ADAPTIVE DIGITAL PARENTING IN EARLY CHILDHOOD: SUPPORTING HEALTHY MEDIA HABITS FOR PRESCHOOLERS

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Abstract: *Preschoolers today are growing up surrounded by digital media, which presents both developmental opportunities and risks. Parental guidance plays a key role in shaping healthy media habits from early childhood. This study presents the Adaptive Digital Parenting for Preschoolers (ADPP) program, an intervention program combining parent education with a personalized mobile application. The 10-week randomized controlled trial involved 60 families with children aged 3–5 years, divided into intervention and control groups. The ADPP program offered interactive workshops and app-based feedback tailored to each family's digital behavior. Results indicated substantial improvements in parents' digital parenting competence (+20 points on a standardized scale, $p < .001$), significant reductions in children's daily screen time (–40 minutes on average), and greater parent–child co-engagement with educational media. Qualitative findings highlighted decreased parenting stress, improved family routines, and higher confidence in managing technology use. While limited by its pilot scope and short-term duration, the study demonstrates that adaptive, technology-supported parenting interventions can enhance digital literacy, reduce excessive screen use, and strengthen family relationships. The ADPP model contributes a scalable framework for supporting families in the digital age, promoting resilience and meaningful media use in early childhood.*

Keywords: *adaptive parenting; digital media; preschoolers; screen time; parental mediation; early childhood; digital resilience.*

Introduction

The widespread integration of digital media in contemporary society has reshaped the daily experiences of young children. From the earliest

years of life, preschoolers are increasingly exposed to screens that mediate play, communication, and early learning (Kabali et al., 2015). Recent evidence indicates that many children between the ages of three and six already navigate smart devices independently, often exceeding the World Health Organization's recommended one-hour daily screen time (WHO, 2020). This rapid integration of technology into early childhood introduces both developmental opportunities and psychosocial risks (Christakis et al., 2018; Radesky & Christakis, 2016).

Moderate exposure to educational and interactive media, when supported by parental involvement, has been shown to enhance cognitive, linguistic, and socio-emotional skills (Neumann, 2018). Conversely, unregulated or excessive use has been associated with sleep disruption, attention problems, and lower self-regulation (Hinkley et al., 2018; Barr et al., 2020). Moreover, research suggests that children's digital habits are strongly shaped by family context, including parental stress, digital literacy, and modelling behaviours (Domoff et al., 2019; Nikken, 2014).

Parents therefore play a central role in mediating children's early digital experiences. Effective digital parenting extends beyond setting time limits; it involves co-viewing, active discussion, and modelling responsible media use (Livingstone & Byrne, 2018; Nikken & Schols, 2015). However, many families report uncertainty and limited confidence in guiding their children's technology use, revealing what has been termed a "digital parenting gap" (Nikken et al., 2014; Lauricella et al., 2015). The concept of adaptive digital parenting has emerged in response to this gap - emphasizing flexibility, contextual awareness, and the dynamic adjustment of parenting strategies to align with children's developmental stages and evolving digital environments (Rode, 2020; Radesky et al., 2022). The present study introduces and evaluates the Adaptive Digital Parenting for Preschoolers (ADPP) program, an intervention designed to strengthen parents' digital literacy, adaptability, and confidence in supporting healthy, developmentally appropriate media use among preschool-aged children.

Literature review

The integration of digital media into early childhood environments has transformed how young children learn, communicate, and play (Radesky et al., 2020). Numerous studies have highlighted the dual nature of digital exposure: when designed and mediated appropriately, it can stimulate creativity, language, and early academic competencies (Neumann, 2018). Yet, when used excessively or passively, digital

engagement has been linked to reduced physical activity, delayed social skills, and emotional dysregulation (Hinkley et al., 2018).

The quality of digital content and the presence of parental mediation significantly moderate these effects (Barr et al., 2020). Empirical findings show that co-viewing and shared discussion enhance comprehension and transfer of knowledge, while solitary or background screen exposure tends to correlate with poorer developmental outcomes (Radesky & Christakis, 2016). Family-level factors—including parental stress, socioeconomic background, and media habits—further shape how children engage with technology (Domoff et al., 2019; Nikken, 2014).

