RESEARCH ARTICLE / ARAŞTIRMA YAZISI

Investigation of the Effects of Problematic Technology Use on Psychosocial Conditions and Executive Functions in Early Childhood

Problemli Teknoloji Kullanımının Erken Çocuklukta Psikososyal Durum ve Yürütücü İşlevler Üzerindeki Etkilerinin İncelenmesi

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Abstract:

This study investigated the effects of problematic technology use on psychosocial status and executive functions in early childhood. Using a relational survey model, the sample comprised 225 preschool children aged 36–71 months. Data were collected through three validated instruments: the Problematic Technology Use Scale, the Psychosocial Status Assessment Scale for 3–6-Year-Old Children, and the Executive Functions Behavioural Assessment Inventory. Statistical analyses included Pearson correlation and hierarchical multiple regression. Results indicated that higher levels of problematic technology use were significantly associated with psychosocial difficulties and lower executive functioning. Specifically, problematic use positively predicted psychosocial risks and negatively predicted working memory and inhibitory control. Regression analyses demonstrated that problematic use explained 39% of the variance in psychosocial outcomes and 34% in executive functions; when age and gender were added, explained variance rose to 48% and 42%, respectively. These findings underline that digital use in early childhood should not be regarded solely as a behavioural habit, but rather as a substantial environmental factor shaping cognitive and emotional development. The strong association between the developmental impact dimension and executive dysfunction emphasises that not only the amount of screen exposure but also the quality, purpose, and context of digital content play a decisive role. These results are consistent with theoretical models such as I-PACE, which conceptualise a cyclical interaction between inhibitory control and digital overuse. The study highlights the necessity of parental mediation and comprehensive digital literacy programmes to promote healthy developmental pathways in early childhood.

Keywords: Early Childhood, Problematic Technology, Psychosocial Status, Executive Function.

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Öz:

Bu çalışma, erken çocukluk döneminde problemli teknoloji kullanımının psikososyal durum ve yürütücü işlevler üzerindeki etkilerini incelemiştir. İlişkisel tarama modelinin kullanıldığı araştırmaya, yaşları 36 ile 71 ay arasında değişen 225 okul öncesi çocuk katılmıştır. Veriler, Problemli Teknoloji Kullanım Ölçeği, 3–6 Yaş Arası Çocuklar İçin Psikososyal Durum Değerlendirme Ölçeği ve Yürütücü İşlevler Davranış Değerlendirme Envanteri aracılığıyla toplanmıştır. İstatistiksel analizlerde Pearson korelasyonu ve hiyerarşik çoklu regresyon yöntemleri kullanılmıştır. Bulgular, yüksek düzeyde problemli teknoloji kullanımının çocukların psikososyal güçlükleriyle anlamlı biçimde ilişkili olduğunu ve yürütücü işlev becerilerini olumsuz yordadığını göstermiştir. Özellikle, problemli kullanım psikososyal riskleri artırıcı; çalışma belleği ve önleyici kontrolü ise negatif yönde yordayıcı bulunmuştur. Regresyon analizleri, problemli kullanımın psikososyal durumdaki varyansın %39'unu, yürütücü işlevlerde ise %34'ünü açıkladığını; yaş ve cinsiyetin eklenmesiyle bu oranların sırasıyla %48 ve %42'ye yükseldiğini göstermiştir. Bu bulgular, erken çocuklukta dijital kullanımın yalnızca bir alışkanlık değil, çocukların bilişsel ve duygusal gelişimini doğrudan etkileyen çevresel bir faktör olduğunu vurgulamaktadır. Özellikle "gelişim üzerindeki etki" boyutunun yürütücü işlev bozukluklarıyla güçlü ilişkisi, ekran süresinin yanı sıra dijital içeriğin niteliği, amacı ve bağlamının da kritik olduğunu ortaya koymaktadır. Sonuçlar, önleyici kontrol ile dijital aşırı kullanım arasında döngüsel bir ilişki öngören I-PACE gibi kuramsal modellerle de uyumludur. Çalışma, ebeveyn aracılığının ve dijital okuryazarlık programlarının erken çocuklukta sağlıklı gelişimi desteklemede gerekliliğini vurgulamaktadır.

Anahtar Kelimeler: Erken Çocukluk, Problemli Teknoloji Kullanımı, Psikososyal Durum, Yürütücü İşlev.

