12 hrs- High

The findings indicated that a majority of the respondents are exposed to extended and consistent screen media use, with daily screen time ranging from 4 to 12 hours and an average of 7.10 hours. This level of exposure suggests that screen use is a significant part of the children's daily routines. A considerable proportion of respondents fall within the moderate to high screen time categories, indicating prolonged engagement with digital devices.

The findings align with and reinforce existing literature suggesting that excessive screen exposure may be associated with various behavioral concerns among young children Muppalla et al. (2023). Prolonged screen time has been linked to difficulties in attention, emotional regulation, increased irritability, and reduced social interaction. Children exposed to higher levels of screen time, particularly those within the 9–12-hour range, may be more likely to experience challenges in managing emotions and engaging in social and physical activities, consistent with previously reported observations.

Table 3. Mean Scores of Early Childhood Learners' Conduct Difficulties Scale

These findings are consistent with established guidelines and empirical studies on screen time and child development. The World Health Organization (2024) recommends limiting screen time to no more than one hour per day for young children, emphasizing that excessive exposure may negatively affect behavior and overall development. Similarly, the American Academy of Pediatrics (2022) highlights that prolonged screen use is associated with behavioral concerns such as poor self-regulation, attention difficulties, and increased irritability. Empirical studies further support these observations. Madigan et al. (2019) found that increased screen time is associated with developmental delays, particularly in communication and problem-solving skills. In addition, Webb (2023) reported that excessive technology exposure may contribute to emotional dysregulation and reduced social competence among young children. As the average screen time observed in this study exceeds recommended guidelines, the findings further support existing research suggesting a potential relationship between prolonged screen exposure and behavioral outcomes.

Table 3. Mean Scores of Early Childhood Learners' Conduct Difficulties Scale

Statement	Mean	Qualitative Interpretation
Often has temper tantrums or hot tempers	1.47	High
Generally obedient, usually does what adults request	1.47	High
Often fights with other children or bullies them	1.40	High
Often argumentative with adults	1.37	High
Can be spiteful to others	1.30	Moderate

Legend: 0.00 - 0.66 - Low, 0.67 - 1.33- Moderate, 1.34 - 2.00- High

The results showed high conduct difficulties with frequent anger outbursts, arguing with adults, and fights with other children. These behaviors often occur when children have trouble handling frustration, and are consistent

with recent research indicating that excessive screen time is associated with higher levels of emotional and behavioral problems in children because it can disrupt emotional regulation, reduce face to face interaction, and displace activities such as play, sleep, and guided social engagement (Yu et al., 2025; Muppalla et al., 2023). In this study, high scores for temper tantrums, arguing, and peer fighting reflect patterns already identified in prior research, where learners often lose control of their emotions, which upsets classroom activities and makes it harder to get along with teachers and other students.

A clear contrast appears in the high score for obedience. This finding aligns with existing perspectives suggesting that learners may follow adult instructions when closely monitored, but this does not necessarily indicate strong self-regulation. Instead, close adult guidance may mask underlying behavioral difficulties that emerge quickly when children are left to manage interactions independently, reinforcing the need for support in developing self-directed behavior.

Also, high bullying scores with moderate spitefulness are consistent with previously observed patterns of difficulty in sharing or understanding others. When upset, these learners often choose meanness or fighting instead of cooperation. These behaviors reflect trends noted in children with high screen time exposure and poorer emotional regulation, further supporting the importance of direct teaching of behavior and emotion regulation skills in the classroom, rather than relying mainly on punishment (Yu et al., 2025; Muppalla et al., 2023).