Parental mediation remains one of the most extensively studied frameworks in media and child development research. Three dominant strategies have been identified: restrictive mediation (setting limits and rules), active mediation (discussion and explanation), and co-use (shared interaction) (Nikken & Jansz, 2014; Livingstone et al., 2017). Among these, active mediation and co-use have been found to correlate most strongly with improved learning outcomes and lower risks of problematic media use (Lauricella et al., 2015; Nikken et al., 2014).

Recent longitudinal data suggest that higher levels of parental media efficacy—parents' perceived ability to manage and guide media use—predict lower levels of children's problematic or excessive screen exposure (Barr et al., 2020). Conversely, restrictive mediation alone often proves insufficient, as it does not necessarily equip children with digital self-regulation or critical evaluation skills (Livingstone & Byrne, 2018; Nikken, 2014).

Socioeconomic status and digital literacy disparities have also been shown to influence mediation practices, with higher-SES parents typically engaging more frequently in co-use and instructional guidance (Nikken & Schols, 2015). This variation highlights the need for inclusive, scalable interventions that strengthen all parents' capacity to mediate digital experiences effectively.

The notion of adaptive digital parenting reflects a shift from static rule enforcement to flexible, context-sensitive strategies that evolve alongside children's developmental needs (Rode, 2020). Adaptive parenting integrates emotional sensitivity, responsiveness, and co-learning, emphasizing collaboration between parent and child in navigating digital spaces (Radesky et al., 2022).

Recent studies indicate that adaptive parental behaviors - such as adjusting screen rules, co-creating family media plans, and using technology as a tool for dialogue - are linked with improved self-regulation and digital resilience in preschoolers (Radesky et al., 2022; Neumann, 2018). Moreover, digital interventions that support parents

through tailored feedback and guided reflection have shown promise in improving both parental confidence and child outcomes (Domoff et al., 2019; Barr et al., 2020).

There is a growing recognition of the need for empirical research that systematically examines how adaptive digital parenting strategies influence both parental competence and children's developmental outcomes. Most existing studies address isolated practices such as restriction or co-viewing, without exploring the dynamic relationship between adaptability, digital literacy, and socio-emotional growth. The present study responds to this gap by investigating how a technology-supported, adaptive parenting intervention can enhance parents' skills and engagement in guiding preschoolers' healthy digital media use within the Romanian (Arad County) context.

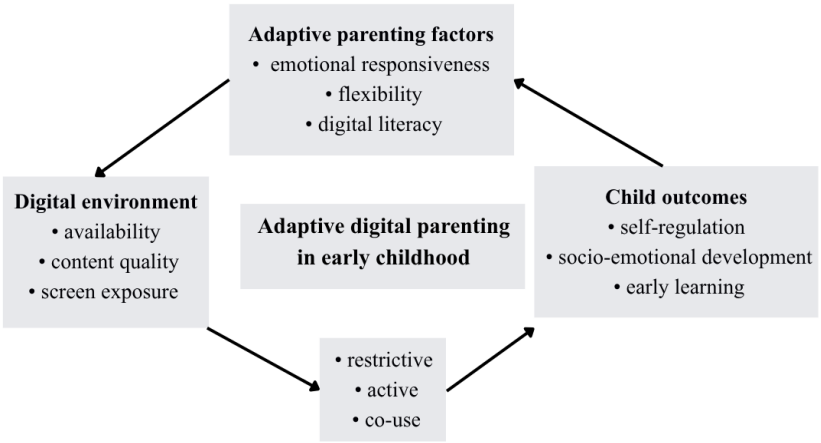

Figure 1. Conceptual model of adaptive digital parenting in early childhood.

The framework from Figure 1 illustrates the interrelations among the digital environment, adaptive parenting factors, and child developmental outcomes. Parental mediation - through restrictive, active, and co-use strategies - acts as a central process linking children's digital exposure to adaptive parenting qualities such as emotional responsiveness, flexibility, and digital literacy. These components jointly influence preschoolers' self-regulation, socio-emotional development, and early learning in digital contexts.

