

Unintended Media Exposure and Children's Cognitive Development: Parental Perspectives from Bangladesh Using UNESCO's MODEL Framework

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Abstract

In Bangladesh, early childhood is being increasingly shaped by unintended exposure to media, but little is known about how such exposure influences children's cognitive and socio-emotional development from the parents' perspective. This study examines the impact of unintended screen exposure on the early cognitive development of children. Using a qualitative design, semi-structured interviews were conducted with parents of 20 children aged 4-6. Data was analyzed through thematic analysis informed by the UNESCO MODEL framework, allowing parental interpretations to be linked with cognitive, executive, and socio-emotional development domains. The findings included several benefits, like children picking up new words, recognizing letters, and beginning to count through songs, rhymes, and simple learning apps. On the other hand, parents also expressed concerns. These were shorter attention spans, sleep disruptions, and imitation of aggressive behaviors seen on screens. Longer or unsupervised exposure causes harm to their self-regulation and socio-emotional growth. The study highlights the need to adapt the MODEL framework for Bangladesh, emphasizing culturally relevant content, parental guidance, and routines that support healthy media habits.

Keywords: early childhood development, UNESCO, media effects, Bangladesh, children

Introduction

Media's presence in children's lives is ubiquitous (Schwarzer et al., 2022). As screens become ever-present in human lives, children and teenagers are spending more time playing digital games and browsing on the internet

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(Kim et al., 2025). Modern technology, alongside traditional media, has transformed the way children learn and interact with their environment (Schwarzer et al., 2022). Television is the most dominant media that affects children's consumption habits, and is now joined by the internet, computers, video game players, smartphones, and other connected devices (Zimmerman & Christakis, 2005). That is why children today are completely immersed in media experiences from a very young age.

In Bangladesh, the increasing popularity of televisions, smartphones, and internet platforms has changed how children spend their leisure time and socialize with their surroundings (Mojid, 2025). They are mostly found utilizing media for entertainment and early educational content purposes. Children between the ages of three and six are characterized by rapid cognitive, emotional, and linguistic growth, and they are now spending significant portions of their day exposed to digital screens (Bustamante et al., 2023).

The UNESCO Measuring Early Learning Quality and Outcomes (MELQO) initiative provides an integrated framework called MODEL (Measure of Development and Early Learning) (UNESCO et al., 2017). It emphasizes measuring children's development across executive function, social-emotional development, and pre-academic skills in low and middle-income countries. Using MODEL as a lens can help structure understanding of which cognitive and emotional outcomes are most vulnerable, how parents interpret screen effects, and what protective or moderating factors (such as content quality or parental mediation) may mitigate harm.

Although ages 4 to 6 are crucial for language, executive, and socio-emotional development, media effects research places much emphasis on educational programming (Clements & Sarama, 2007), parental mediation (Cios et al., 2023), or screen time duration (Yamamoto et al., 2023). Bangladesh-based studies also frame screen use as a parenting practice, not developmental impact; therefore, this research will attempt to address that gap. This study addresses the aspect of the unintended effects of media exposure on children between the ages of 4 and 6. In the present research, unintended effects mean the influences that happen during non-intentional exposure, as opposed to planned educational exposure. It may include passive viewing, the presence of TV during meals, or the use of mobile phones before sleep. According to previous research, unintended exposure has been known to affect the cognition process, such as

attention, emotion, or learning ability, which later deviates from the original intention of the caregiver (Mallawaarachchi et al., 2024; Ponti, 2023).

Although a vast body of research exists regarding the intentional usage of educational materials through media. But there is a significant gap in research regarding unintended usage and parents' interpretations of developmental impacts thereof in low and middle-income nations like Bangladesh (Kundu, 2024; Nazme, 2024). The current research aims to fill this gap using MODEL.

Unintended Media Effects on Children

The American Academy of Pediatrics (AAP) asserts that children pick up new behaviors by watching, copying, and assimilating media programs (AAP, 2001). Parents, teachers, and medical experts have all become more aware of the impact that the media has on children. As new and more advanced forms of media have been introduced and made accessible to the public, the effect of media on children has gradually grown (Vossen et al., 2014). Children now have easier access to media due to its increased availability.