Table 4. Mean Scores of Early Childhood Learners' Hyperactivity Scale

Statement	**Mean**	**Qualitative Interpretation**
Restless, overactive, cannot stay still for long	1.47	High
Constantly fidgeting or squirming	1.50	High
Easily distracted, concentration wanders	1.47	High
Can stop and think things out before acting	1.40	High
Sees tasks through to the end, good attention span	1.37	High

Legend: 0.00 - 0.66 - Low, 0.67 - 1.33- Moderate, 1.34 - 2.00- High

The uniformly high mean scores indicated that hyperactive behaviors are frequently observed among the learners. Behaviors related to physical movement, such as restlessness and fidgeting, appear most dominant. At the same time, cognitive aspects of hyperactivity—such as distractibility and impulsivity—are also evident, as reflected in the high ratings for difficulty in sustaining attention and regulating actions. The inclusion of "Can stop and think things out before acting" among high scores may suggest variability in self-control, possibly influenced by scoring direction or inconsistent behavioral patterns among learners.

These findings suggest that early childhood learners in the study exhibit elevated levels of hyperactivity that may affect both behavior and academic engagement. Difficulties in attention and impulse control align with previously documented challenges that hinder learners' ability to complete tasks, follow instructions, and actively participate in structured classroom settings. Although some learners may demonstrate moments of self-regulation, the overall pattern remains consistent with high levels of hyperactivity, as described in earlier research, indicating possible developmental or environmental influences on behavior.

These findings align with and reinforce existing literature suggesting that excessive screen time is associated with increased behavioral problems and reduced well-being among children. Xiang et al. (2022) explained that prolonged screen exposure may negatively affect children's development through several mechanisms, including changes in brain white matter related to executive functioning, displacement of time for physical and cognitive activities, reduced social interaction with peers and parents, and increased attention-related difficulties. These

mechanisms have already been identified as contributing to poorer behavioral outcomes, including hyperactivity and reduced self-regulation, and the present findings reflect these established patterns, further supporting the role of excessive technology exposure in shaping the behavioral characteristics observed among early childhood learners.

Statement	Mean	Qualitative Interpretation
Rather solitary, tends to play alone	1.50	High
Has at least one good friend	1.40	High
Generally liked by other children	1.40	High
Picked on or bullied by other children	1.37	High
Gets on better with adults than with other children	1.30	Moderate

Legend: 0.00 - 0.66 - Low, 0.67 - 1.33- Moderate, 1.34 - 2.00- High

The data indicated that most learners exhibit high levels of peer-related behavioral indicators, particularly in areas associated with social interaction patterns. The high score for being solitary suggests that many children tend to engage in independent play rather than group interaction. At the same time, high ratings in having at least one good friend and being generally liked suggest that children are still able to form social connections despite tendencies toward isolation. The high mean for being picked on or bullied is notable, as it may reflect negative peer interactions occurring alongside social acceptance. The moderate score in preferring adults over peers suggests that this behavior is present but less dominant compared to other peer difficulty indicators.

The findings reflect patterns already identified in existing research on social behavior and screen exposure. The tendency to be solitary and play alone is consistent with observations that increased screen time may reduce opportunities for face-to-face peer interaction. At the same time, the presence of friendships and being liked by peers aligns with prior findings that social development may still occur, though sometimes inconsistently or unevenly. The relatively high experience of being bullied or picked on corresponds with previously noted links between weaker social skills, limited peer engagement, and negative peer interactions, while the preference for adults reflects patterns associated with comfort in more structured or less socially demanding environments.

These findings align with and reinforce existing literature on screen time and social development. The American Academy of Pediatrics (2022) emphasizes that excessive screen exposure can limit children's opportunities for social interaction and peer engagement, which are essential for developing interpersonal skills. Similarly, Twenge and Campbell (2018) found that increased screen time is associated with reduced social skills and a higher likelihood of social isolation among children. In addition, Madigan et al. (2019) reported that higher screen time is linked to delays in communication and social development. The consistency between these established findings and the present results further supports the connection between prolonged technology exposure and the peer-related behavioral patterns observed among learners.