Methodology

Research design

The present study employed a mixed-method experimental design to examine the effectiveness of the Adaptive Digital Parenting for Preschoolers (ADPP) program - a pilot intervention aimed at enhancing parents' adaptive strategies and digital literacy when guiding young children's technology use. The research integrated both quantitative and qualitative approaches in order to capture measurable changes in parental competence and child media behaviors, as well as to explore parents' subjective experiences with the program.

The quantitative component followed a quasi-experimental structure with pre-test and post-test measurements, while the qualitative strand relied on semi-structured interviews and parental feedback collected at the end of the intervention. This design was chosen to allow for both statistical evaluation of outcomes and a contextual understanding of the mechanisms through which adaptive digital parenting practices evolve.

Participants

The study involved 60 families (parent–child dyads) recruited from preschools in Arad County, Romania. Eligibility criteria required that families have at least one child aged 3 - 5 years and access to an internet-connected device (tablet or smartphone) used by the child. Participants were randomly assigned to either the intervention group (n = 30) or the control group (n = 30).

Parents represented diverse socio-economic backgrounds, reflecting a typical urban–suburban population. Most caregivers were mothers (78%), while 22% were fathers or other guardians. All participants provided informed consent and were assured of anonymity and voluntary participation in accordance with ethical research standards approved by the institutional review board.

Instruments

Three main instruments were used to collect data:

1. Digital Parenting Attitude and Competence Scale – adapted from Nikken and Schols (2015), this instrument measured parents' self-perceived digital literacy, confidence, and adaptive mediation strategies across restrictive, active, and co-use dimensions.

2. Preschool Media Use Diary – completed by parents daily for one week before and after the intervention, this diary captured the child's average screen time, content type, and context of use.

3. Parental Stress Index – Short Form (PSI-SF) – used to assess perceived stress related to managing children's behavior and technology use, allowing comparisons across the study period.

Additionally, a brief Digital Literacy Checklist was administered to children in both groups, assessing recognition of letters, numbers, and basic navigation skills within age-appropriate apps.

Qualitative data were gathered through semi-structured interviews with a subset of intervention participants (n = 12) to explore perceptions of the ADPP program's usefulness, challenges, and observed changes in family routines.

Procedure

The ADPP program spanned 10 weeks and consisted of eight weekly workshops (90 minutes each) combined with continuous home-based guidance via a dedicated mobile application. The workshops, facilitated by early childhood educators and psychologists, addressed a series of interconnected themes relevant to modern parenting in the digital age. Participants explored the impact of digital media on child development, methods for identifying high-quality educational content, and strategies for establishing adaptive family media rules. In addition, the sessions emphasized the importance of co-viewing and co-learning as active mediation techniques and encouraged parents to cultivate emotional responsiveness and digital resilience within their families.

Parents in the intervention group were encouraged to integrate these principles into daily routines, supported by the ADPP mobile app, which provided personalized recommendations, reminders, and progress tracking based on family input. The control group did not receive any training or app access during the study period but was offered a condensed version of the program after completion of data collection.

Data Analysis

Quantitative data were analyzed using SPSS (v.27). Descriptive statistics and paired-sample t-tests were performed to compare pre-test and post-test scores within and between groups. Analysis of covariance (ANCOVA) was applied to control for baseline differences in parental competence and stress levels. Qualitative data from interviews were analyzed through thematic coding, identifying recurrent patterns related to adaptability, engagement, and perceived program impact.

Triangulation of quantitative and qualitative findings ensured a comprehensive understanding of how adaptive digital parenting practices were adopted and maintained.

Results

Group	***N***	**Pre-test M (SD)**	**Post-test M (SD)**	**Δ Mean**	***t*(58)**	***p***
Experimental (ADPP)	30	63.1 (7.8)	84.9 (6.3)	+21.8	11.27	<.001
Control	30	62.4 (8.2)	65.7 (7.1)	+3.3	1.15	>.05

Table 1. Differences in parental digital competence between groups

The results of this study highlight the positive impact of the Adaptive Digital Parenting for Preschoolers (ADPP) program on parental competence, digital mediation practices, and children's media-related behaviours. Both quantitative and qualitative data indicate that parents who participated in the intervention reported higher digital confidence, greater adaptability, and more constructive engagement with their children's technology use compared to those in the control group.