Early learning readiness, educational enrichment, social problem viewing or debate opportunities, exposure to the arts through music and performance, and amusement are all positive outcomes. Educational programming, offered primarily on public television stations, was the next milestone in television's early influences (Haddon and Silverstone, 2000). In the larger discussion of media influence on children, educational programming is without question the source of the most significant and long-lasting positive effects (Clements & Sarama, 2007). Harmful effects may result from sensitization of violent behavior, exposure to aggressive content, presentation of poor health habits as desirable practices, and exposure to persuasive content.

Child's Social Cognitive Development

Based on the theory of cognitive development by Piaget, the current research constructs early learning as a dynamic, constructive procedure that depends on children's interactions with their surroundings (Piaget, 1964). The concept of cognitive disequilibrium by Piaget, which fits well in explaining unintended media influence, discusses how exposure to fast-paced digital content, as well as its semiotic nature, can influence

children's mechanisms of assimilation and accommodation of new information. The more screen time children in the modern era have, the more exploration time with physical surroundings, play, and social interaction with peers' children have less of. Rather than presenting Piaget as a developmental chronology, this study employs his framework to interpret how mediated environments interact with children's cognitive processes in early childhood.

UNESCO's Measure of Development and Early Learning (MODEL)

The United Nations declared Sustainable Development Goals (SDGs) in 2015, which included early childhood education as a global agenda SDG Target 4.2. By 2030, all girls and boys will have access to quality early childhood development, care, and pre-primary education so that they are ready for primary education (UNESCO et al., 2017, p. 7). Accordingly, it is understood that early childhood education needs more attention, including in Bangladesh as a UN member.

This study focuses more on pre-primary education, which has educational characteristics, namely children's interaction that can increase the use of language and social skills, development of logic, and speaking through the thinking process. The MODEL module in MELQO (Measuring Early Learning Quality and Outcomes) examines the development of children's skills, including their early literacy skills, early mathematical skills, social-emotional development, and executive function.

Early literacy skills

This is a basic skill for children to read, write, and use language, and other abilities that support it. Phonological awareness in children can be developed with the help of rhymes and songs (UNESCO et al., 2017, p.43). MELQO prioritizes four constructs to observe early literacy skills, which are:

1. Alphabetical skills include the knowledge of letters and their sounds (phonemes).
2. Phonological awareness develops gradually from the word level, the syllable level, rhymes, to the phoneme level.
3. Expressive words refer to words that a child can say.
4. Listening skill refers to the ability to read and understand an instruction (UNESCO et al., 2017, pp. 43–44).

Early Mathematical Skills

This skill refers to basic math skills in early childhood, which gives a useful tool for children in understanding their surroundings (UNESCO et al., 2017). In early childhood education, this concept relates to numbers and their operationalization, geometry, including the concept of space and measurement. The model module has six constructs to observe these basic math skills, which are: (UNESCO et al., 2017, pp. 40–42):

1. Verbal counting refers to the knowledge of mentioning numbers and their order.
2. The knowledge of the order of numbers is not the same as the knowledge of quantity.
3. Early children often encounter a small scale of “addition”.
4. Early childhood encounters a number in his daily life in clocks, house numbers, prices, phone numbers, and others. Children will have to learn to remember the number and its lexical form (number in word).
5. The development of spatial language varies in each culture, and children have a significant understanding of spatial relations that becomes the basis of language proficiency.
6. Measurement activity can help children to create a simple framework of thinking in problem-solving. Even before a child can use a specific measuring word (e.g., “I am taller”).

Socio-Emotional Development

Social-emotional development is a learning process about what is good socially and culturally (UNESCO et al., 2017, p. 37). Critical competencies include:

1. Understand basic emotions, like happy, sad, angry, and express those emotions, including the trigger, causes, and the consequences.
2. To recognize the complexity of emotion
3. To differentiate the rules of standard and complex expression of emotion (e.g., shame and guilt).