Table 6. Mean Scores of Early Childhood Learners' Prosocial Scale

Statement	Mean	Qualitative Interpretation
Considerate of other people's feelings	0.77	Moderate
Shares readily with other children (treats, toys, pencils etc.)	0.80	Moderate
Helpful if someone is hurt, upset or feeling ill	0.70	Moderate
Kind to younger children	0.70	Moderate
Often volunteers to help others (parents, teachers, other children)	0.70	Moderate

Legend: 0.00 - 0.66 - Low, 0.67 - 1.33- Moderate, 1.34 - 2.00- High

The data indicated that learners demonstrate consistent but moderate levels of prosocial behavior across all measured indicators. No item reached a "High" level, suggesting that while children are capable of positive social behaviors such as sharing, helping, and showing kindness, these behaviors are not strongly developed or consistently exhibited. The relatively higher score in sharing suggests that children are more likely to engage in observable and situational prosocial acts, while slightly lower scores in helping and empathy-related behaviors may indicate less spontaneous or emotionally driven responses.

The findings reflect patterns already identified in existing research on prosocial development. The moderate levels across all indicators are consistent with observations that limited opportunities for meaningful social interaction may affect the strengthening of empathy, cooperation, and helping behaviors. The influence of excessive screen time, particularly in reducing children's engagement in real-life social experiences, has been previously noted as a factor contributing to less frequent practice of prosocial skills. As a result, while learners demonstrate the ability to act kindly and cooperatively, these behaviors may not yet be deeply internalized or consistently practiced, aligning with earlier findings on social and emotional development.

These findings align with and reinforce existing literature on child development and technology use. The study of Chassiakos et al. (2016) found that high levels of digital media use are associated with fewer parent-child and peer interactions, which are crucial for developing helping and sharing behaviors. Moreover, Teague et al. (2026b) highlighted consistent associations between higher digital media exposure and a range of socioemotional and behavioral problems, emphasizing that intensive media use can displace high quality, in person interactions that support prosocial skills. The consistency between these studies and the present findings further supports the interpretation that the moderate prosocial scores observed in the data are in line with established research on the effects of excessive technology exposure.

Table 7. Level of Early Childhood Learners' Behavior Developmental Domains

Behavioral Development	**Average**	**Qualitative Interpretation**
Conduct Difficulties	7	Abnormal
Hyperactivity	7.37	Abnormal
Peer Difficulties	7.03	Abnormal
Prosocial	3.70	Abnormal
Total Difficulties Score	**25.13**	**Abnormal**

Legend: Conduct Difficulties score: 0-2 (Normal), 3 (Borderline), 4-10 (Abnormal); Hyperactivity score: 0-5 (Normal), 6 (Borderline), 7-10 (Abnormal); Hyperactivity score: 0-2 (Normal), 3 (Borderline), 4-10 (Abnormal); Prosocial score: 6-10 (Normal), 5 (Borderline), 0-4 (Abnormal); Total Difficulties score: 0-13 (Normal), 14-16 (Borderline), 17-40 (Abnormal)

Based on this framework, the results place learners within the abnormal range across all assessed domains, indicating a pattern that is consistent with previously documented elevated behavioral and social-emotional concerns rather than isolated difficulties.

The abnormal classification in conduct-related behaviors, hyperactivity, and peer interaction reflects challenges that align with established findings on behavioral regulation, including difficulties with impulse control, sustained attention, and maintaining positive peer relationships. These patterns correspond with broader issues in self-regulation that have been identified in earlier research as affecting both classroom behavior and social functioning.

Equally important is the abnormal level of prosocial behavior, which mirrors prior observations of limited demonstration of helping, sharing, empathy, and cooperative interaction. This highlights a critical developmental gap, as prosocial skills are widely recognized as foundational for successful peer engagement and emotional competence. The findings are consistent with existing evidence suggesting that learners may not only struggle with managing behavior but also with actively engaging in positive social exchanges.

Anchored in Displacement Theory, this pattern reflects mechanisms already described in the literature, where reduced opportunities for meaningful, face-to-face interaction may constrain the development of interpersonal skills. When screen-based activities displace social experiences, children may experience what has been described as "social stagnation." This interpretation aligns with Muppalla et al. (2023), who found that excessive screen time is associated with poorer behavioral regulation and reduced social coping skills in children, including increased risk for externalizing behaviors and emotional dysregulation. Similarly, Kiing et al. (2024) emphasized that higher levels of early childhood screen time predict elevated emotional and behavioral problems, including abnormal conduct, hyperactivity, peer difficulties, and impaired prosocial behavior, as measured by the Strengths and Difficulties Questionnaire (SDQ). Further support comes from Zhang et al. (2024), whose study showed that higher electronic media use in young children is negatively associated with prosocial behavior and emotion regulation. The consistency between these established findings and the present results further supports the link between excessive technology exposure and diminished social-emotional development in early childhood learners.