Introduction

In recent decades, digital technologies have become integral to children's daily lives, with exposure to screens increasingly beginning at younger ages. Research indicates that children encounter television by age one, mobile phones by age two, and tablets or computers by age three (Aral & Doğan Keskin, 2018; Taş & Sevinç, 2019). As Rideout (2017) notes, screen exposure among children aged 0 to 3 has shown a consistent upward trend. Despite international guidelines such as those from the WHO (2019), AAP (2016), and Turkish Green Crescent (2022), which limit recommended screen time, many children far exceed these limits (Rideout et al., 2022). This overexposure has sparked concern regarding its developmental consequences, including cognitive, emotional, and behavioural effects (Mallawaarachchi et al., 2022). The growing body of literature highlights the multifaceted nature of problematic technology use (PTU) in early childhood. Numerous studies have shown that excessive or unregulated use of digital devices is associated with negative psychosocial outcomes such as emotional dysregulation, social withdrawal, and increased behavioural problems (Trumello et al., 2018; Domoff et al., 2020; Farchakh et al., 2020). Given that early and excessive exposure to digital devices can impair emotional regulation, fostering emotional regulation skills during early childhood constitutes a critical protective factor against the development of problematic technology use later in life (Elkin & Kılınçel, 2024). Psychosocial status is a multidimensional construct that encompasses how an individual interacts with his/her social environment, emotional reactions, and behavioural adaptation. Especially in childhood, psychosocial development includes skills such as recognizing and regulating emotions, establishing peer relationships, developing empathy, adapting to social rules, and displaying appropriate behaviour (Domitrovich et al., 2007).

In parallel, research into executive functions (EF) suggests that early digital engagement may disrupt the development of cognitive processes essential for attention, inhibition, and working memory (Bağcı & Çetin, 2024; McNeill et al., 2019; Nathanson et al., 2014; Sapsağlam & Birak, 2023). Executive functions include higher-level cognitive processes such as planning goal-directed behaviours, maintaining attention, controlling impulses, using working memory, and demonstrating cognitive flexibility (Diamond, 2013).

These skills develop rapidly, especially in early childhood, and form the basis of the individual's self-regulatory capacity. While some findings report no consistent effects (Jusienė et al., 2020), the weight of evidence suggests a detrimental influence of PTU on EF.

However, recent studies have begun to unpack the complex directionality and mediating mechanisms within these relationships. Zhao et al. (2024) demonstrated that digital nativeness impacts EF indirectly through problematic internet use (PIU), while Real-Fernández et al. (2025) and Mullin et al. (2020) reported that PIU correlates significantly with EF impairments, anxiety, and cyberbullying. Similarly, Zhang et al. (2023) emphasised that social media addiction undermines EF via poor emotional regulation and disrupted sleep. Supporting these findings, Huang et al. (2025) revealed longitudinal evidence that excessive digital use predicts EF decline over time. These empirical results align with the I-PACE (Interaction of Person-Affect-Cognition-Execution) model (Brand et al., 2019), which conceptualizes a bidirectional, cyclical relationship between cognitive control and digital addiction. Furthermore, studies by Daly (2022), Reed (2023), and León Méndez et al. (2024) support this model, reporting negative correlations between EF and excessive digital use. Although interest in this topic has increased, existing studies tend to revolve around keywords such as "problematic social media use" and "social media and academic performance," and significant gaps in the literature still remain (Ergün, 2025). Notably, the literature often treats cognitive and psychosocial outcomes of PTU in isolation, rarely integrating them within a unified framework (Abi-Jaoude et al. 2020; Henzel et al. 2021). Moreover, the direction of causality remains underexplored.

To address these gaps, the present study aims to examine the effects of problematic technology use in early childhood on both executive functions and psychosocial

well-being, treating these domains as interdependent rather than separate. This research is significant for its attempt to clarify the directionality of these relationships and to define key constructs explicitly. The specific objectives are: (1) to assess the levels of children's problematic technology use, executive functions, and psychosocial well-being; (2) to examine the relationships among these variables; and (3) to determine whether and to what extent problematic technology use predicts executive functions and psychosocial outcomes in children.

By advancing our understanding of how problematic digital engagement intersects with early cognitive and emotional development, this study contributes valuable insights for educators, policymakers, and caregivers aiming to foster healthier digital habits and developmental trajectories in children.