Self-regulation is also important, referring to the ability that enables control over emotional reactions to contribute positively towards social engagement. An important point is that socio-emotional development occurs through face-to-face interaction. Some literature points to the fact

that overexposure in passive screen-based activities can curtail practice in face-to-face skills, hence impeding the ability of children in recognizing or interpreting emotional markers (Madigan et al., 2023).

Executive Function

Executive function is “a set of highly interconnected cognitive abilities that play an essential role in learning and achieving educational success, including working memory, inhibition, and cognitive flexibility” (UNESCO et al., 2017, p. 35). Working memory helps children retain and manipulate information temporarily to learn academics successfully. Inhibitory control helps children inhibit inappropriate responses and persist with attention to the task (UNESCO et al., 2017, p. 35). Passive viewing could interfere with more actively engaging with learning activities related to executive function during critical developmental stages (Zhang et al., 2021).

Literature Review

Studies in the field of cognitive and early learning domains require a cautious approach. Several longitudinal and systematic review studies report that early cognitive development is influenced by both the amount and quality of screen usage (Zimmerman & Christakis, 2005; Zhang et al., 2021). The impact of media exposure was studied on preschoolers by Zhang et al. (2021). He found that excess screentime results in weaker memory performance among children. According to research, unsupervised screen usage and overtime lead to poor social connections (Children & Screens, 2023). In a separate study, Mallawaarachchi et al. (2024) argued that background television and passive viewing were negatively associated with cognitive outcomes. But co-use with a caregiver, or parents, was linked to positive effects among children.

Nowadays, screen time replaces the interactive play and shared attention that promote self-regulation and executive skills like working memory, inhibitory control, and cognitive flexibility (Zhang et al., 2021). A UNESCO report stated that the daily social and cognitive activities that improve concentration, memory, and impulse control are being decreased by this replacement (UNESCO et al., 2017). An observational study was conducted by Zhang, where preschoolers were the focus. The study revealed that those who were exposed to screens more often build up worse working memory and attentional control, according to observational research (Zhang et al., 2021). Further studies were conducted with

experimental and quasi-experimental methods in this field. Children who spend most of their time passively watching screens show less improvement on tasks requiring sustained attention than their peers who engage in interactive activities (Madigan et al., 2020). Different studies have found that passive or unaccompanied media use reduces children's capacity to learn language and symbols (Karakaya, 2018). To investigate this phenomenon, Brushe et al. (2024) conducted a study using natural recordings of children's everyday contexts. The study revealed that every additional minute of screen time is associated with fewer adult words and conversational turns. This phenomenon results in a loss of language input over time (Brushe et al., 2024). According to longitudinal studies, children who spend more time on screens early in life typically do worse on early reading and numeracy assessments later in life (Yamamoto et al., 2023).

Previous studies also found that children's social and emotional development is associated with their exposure to screen time. Face-to-face communication in the real world helps children in learning empathy, recognizing emotions, and developing prosocial behavior (UNESCO et al., 2017). Madigan et al. (2023) found an association between higher screen exposure and lower social-emotional skills. The study revealed that high screen-exposed children were also found with a rise in behavioral problems. According to other research, children who use electronic media more often have lower levels of prosocial behavior (Xu et al., 2023). These findings are partially explained by poor parent-child relations and their lack of practice of emotion control (Xu et al., 2023).

In Bangladesh, studies on children's cognitive development and media exposure are still limited. Islam (2023) studied rural area mothers and their practice of parenting. The study argues that parents use television and mobile phones to keep their children busy, and this has resulted in improvements in early childhood development (Islam, 2023). But one major limitation of this study is that the investigations are mostly done focusing on caregivers or parents, not the children or their specific developmental outcomes. A recent study by Kundu (2024) from Bangladesh has reported reasons behind children's speech delays. The findings of the study revealed that high levels of screen use among children for a longer period have a negative impact on a child's language development (Kundu, 2024). Yet, there remains a lack of rigorous, model-based research that examines how a child's cognitive, executive, and

social-emotional outcomes are influenced by media content and context (Kundu, 2024; Nazme, 2024).