Table 8. Descriptive Interpretation of Spearman's Rho (ρ) Values

Variables	Spearman's rho (p) value	P-value	Interpretation
Screentime vs Conduct	0.87	<.001	Significant, very strong positive
Screentime vs Hyperactivity	0.86	<.001	Significant, very strong positive
Screentime vs Peer Difficulties	0.85	<.001	Significant, very strong positive
Screentime vs Prosocial	-0.90	<.001	Significant, very strong negative

Spearman's rho (ρ) Value	Strength of Correlation	Interpretation
0.00 – 0.19	Very Weak	Negligible relationship
0.20 – 0.39	Weak	Low relationship
0.40 – 0.59	Moderate	Average relationship
0.60 – 0.79	Strong	High relationship
0.80 – 1.00	Very Strong	Very high relationship

Legend:

The analysis leads to the rejection of the null hypothesis at $p < .001$, providing strong statistical evidence that is consistent with existing research demonstrating a significant relationship between prolonged screentime and the behavioral development of early childhood learners. The results indicate that screentime is meaningfully associated with all four behavioral domains examined: conduct difficulties, peer difficulties, hyperactivity, and prosocial behavior. There is a very strong positive relationship between screentime and each of the three behavioral difficulty domains, reflecting patterns already identified in prior studies, where increases in screentime correspond with higher levels of conduct problems, hyperactivity, and peer-related challenges. Among these, the relationship with peer difficulties appears particularly pronounced, aligning with earlier findings that highlight the strong link between screen exposure and social interaction difficulties.

At the same time, screentime shows a very strong inverse relationship with prosocial behavior, consistent with established evidence that greater screen exposure is associated with lower levels of positive social behaviors such as sharing, helping, and cooperation. This pattern reflects previously observed trends suggesting that prolonged screentime is associated not only with increased behavioral difficulties but also with reductions in the social skills that support healthy peer functioning and emotional well-being. Overall, the findings correspond with existing research indicating that excessive screen media consumption may negatively influence children's behavioral regulation and social development, even when overt aggression or severe conduct problems are not immediately apparent.

These results align with Displacement Theory, which has long proposed that time spent on screens displaces essential developmental activities such as physical play, face-to-face interaction, and caregiver engagement. These displaced experiences are widely recognized as critical for the development of self-regulation, emotional control, and social competence. As supported in prior literature, when children spend more time in front of screens and less time in interactive, real-world contexts, they become more prone to behavioral difficulties and weaker social skills. Bandura's Social Learning Theory (1977) further reinforces this interpretation by emphasizing that children learn behaviors through observation and imitation. Existing studies suggest that excessive exposure to screen media may increase the likelihood that children model impulsive or socially inappropriate behaviors seen in digital content, while reducing opportunities to observe and practice prosocial behaviors modeled by caregivers and peers.

Empirical literature also reflects the observed pattern. A systematic review indexed by the National Library of Medicine (2023) found that higher screen time is significantly associated with increased externalizing behaviors such as conduct problems and hyperactivity, as well as decreased prosocial behavior in children. Similarly, a longitudinal study published in BMC Public Health (2025) reported that excessive screen exposure during the preschool years is linked to higher levels of behavioral difficulties and lower levels of social competence over time. The consistency between these studies and the present findings further supports the interpretation that prolonged screentime functions as a risk factor for poorer behavioral outcomes and weaker social skills in early childhood.