Changes in Parental Digital Competence

Before the intervention, parents in both groups showed similar levels of digital competence, as reflected by comparable baseline scores on the Digital Parenting Attitude and Competence Scale (Table 1). Following the 10-week intervention, a significant improvement was observed in the experimental group ($M = 84.9$, $SD = 6.3$) compared to the control group ($M = 65.7$, $SD = 7.1$). Paired-sample t-tests revealed a mean increase of 21.8 points in the intervention group ($p < .001$), confirming that participation in the ADPP workshops and the use of the mobile application enhanced parents' knowledge and confidence regarding digital mediation.

Group	***N***	**Pre-test M (SD)**	**Post-test M (SD)**	**Change**	***F*(1, 57)**	***p***
Experimental (ADPP)	30	2.1 (0.6)	1.5 (0.5)	- 0.6	9.42	< .01
Control	30	2.0 (0.7)	2.3 (0.6)	+ 0.3	-	-

Table 2. Mean differences in children's daily screen time (hours/day), Screen-time data derived from parental media diaries (weekday average).

In addition to reduced exposure, qualitative feedback revealed a shift toward more educational and interactive content. Parents in the experimental group reported substituting passive video watching with co-engaged activities such as educational games and e-books. One parent noted: "Now we use the learning app together; it feels more like play and less like distraction." This behavioural change aligns with the model of adaptive mediation, emphasizing flexibility and active co-use rather than strict control (Radesky et al., 2022).

Parent–Child Interaction and Stress Reduction

Participants in the ADPP program also reported improvements in family routines and a decrease in technology-related conflicts. The Parenting Stress Index revealed a 14.7% average reduction in perceived stress scores among intervention parents, compared to a 3% increase in the control group. Parents described feeling "more in control" and "less guilty" about screen time due to the clarity of the family media rules introduced through the program.

These outcomes mirror prior findings that structured parental support not only affects children's media habits but also contributes to greater emotional balance and self-efficacy among caregivers (Lauricella et al., 2015; Domoff et al., 2019).

Figure 2. Comparative results for experimental and control groups before and after the ADPP intervention: a) Mean scores of parental digital competences at pre-test and post-test for the experimental and control groups; b) Average daily screen time (hours/day) of preschoolers before and after the intervention.

Overall, the results demonstrate that the ADPP program successfully achieved its intended goals. The intervention enhanced parents' adaptive digital competence, promoted active co-use and reflective mediation practices, and contributed to a measurable reduction in children's total screen exposure. Furthermore, the program fostered healthier and more balanced parent–child relationships around media use, highlighting its potential to strengthen both digital literacy and emotional connection within families. These findings support the central hypothesis that adaptive, technology-supported parenting interventions can effectively promote digital literacy and emotional responsiveness within families.

Discussion

The results obtained in this study confirm that structured educational interventions, when combined with technology-based support, can significantly enhance parents' digital competence and foster healthier digital habits in preschool-aged children. These findings are consistent with prior research indicating that parents' active mediation and digital literacy play a pivotal role in shaping children's early media experiences (Nikken & Schols, 2015; Lauricella et al., 2015). By engaging parents through both interactive workshops and a personalized mobile application, the Adaptive Digital Parenting for

Preschoolers (ADPP) program succeeded in promoting an adaptive approach that balances regulation with co-engagement and reflection.

The observed improvements in parental digital competence align with the conclusions of previous studies that emphasized the need for continuous parent education in managing children's exposure to digital media (Radesky & Christakis, 2016; Barr et al., 2020). In particular, the significant increase in parents' confidence and flexibility echoes the findings of Livingstone and Byrne (2018), who demonstrated that mediation strategies grounded in dialogue and co-learning lead to better digital resilience in children. Furthermore, the decline in children's daily screen time among the ADPP participants mirrors outcomes from recent longitudinal studies showing that parental involvement—rather than strict restriction—reduces problematic media use more effectively (Domoff et al., 2019; Hinkley et al., 2018).