By reviewing the past literature, two distinct modes of the impact that media has upon a child's development have been recognized. The first is the effect that takes place through substitution, in that screen use displaces highly interactive modes of development, such as playing, talking, and exploring. These aid in the development of language, executive skills, and socio-emotional skills (Zhang et al., 2021; Brushe et al., 2024). Secondly, content-specific effects come from direct interaction of children with media. Imitations of behavior, learning new words, or adapting emotional expressions shown by what they watch reveal that media effects are not founded upon mere exposure. Consequently, studies must be founded upon social-cultural conditions existing within Bangladesh to comprehend the impact of unintended media exposure affecting the development of children.

Study Objectives

This study investigates how the everyday presence of screens in Bangladeshi households quietly shapes the development of children aged 4 to 6 years. Many young children are not deliberately given devices, yet they still absorb visual and auditory media from televisions, phones, tablets, and online games running around them. Guided by the UNESCO MELQO model, the research will examine how this unintended exposure relates to children's early literacy and numeracy, executive abilities such as remembering, impulse control, and shifting attention, as well as social-emotional indicators like empathy and prosocial behavior. Thus, this study is important to understand the media and its influence on Alpha-generation children. This study tries to answer: How are unintended media effects impacting children's cognitive development and early learning?

Methodology

This study used a qualitative method to understand how unintended media exposure shapes early cognitive, social-emotional, and pre-academic development among Bangladeshi children between four and six years old. This methodology is acknowledged by UNESCO's Measure of Development and Early Learning (MODEL) framework. It highlights the value of direct assessment reports from parents or teachers (UNESCO et al., 2017).

Participants of the study

A total of 20 parents with children between the ages of 4 and 6 years (mean child age: 5.1 years), with 12 boys and 8 girls, participated in this study. The sample was adequate since it managed to attain saturation, and no materially different groups emerged in follow-up interviews (Guest et al., 2012). In qualitative studies, saturation can be expected in a somewhat similar group in about 12-20 interviews (Guest et al., 2012).

This study's attention is placed solely on parents and guardians of children between four and six years old, as they are best positioned to describe children's everyday routines and the context in which media is used at home. A purposive sampling strategy was adopted to select children who regularly spend at least five hours a day on digital or televised media. This criterion was chosen to ensure that participants had enough exposure, allowing parents to comment meaningfully on its developmental impact.

Data Collection

Semi-structured interviews were carried out with the parents in the Bangla language either personally or through telephonic conversations as per their availability. The interview lasted for 30 to 45 minutes and consisted of semi-structured questions revolving around the children's daily media usage, learning habits, emotional expression, and home environment. The interview questions were designed to encourage the participants to provide specific instances of the observed developments.

Based on UNESCO's Measure of Development and Early Learning (MODEL), this research collected data on the cognitive development of children in the early literacy skills, early numeracy skills, executive functions, and socio-emotional skills, using indicators such as language use, basic numeracy skills, attentional control, emotional regulation, and interaction with peers. Parents discussed changes they noticed in areas including early reading and numeracy, social interaction, emotional expression, and executive functioning. The parental accounts were further enriched by focusing on the indicators of education, media use, caregiving, and routines that define the family environments.

Data analysis procedure

Data were analyzed employing the six-step model of Braun and Clarke (2006) for Reflexive Thematic Analysis. In the first step, the transcripts of the interviews were perused several times to become familiar with the data. Second, initial codes were generated inductively from the data, focusing on observable behaviors related to literacy, numeracy, executive function, and socio-emotional regulation. The codes were grouped to form preliminary themes in the third step of the model. In the fourth step of the model, the themes were evaluated for consistency against the complete set of data. In the final step of the model, the themes remained categorized and named to suit the MODEL constructs. Finally, the quotes were picked for the purpose of illustrating the pattern of the results that emerged from the model.

To improve rigor in analysis, themes were established through comparison of interviews rather than singular instances. Results had to be consistent in more than one household to be retained as themes; conflicting examples were used for further interpretation.