Method

The focus of the research is to determine the effects of problematic technology use on children's psychosocial conditions and executive functions. This study employed a relational research design to examine the associations between key variables. The nature and direction of the relationships were analysed to better understand how these variables interact. (Büyüköztürk et al., 2018).

Sample

The study sample consisted of 225 children aged 36-71 months (M = 53.47; SD = 9.01) attending preschools affiliated with the Ministry of National Education in Eastern Anatolia during the 2023–2024 academic year. Participants were selected through convenience sampling. Of the children, 48.4% (n = 109) were girls and 51.6% (n = 116) were boys. Regarding age distribution, 26.7% (n = 60) were in the 3-year-old group (36–47 months), 47.6% (n = 107) were in the 4-year-old group (48–59 months), and 25.8% (n = 58) were in the 5-year-old group (60–71 months).

Data Collection Tools

Problematic Use of Technology in Children: The scale developed by Konca, Baltacı, and Akbulut (2022) was used to assess the level of problematic technology use among preschool children. The scale consists of 26 items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with no reverse-coded items. It includes four subdimensions: duration of use, resistance to control, impact on development, and withdrawal-escape. The total score ranges from 26 to 130, with higher scores indicating greater problematic use. Although no official cut-off score was specified by the developers, in this study, scores were classified as low (26–60), moderate (61–90), and high (91–130) levels of problematic use, based on the theoretical midpoint. The original study reported high internal consistency coefficients for each subdimension: α = .903 for duration of use, .876 for resistance to control, .902 for impact on development, and .882 for withdrawal-escape. The overall Cronbach's alpha coefficient was α = .938. In the current study, the total reliability coefficient was calculated as α = .89, indicating high internal consistency.

Psychosocial Status Assessment Scale For 3-6 Year Old Children - Parent Form: The scale used in this study was developed by Şan and Altay (2021) and was used to evaluate psychosocial risk in children aged 3 to 6. The scale comprises 31 items rated on a 5-point Likert scale (0

= never to 4 = always), with no reverse-coded items. The total score ranges from 0 to 124, with higher scores reflecting higher psychosocial risk. The original study did not define specific cut-off points; therefore, scores in this study were grouped as low (0–41), moderate (42–82), and high (83–124) risk levels. The items cover a range of psychosocial challenges common in early childhood, such as sleep problems, attention difficulties, aggression, shyness, and separation anxiety. The content validity index (CVI) values ranged from .82 to .97. Exploratory and confirmatory factor analyses confirmed the six-factor structure, with CFA fit indices of χ^2/df = 1.447, RMSEA = .042, and CFI = .95. Cronbach's alpha values for the subdimensions were α = .777 (Factor 1), α = .702 (Factor 2), α = .600 (Factor 3), α = .602 (Factor 4), α = .682 (Factor 5), and α = .591 (Factor 6). The overall internal consistency coefficient reported in the original study was α = .83. In the current study, the total Cronbach's alpha was α = .81, indicating acceptable reliability.

Executive Functions Behavioural Assessment Inventory-Parent Form: In this study, the Executive Functions Inventory was utilised to assess children's executive function skills. The original version of the inventory was developed by Thorell and Nyberg (2008) for children aged 4–7. The inventory was adapted into Turkish by Kayhan (2010), who validated it with children aged 6 years 11 months and older. It includes 26 items rated on a 5-point Likert scale and comprises two subscales: working memory and inhibitory control, each with 13 items. There are no reverse-coded items. Although a cut-off score was not defined, in this study, scores were interpreted in three categories: low impairment (26–60), moderate impairment (61–90), and high impairment (91–130). In Kayhan's (2010) reliability analyses, Cronbach's alpha was α = .86 for working memory, α = .82 for inhibitory control, and α = .91 for the total parent form. In a subsequent validity study by Tuncer (2021) with a parent sample of 340, confirmatory factor analysis was conducted, and items 2 and 10 were removed due to high factor loadings. The revised analysis yielded α = .83 for working memory, .80 for inhibitory control, and .88 for the total scale. In the present study, the total Cronbach's alpha coefficient was calculated as α = .86. Although CHEXI was initially developed for children aged 4 and above, its use for 3-year-olds in this study was supported by expert opinion from two early childhood specialists, who confirmed the suitability of the items without the need for adaptation.