In practical terms, the findings reflect recommendations already emphasized in existing research regarding the importance of monitoring and regulating screen time during early childhood to support healthy behavioral and social development. Prior studies highlight that, beyond the absence of severe behavioral problems, attention must also be given to the development of positive social behaviors such as empathy, cooperation, and prosocial engagement. These skills are widely recognized as foundational for long-term emotional well-being and successful integration into school and community life, and the present results are consistent with existing evidence showing that excessive screen time is significantly and negatively associated with their development in early childhood learners.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the findings of the study, the following conclusions were drawn:

The study suggests that early childhood learners are highly exposed to smartphones and televisions, which dominate their daily media environment. Tablets/iPads and laptops/computers are also commonly used, indicating that children engage with multiple digital platforms both for entertainment and learning. In contrast, gaming consoles are used less frequently, suggesting that interactive gaming devices play a marginal role in their media routines. These patterns shows that screen-based engagement is deeply embedded in children's daily lives, and the presence of multiple devices may contribute to prolonged and fragmented screen exposure, increasing the risk of excessive screen time.

The learners in this study experience excessive daily screentime, with an average of 7.10 hours and many children spending between 4 and 12 hours on screens. This far exceeds the recommended limits for young children and suggests that prolonged technology use has become a routine feature of their daily schedules. Such high levels of exposure may displace physical play, face-to-face interaction, and other age-appropriate developmental activities, increasing the likelihood of attention problems, emotional dysregulation, and reduced social interaction.

Early childhood learners in this study generally show normal levels of conduct, hyperactivity, and peer difficulties, yet they exhibit abnormally low levels of prosocial behavior. This profile suggests that the children may appear well-behaved on the surface, but their social–emotional development may be compromised by a deficit in essential prosocial skills such as sharing, helping, and cooperation. The pattern underscores that

behavioral development is not only about the absence of behavioral problems but also about the presence of positive social capacities that support healthy peer relationships and long-term emotional well-being.

The findings suggests that prolonged screentime is strongly and significantly associated with behavioral development. Higher screentime is linked to increased conduct difficulties, hyperactivity, and peer difficulties, while at the same time showing a strong inverse relationship with prosocial behavior. This pattern suggests that excessive screen media consumption is not only related to more externalizing problems but also to weaker positive social functioning, implying that screentime plays a meaningful role in shaping children's behavioral regulation and social competence.

Recommendations

Drawing from the conclusion, the following are practical recommendations to address screen dominance risks in early learners:

Parents and caregivers should set clear, consistent limits on the use of smartphones and televisions, which are the most dominant devices in children's media diets. Daily routines should be designed to balance screen time with physical play, outdoor activities, storytelling, and face-to-face interaction, minimizing fragmented and prolonged exposure. Early childhood learning environments are encouraged to strengthen hands-on, play-based, and interactive teaching strategies that reduce dependence on screens while still allowing for purposeful, time-regulated use of digital tools.

Families and educators should monitor and reduce children's daily screentime to bring it closer to the recommended limits (e.g., around 1 hour per day for young children, with co-viewing and high-quality content). Structured schedules that prioritize active play, social interaction, and caregiver-mediated learning should be encouraged as alternatives to passive, prolonged device use. Awareness programs in schools and communities can help parents understand the behavioral and developmental risks of excessive screentime and support them in creating healthier media habits.

Given the abnormal level of prosocial behavior despite normal externalizing scores, it is recommended that parents, educators, and early childhood practitioners prioritize explicit teaching and practice of prosocial skills such as empathy, turn-taking, sharing, and helping. Structured, face-to-face social activities, group projects, and role-play scenarios should be integrated into daily routines so children can experience and internalize positive social behaviors. Schools and community programs may also implement awareness initiatives that emphasize prosocial development as a critical marker of long-term emotional and social well-being, ensuring that digital media use remains a supplement rather than a substitute for rich, interactive human experiences.

To counteract the association between screentime and increased conduct difficulties, hyperactivity, and peer problems, schools and caregivers should implement structured routines that foster self-regulation, such as guided play, mindfulness-style activities, and clear behavioral expectations. Early childhood programs can provide guided opportunities for peer interaction, conflict resolution, and cooperative play so children can practice social skills in real-time, rather than relying on screen-mediated experiences. Educators may also conduct brief parent sessions on the behavioral effects of excessive screen exposure to strengthen home–school collaboration.