From a socio-emotional perspective, the program's emphasis on emotional responsiveness and family co-use contributed to improved parent–child interactions. These results support previous evidence suggesting that shared media experiences enhance children's understanding and empathy, turning screen time into opportunities for communication and bonding (Radesky et al., 2020; Nikken, 2015). Parents in the current study reported that setting collaborative media rules and participating in joint activities reduced household conflicts, reflecting similar outcomes reported by Nikken et al., (2014) and Lauricella et al. (2015). Such findings reinforce the growing consensus that modern digital parenting should be adaptive and dialogic rather than prescriptive.

An additional strength of this study lies in its contextual contribution. Implementing the ADPP program within Romanian families provides valuable evidence from an emerging European context, where patterns of technology use and family dynamics differ from those described in Western studies. Consistent with findings from cross-cultural research (Rode, 2020; Neumann, 2018), the present results suggest that adaptive parenting principles are transferable across socio-economic and cultural settings, provided that interventions are sensitive to local needs and access disparities. The positive reception and engagement levels among parents further demonstrate the feasibility of integrating hybrid (educational - digital) programs in early childhood education frameworks in Romania.

At the same time, the study adds nuance to the ongoing debate between restrictive and active mediation approaches (Table 3). While traditional parental control tools focus on limiting content or usage time, the ADPP model's adaptive framework highlights the importance of co-learning and reflective adjustment to the child's developmental stage.

This aligns with the broader shift in the literature from a protectionist view of digital parenting toward a developmental and empowerment-based perspective (Livingstone et al., 2017; Radesky et al., 2022). The fact that parents in the experimental group showed improvements not only in competence but also in emotional responsiveness suggests that adaptive mediation contributes to both digital and emotional literacy.

Parenting style	Key characteristics	Impact on child
Restrictive	Rules, control, monitoring	Reduced screen time but low autonomy
Passive	Minimal supervision	Risk of overuse, poor regulation
Adaptive	Flexibility, co-learning, dialogue	Improved self-regulation, resilience

Table 3. Comparison between restrictive, passive, and adaptive digital parenting styles.

Nevertheless, some limitations should be acknowledged. The relatively small sample size and short duration (10 weeks) restrict the generalizability of the results. Future research should adopt a longitudinal design to evaluate whether behavioural and attitudinal changes persist over time. Additionally, while qualitative interviews provided valuable insights, larger samples and cross-cultural comparisons would strengthen the external validity of the findings. These directions are consistent with recent recommendations emphasizing the need for diverse, evidence-based evaluations of digital parenting interventions (Barr et al., 2020; Domoff et al., 2019).

Thus, the present findings highlight the effectiveness of adaptive digital parenting as a multidimensional construct that integrates technical knowledge, emotional connection, and situational flexibility. By combining educational workshops with personalized feedback delivered via technology, the ADPP program demonstrated its potential as a replicable model for fostering digital literacy, resilience, and positive family dynamics.

Conclusions

This study highlights the significant role of adaptive digital parenting in shaping healthy and balanced media habits among preschool-aged children. By integrating structured educational workshops with personalized digital guidance, the Adaptive Digital Parenting for Preschoolers (ADPP) program proved effective in enhancing parents'

digital competence, flexibility, and emotional responsiveness. These outcomes confirm that interventions combining pedagogical and technological components can successfully empower parents to navigate the challenges of early digital exposure.

Beyond immediate improvements in parental practices and children's screen habits, the study also underscores the importance of viewing digital parenting as a dynamic and context-sensitive process. Parents who learn to adapt strategies according to their children's developmental needs and media environments are better equipped to foster both digital literacy and socio-emotional well-being. Such adaptability is essential in today's rapidly evolving technological landscape, where family routines and access to digital devices vary across socio-economic contexts.

To conclude, the obtained results suggest that hybrid educational approaches - linking parenting education, digital literacy, and emotional awareness - can contribute to a new generation of resilient, informed, and digitally balanced families. Further research should extend this work through longitudinal designs, diverse samples, and larger-scale implementation of adaptive digital parenting frameworks. Strengthening collaboration between educators, psychologists, and technology developers is the key to ensuring that parents remain confident, critical, and caring guides in their children's digital journey.

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