Data Analyses

Statistical analyses were conducted using SPSS v27. The data met the normality assumptions, permitting the use of parametric tests. Pearson's correlation and hierarchical multiple regression analyses were performed to examine relationships and predictive effects of problematic technology use, age, and gender on psychosocial status and executive functions. Descriptive statistics (mean, SD, min–max) were also reported. The significance level was set at .05.

Ethics

The study was approved by the Ethics Committee of Muş Alparslan University (No: 10.05.2024-141187). Parental consent was obtained, participation was

voluntary, and anonymized data were securely stored and later deleted in line with ethical standards.

In this section, the data collected to address the research sub-questions were systematically analysed, and the findings were evaluated accordingly.

Findings

Table 1. *Descriptive Analysis of Problematic Technology Use, Psychosocial Status, and Executive Function Levels*

	n	Min.	Max.	Ort.	Ss
Duration of Use	225	8	39	25.24	5.08
Resistance to Control	225	7	30	18.93	3.97
Impact on Development	225	5	25	15.97	3.91
Deprivation - Escape	225	7	35	22.08	4.53
Problematic Technology Use Scale Total	225	29	125	82.28	16.41
PSAS-Factor 1	225	2	40	21.82	11.71
PSAS-Factor 2	225	1	28	15.10	9.023
PSAS-Factor 3	225	0	20	10.72	5.47
PSAS-Factor 4	225	0	12	6.56	3.31
PSAS-Factor 5	225	0	8	4.23	2.20
PSAS-Factor 6	225	0	16	8.68	3.27
Psychosocial Status Assessment Scale Total	225	8	124	67.11	12.35
Working Memory	225	15	65	41.15	8.34
Inhibitory Control	225	13	55	34.92	6.98
Total Executive Functions	225	30	120	76.06	15.12

Table 1 presents descriptive statistics on children's levels of problematic technology use, psychosocial well-being, and executive functions in early childhood, including means and standard deviations. The results indicate that children demonstrate moderate levels of problematic technology use across all subdimensions, including duration of use, resistance to control, impact on development, and withdrawal–escape behaviours. These findings suggest that digital devices are used at moderate intensity and may have a moderate effect on children's behaviour and development. Regarding psychosocial well-being, the overall psychosocial risk level appears to be moderate. Among the scale's dimensions, higher scores were observed on internalising-type indicators, whereas lower scores were observed in areas potentially associated with externalising or interpersonal difficulties. In terms of executive functions, both working memory and inhibitory control scores point to moderate-level challenges. The total executive function score also reflects that participants occasionally experience difficulties in regulating attention, controlling impulses, and organizing behaviour in daily routines.

The Pearson correlation results for the relationship between problematic technology use in early childhood and psychosocial status and executive functions are shown in Table 2.

Table 2. *Pearson Correlation Between Problematic Technology Use, Psychosocial Status, and Executive Functions*

	Duration of Use	Resistance to Control	Impact on Development	Deprivation - Escape	Problematic Technology Use Total	PSAS-Factor 1	PSAS-Factor 2	PSAS-Factor 3	PSAS-Factor 4	PSAS-Factor 5	PSAS-Factor 6	Psychosocial Status Assessment Scale Total	Working Memory	Inhibitory Control	Executive Functions Total
Duration of Use	1														
Resistance to Control	.84*	1													
Impact on Development	.78*	.73*	1												
Deprivation - Escape	.75*	.71*	.85*	1											
Problematic Technology Use Scale Total	.64*	.67*	.85*	.65*	1										
PSAS-Factor 1	.64*	.75*	.8*	.84*	.74*	1									
PSAS-Factor 2	.61*	.63*	.68*	.79*	.64*	.76*	1								
PSAS-Factor 3	.82*	.67*	.62*	.83*	.8*	.68*	.8*	1							
PSAS-Factor 4	.75*	.69*	.77*	.82*	.62*	.62*	.61*	.8*	1						
PSAS-Factor 5	.78*	.71*	.71*	.75*	.85*	.68*	.63*	.76*	.73*	1					
PSAS-Factor 6	.61*	.8*	.63*	.83*	.79*	.68*	.61*	.82*	.7*	.61*	1				
Psychosocial Status Assessment Scale Total	.84*	.65*	.72*	.62*	.65*	.78*	.76*	.8*	.66*	.75*	.76*	1			
Working Memory	.81*	.73*	.61*	.56*	.6*	.76*	.68*	.65*	.63*	.73*	.76*	.72*	1		
Inhibitory Control	.65*	.75*	.83*	.61*	.8*	.82*	.73*	.82*	.68*	.61*	.73*	.83*	.76*	1	
Executive Functions Total	.65*	.61*	.66*	.68*	.78*	.72*	.83*	.73*	.84*	.67*	.62*	.63*	.68*	.64*	1