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Author's Biographical Sketch

Ashley Lorraine A. Agliam, born in Manolo Fortich, Bukidnon, completed her elem ry education at Bagontaas Central Elementary School and her secondary education at Valencia Colleges Buk on, Inc.; Abegail B. Baysa, born in Nalin 1, Midsayap, North Cotabato, finished her primary education at Valencia Baptist Christian Academy and her secondary education at Valencia National High School; Sheena S. Directo, from Tongantongan, Valencia City, Bukidnon, completed her elementary and secondary education at Tongantongan Elementary School and Tongantongan National High School; Khicy Jean G. Escultor, born in Malaybalay City,

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The Researchers

Dedication

This work is lovingly and wholeheartedly dedicated to the Almighty

God, the source of wisdom, strength, and all blessings, whose guidance

Moreover, grace has made this endeavor possible.

To our cherished parents:

Mr. & Mrs Glenn O. Agliam

Mr. & Mrs Dante B. Baysa

Mr. & Mrs. Arsenio P. Directo

Mr. & Mrs. Tomas O. Escultor

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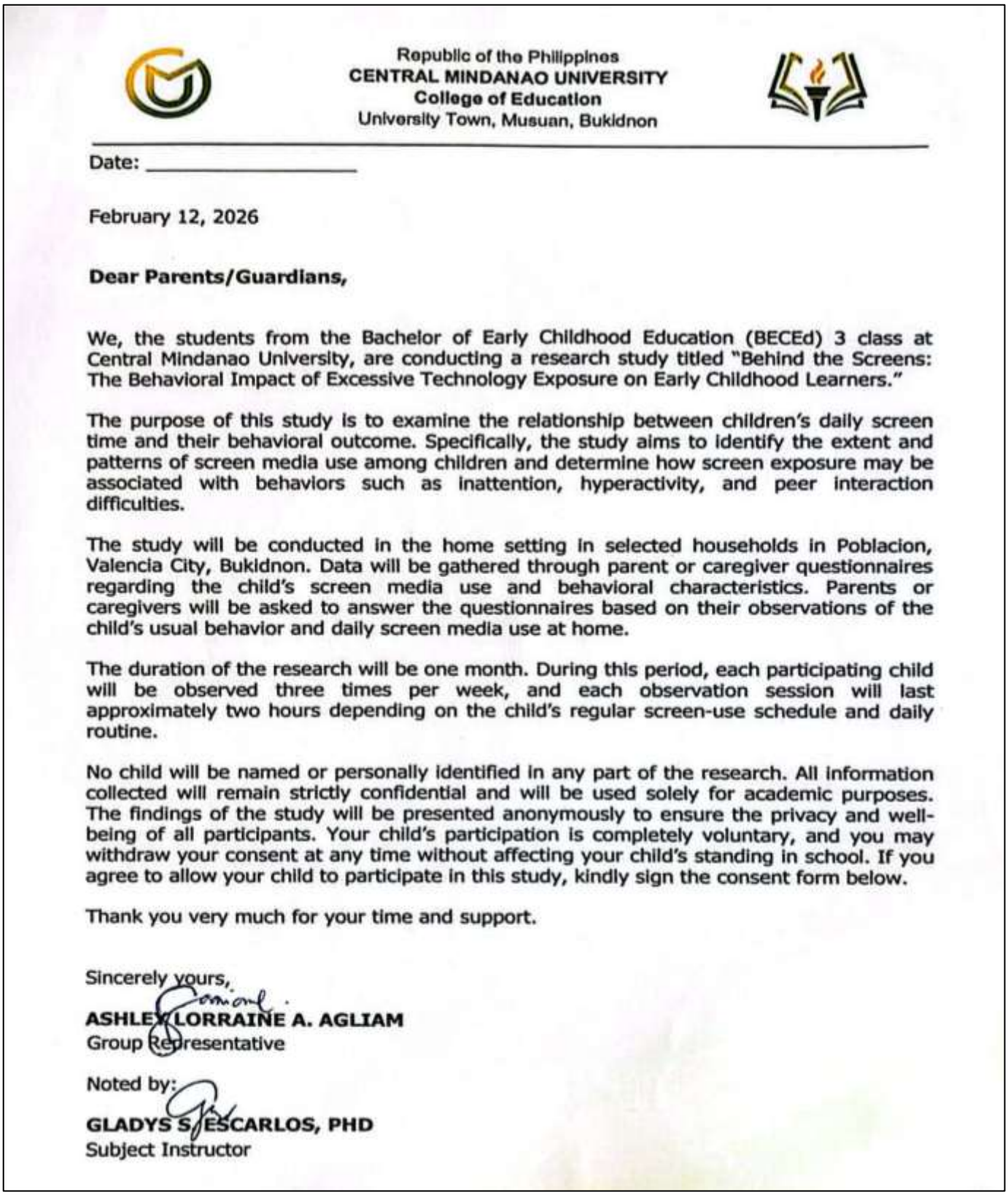
Appendices