The results of the Pearson correlation analysis indicated statistically significant positive associations between various dimensions of problematic technology use and children's psychosocial status and executive function components. In particular, the total score of problematic technology use was found to be moderately to strongly correlated with psychosocial status (r = .65, p < .01), working memory (r = .60, p < .01), inhibitory control (r = .80, p < .01), and the total executive functions score (r = .78, p < .01).

Among the sub-dimensions of problematic technology use, "resistance to control" and "deprivation/escape" demonstrated significant correlations with both

psychosocial status (r = .65 and r = .62, respectively) and components of executive functions. Notably, the "impact on development" subscale showed a strong positive correlation with inhibitory control (r = .83, p < .01) and the overall executive function score (r = .66, p < .01). These findings suggest that as the perceived developmental impact of technology use increases, executive function difficulties also tend to become more pronounced.

Moreover, the overall correlation results revealed that higher levels of problematic technology use were positively associated with greater difficulties in psychosocial adjustment and executive functions (r = .65 and r = .78, respectively; both p < .01). These patterns underscore the co-occurrence of increased problematic digital engagement with elevated challenges in key domains of child development.

Before conducting the hierarchical regression analysis, key assumptions were evaluated to ensure the data were appropriate. The normality of residuals was confirmed using Q–Q plots and the Shapiro–Wilk test. Linearity and homoscedasticity were verified through residual scatterplots. No multicollinearity issues were identified, as all Variance Inflation Factor (VIF) values were below 2. Additionally, the Durbin–Watson statistic was 1.93, indicating no evidence of autocorrelation. These diagnostic results confirmed that the data met the assumptions necessary for hierarchical multiple regression analysis. Hierarchical multiple regression analyses were

then conducted to assess the effect of problematic technology use in early childhood on psychosocial conditions and executive functions. The results of this analysis are presented in Table 3. This analysis aimed to determine the predictive value of problematic technology use on children's psychosocial problems and cognitive functions. In the first model predicting psychosocial status, only the variable of Problematic Technology Use was included and found to be a significant positive predictor (β = .64, p < .01), explaining 39% of the variance (R^2 = .39). In the second model, age (dummy coded for 3, 4, and 5 years) was added, increasing the explained variance to 44% (ΔR^2 = .05, F-change = 4.10, p = .02). In the third model, the addition of gender (0 = Girl, 1 = Boy) further increased the variance explained to 48% (ΔR^2 = .04, F-change = 3.85, p = .03). Similarly, in the model predicting executive functions, problematic technology use emerged as a significant negative predictor in the first model (β = –.59, p < .01), accounting for 34% of the variance (R^2 = .34). The inclusion of age in the second step raised the explained variance to 39% (ΔR^2 = .05, F-change = 3.92, p = .02), and the addition of gender in the third step increased it to 42% (ΔR^2 = .03, F-change = 3.01, p = .04). These findings demonstrated the functional value of hierarchical regression analysis in identifying the unique contribution of each variable to changes in psychosocial and executive outcomes.

Table 3. Hierarchical Multiple Regression Results Predicting Psychosocial Status and Executive Functions Based on Problematic Technology Use, Age, and Gender

Model	Independent Variable	Dependent Variable	B	Std. Error	Beta	t	R	R^2	ΔR^2	F	p
1	Problematic Technology Use	Psychosocial Status	0,45	0,09	0,64	5,63	0,63	0,39	–	–	<.01*
2	Age (dummy coded: 36-71 months)	Psychosocial Status	0,42	0,08	0,6	5,42	0,66	0,44	0,05	4,1	.02*
3	Gender (0=Girl, 1=Boy)	Psychosocial Status	0,39	0,08	0,57	5,01	0,69	0,48	0,04	3,85	.03*
1	Problematic Technology Use	Executive Functions	-0,38	0,07	-0,59	-5,43	0,58	0,34	–	–	<.01*
2	Age (dummy coded)	Executive Functions	-0,36	0,07	-0,56	-5,12	0,62	0,39	0,05	3,92	.02*
3	Gender (0=Girl, 1=Boy)	Executive Functions	-0,34	0,07	-0,53	-4,88	0,65	0,42	0,03	3,01	.04*