Republic of the Philippines
CENTRAL MINDANAO UNIVERSITY
College of Education
University Town, Musuan, Bukidnon

Date: _____

February 12, 2026

Dear Parents/Guardians,

We, the students from the Bachelor of Early Childhood Education (BECEd) 3 class at Central Mindanao University, are conducting a research study titled "Behind the Screens: The Behavioral Impact of Excessive Technology Exposure on Early Childhood Learners."

The purpose of this study is to examine the relationship between children's daily screen time and their behavioral outcome. Specifically, the study aims to identify the extent and patterns of screen media use among children and determine how screen exposure may be associated with behaviors such as inattention, hyperactivity, and peer interaction difficulties.

The study will be conducted in the home setting in selected households in Poblacion, Valencia City, Bukidnon. Data will be gathered through parent or caregiver questionnaires regarding the child's screen media use and behavioral characteristics. Parents or caregivers will be asked to answer the questionnaires based on their observations of the child's usual behavior and daily screen media use at home.

The duration of the research will be one month. During this period, each participating child will be observed three times per week, and each observation session will last approximately two hours depending on the child's regular screen-use schedule and daily routine.

No child will be named or personally identified in any part of the research. All information collected will remain strictly confidential and will be used solely for academic purposes. The findings of the study will be presented anonymously to ensure the privacy and well-being of all participants. Your child's participation is completely voluntary, and you may withdraw your consent at any time without affecting your child's standing in school. If you agree to allow your child to participate in this study, kindly sign the consent form below.

Thank you very much for your time and support.

Sincerely yours,

ASHLEY LORRAINE A. AGLIAM
Group Representative

Noted by:

GLADYS S. ESCARLOS, PHD
Subject Instructor

Formal Letter to the Respondents

Formal Informed Consent

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CONSENT FORM

Dear Parents,

Greetings!

We, the group of Bachelor of Early Childhood Education (BECE) 3 students of Central Mindanao University – College of Education, respectfully ask your permission to allow your child to participate in our study entitled "*The Behavioral Impact of Excessive Technology Exposure Among Early Childhood Learners*" for the course ECED 95.2 – Research in Early Childhood Education 2. The purpose of this research is to examine how screen time and technology use may influence children's behavior, including conduct, attention, social interaction, and prosocial behavior. This activity serves as our final requirement for the said course.

If you agree to participate, you will be asked to answer a set of questionnaires regarding your child's screen time and behavior. In addition, your child will be observed during regular daily activities, particularly during the use of digital devices. These observations will be conducted in your home for approximately two (2) hours per session over a period of ten (10) days.

Please be assured that participation in this study is entirely voluntary. You have the right to refuse participation or withdraw your child at any time without any form of penalty. All information gathered will be treated with strict confidentiality, and your child's identity will remain anonymous. We sincerely hope for your support and cooperation in this endeavor.

Thank you very much for your time and support!

Respectfully yours,

The Researchers
Ashley Lorraine A. Agliam
Abegail B. Baysa
Sheena S. Directo
Khicy Jean G. Escultor
Ivy Grace A. Martinez

Name and Signature of Parents
Blessy Love Joaquino

Date: March 30,2026

STRENGTHS AND DIFFICULTIES QUESTIONNAIRE

(*3-8 years old*)

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of the child's behaviour over the last six months or this school year.

Child's Name:_____ Age:_____ Sex:_____

	Not True	Somewhat True	Certainly True
CONDUCT DIFFICULTIES SCALE			
1. Often has temper tantrums or hot tempers			
2. Generally obedient, usually does what adults request			
3. Often fights with other children or bullies them			
4. Often argumentative with adults			
5. Can be spiteful to others			
HYPERACTIVITY SCALE			
1. Restless, overactive, cannot stay still for long			
2. Constantly fidgeting or squirming			
3. Easily distracted, concentration wanders			
4. Can stop and think things out before acting			
5. Sees tasks through to the end, good attention span			
PEER DIFFICULTIES SCALE			
1. Rather solitary, tends to play alone			
2. Has at least one good friend			
3. Generally liked by other children			
4. Picked on or bullied by other children			
5. Gets on better with adults than with other children			
PROSOCIAL SCALE			
1. Considerate of other people's feelings			
2. Shares readily with other children (treats, toys, pencils etc.)			
3. Helpful if someone is hurt, upset or feeling ill			
4. Kind to younger children			
5. Often volunteers to help others (parents, teachers, other children)			

Parent's Name & Signature :_____ Date:_____

Instruments

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SCREENS QUESTIONNAIRE

(The purpose of the SCREENS questionnaire is to investigate the screen media use and behavior of children)

Child's Name: _____ Age: _____ Sex: _____

1. What is your relationship with the child?

Father
Mother
Other(s): _____

2. How many people live in your household?
_____ persons

ACCESS TO SCREEN MEDIA		
3. Does the child have access to the following devices at home?		
DEVICES	**YES**	**NO**
Smartphone		
Tablet/iPad		
Laptop/Computer		
Television		
Gaming Console		
Other(s)please specify:		

FREQUENCY OF SCREEN USE			
4. How often does the child use the following devices?			
DEVICES	**Never (1)**	**Sometimes (2)**	**Everyday (3)**
Smartphone			
Tablet/iPad			
Laptop/Computer			
Television			
Gaming Console			
Other(s)please specify:			

SCREEN ACTIVITIES			
5. How often does the child use screen media for the following activities?			
ACTIVITY	**Never (1)**	**Sometimes (2)**	**Everyday (3)**
Watching Videos (YouTube, TV shows, movies			
Playing Digital Games			
School-related Activities			
Video calls with family or friends			
SCREEN USE BEHAVIOR			
6. How often does the child use screen media during the following times?			
SITUATION	**Never (1)**	**Sometimes (2)**	**Everyday (3)**
Before going to school			
After school			
Before sleeping at night			
SCREEN USE ENVIRONMENT			
7. When the child uses screen media, how often does this happen?			
BEHAVIOR	**Never (1)**	**Sometimes (2)**	**Everyday (3)**
Uses more than one screen at a time			
Uses screen media alone			
Uses screen media with family members			
SCREEN RULES AT HOME			
8. Please indicate your response to tell following statements			
STATEMENT	**Disagree (1)**	**Not sure (2)**	**Agree (3)**
The child must ask permission before using screen media			
There are limits on the child's screen time			
There are rules on what content the child can watch			

9. Within the past month, how much time has the child typically spent per day on the following screen-based activities during leisure time?						
	Weekdays			**Weekend days**		
	30mins - 1hr	**1hr - 2 hrs**	**More than 2 hrs**	**30mins - 1hr**	**1hr - 2 hrs**	**More than 2 hrs**
Movies, TV shows, YouTube clips and movies, entertainment programs						
Games (on smartphone, tablet, game console, PC)						
School-related tasks using screen media devices						
Video calls (e.g., Facetime, Skype)						
Social media or other types of communication (e.g.Facebook, Messenger, Twitter, WhatsApp, Snapchat, Instagram, Email, SMS)						
Other (for example, drawing programs, making musical or stop-motion videos)						