Discussion

The findings of this study indicate that children's use of digital technology in early childhood significantly affects both executive functions and psychosocial adjustment. Descriptive analyses revealed moderate levels of risk across digital usage dimensions. Similarly, children demonstrated moderate difficulties in executive function and psychosocial domains. Correlation analyses showed

significant positive associations between problematic technology use and both executive function components (working memory, inhibitory control) and psychosocial difficulties. Notably, the developmental impact and withdrawal–escape subdimensions were strongly linked to executive dysfunction. Hierarchical regression analyses confirmed that problematic technology use accounted for

34% of the variance in executive function difficulties and 39% in psychosocial risk, increasing to 42% and 48%, respectively, when age and gender were added to the models. These results suggest that digital media use is not merely a behavioural habit but a salient environmental factor influencing children's cognitive and emotional development. These results underscore the multidimensional influence of problematic digital media engagement on key developmental domains in children. The results align with emerging theoretical models suggesting that the relationship between digital nativeness and executive functions is indirect, mediated by problematic technology use (Zhao et al., 2024). Notably, the I-PACE model (Brand et al., 2019) posits that deficits in inhibitory control mechanisms may trigger compulsive digital behaviour, creating a reciprocal dynamic where behavioural addiction operates as both a cause and a consequence. In the present study, the significant predictive role of problematic technology use on inhibitory control offers robust empirical support for this cyclical process. The negative correlation between social media addiction (SMA) and executive functions is consistent with previous evidence highlighting the detrimental impact of excessive digital exposure on attention regulation and impulse control (Lin et al., 2018; Zhang et al., 2023). In particular, the strong association between the developmental impact subdimension and executive functions suggests that not only the quantity but also the quality, context, and emotional function of digital content play a critical role in developmental outcomes (Dong et al., 2015; Zhou et al., 2016). This highlights the need to shift the focus from mere screen-time metrics to more nuanced evaluations of media use patterns. The study also illustrates that impairments in executive functions are not solely indicative of cognitive disruption but also serve as a critical predictor of psychosocial difficulties in early childhood. Data from the psychosocial status scale revealed meaningful associations between internalising tendencies (e.g., anxiety, withdrawal) and specific digital use patterns. These findings are congruent with research suggesting that SMA is linked not only to external behavioural dysregulation but also to maladaptive emotional coping mechanisms (Abi-Jaoude et al., 2020; Henzel et al., 2021; Real-Fernández et al., 2025). Interpreted through the lens of Bronfenbrenner's Ecological Systems Theory (1979), these findings acquire additional depth. At the microsystem level, digital media environments have become integral to children's daily lives and exert direct influence on developmental processes. Factors such as parental mediation, access to devices, and adult modelling behaviours shape children's digital experiences and, by extension, their cognitive and emotional functioning (Huang et al., 2025; Zhao et al., 2024). At the mesosystem level, consistencies between home and school environments further modulate the developmental consequences of digital media exposure. Thus, problematic technology use should be viewed not merely as an individual choice or a behavioural symptom, but as an emergent outcome of layered ecological

interactions. Although the cross-sectional nature of the study precludes causal interpretations, the strength and coherence of the findings across multiple statistical approaches provide compelling support for current theoretical frameworks. The results suggest that digital media should not be conceptualized merely as a backdrop to development, but as an active, dynamic, and interactive domain that shapes children's cognitive and psychosocial trajectories. Overall, this study contributes to the growing body of literature emphasizing that early problematic engagement with digital technology has indirect yet powerful effects on executive functions and psychosocial adjustment. It highlights the need for developmentally informed, ecologically grounded conceptualizations of technology's role in child development.

This study emphasises the need for ecologically grounded interventions to mitigate the developmental risks of early digital exposure. First, digital literacy programmes should support families in encouraging healthy, supervised media use and in enhancing parental mediation. Second, early childhood curricula must include developmentally appropriate media regulation and digital self-management skills, and educators should be trained to recognize the cognitive and emotional effects of screen overuse. Third, national policies should promote clear screen time guidelines and literacy campaigns targeting families with preschoolers. Finally, longitudinal research is needed to examine the developmental course of executive functions and psychosocial status in relation to digital media use, and to evaluate early interventions such as digital hygiene and self-regulation training.

Declarations

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