Results

The thematic analysis brought forward four central themes that reflect how parents make sense of unintended media exposure to their children's early development. These elaborate on both the benefits and the concerns expressed by parents of children aged four to six. Themes are mapped to parent reports of cognitive skills in early literacy and numeracy, executive functions (attention and impulse control), and socio-emotional development (emotional regulation and interaction with peers), as outlined in the MODEL framework (UNESCO et al., 2017). To ground parental interpretations empirically, the analysis draws on verbatim examples from interviews that illustrate how unintended media exposure manifests in children's everyday cognitive and emotional behaviors.

Stimulated Interest in Language and Early Literacy

One of the recurring cases in the interviews was the development of expressive vocabulary and phonological awareness skills in children through frequent exposure to animations and songs in media, despite the limited use of English at home. Findings of the interviews revealed that regular exposure to media content on television or the internet, including

cartoons, songs, etc., encourages vocabulary development and early reading practices. For example, the mother of a five-year-old girl from a bilingual family in which Bengali was the dominant language explained that her daughter began using words like “triangle,” “behind,” and “danger” without being taught beforehand at home. The mother was later able to identify that it was from watching cartoon programs regularly on television. Another mother mentioned that her child copied song pronunciations and occasionally corrected her English. Parents also linked screen exposure with phonological awareness as children repeated rhymes, sang alphabet songs, and recognized familiar letter sounds. As one father commented, his son had learned the alphabet and basic phonics “before even starting school because the videos repeat things so much.” These examples reflect the way in which expressive vocabulary, which is an important literacy skill in the early stages (UNESCO et al., 2017), can sometimes be picked up accidentally through frequent exposure to media. However, not all experiences were positive. Some parents worried that children showed more excitement for digital letters than for printed materials. One parent commented that her son “only wants the moving images.” This made it difficult to maintain interest in books. This tension reflects a pattern that digital media can support vocabulary and early literacy. Additionally, it reduces engagement with traditional learning tools.

However, these literacy skills were not uniformly distributed across homes. Specifically, parents with higher educational backgrounds and more involved co-viewing practices reported language use that was more meaningful in content, while children who were left to media exposure in isolation evidenced passive repetition more so than communicative application. Therefore, unintended media effects on early literacy appear to be the result of family interaction rather than exposure in and of themselves.

Incidental Awareness of Numeracy

Many parents mentioned that listening to musical numbers or watching animated entertainment on YouTube helped their children recognize numbers. One mother described how her daughter learned to count to twenty without any official instruction at home. A parent recounted his son’s game, in which collecting five stars taught him that “if he only gets three, he needs two more.” Despite these increases, several

parents believed the learning was superficial. As one parent described, “He can say the numbers but cannot count real things unless the screen shows it.”

Heightened Emotional Reactivity and Diminished Self-Regulation

In many cases, parents revealed behavioral changes in relation to screen exposure in children. Some of these include changes in children’s regulation of emotions and social interactions. In an interview, one of the mothers said that her son would “cry loudly or throw things” when his mother took away his phone. This was not something that happened before he became accustomed to screen exposure. Parents also noticed that some children imitated the emotional or aggressive behavior displayed in animated shows. A few reported that superhero content encouraged rough play, such as pushing cousins while declaring themselves “powerful.” Another issue that was introduced during the interview was children’s less social interaction. One parent stated that his child prefers watching television with his friends rather than playing in the field with them. But not all the consequences were concerning. By contrast, a more limited group talked about how calm and slow-paced content, with a focus on nursery rhymes, assisted children with managing distress. The presence of variation here means that emotion regulation was more dependent on content characteristics than on screen exposure.

Reduced Attention Span and Growing Impulsivity

One common case reported by the parents was the contrast between the attention involved in screen-based attention and engagement in offline tasks. During interviews, most of the parents expressed tensions about their children’s short attention span and uncontrolled behavior. Parents frequently observed that children who spent a lot of time in front of a computer had trouble focusing on everyday tasks like eating and reading. One parent noticed that while her child had no problem viewing videos for lengthy periods of time, she was unable to sit with a book for even five minutes. Reports of impulsiveness were also common. A few parents reported that their children would frequently touch or swipe displays out of frustration when the content took a long time to load. Others noted that children frequently repeated “wait” and kept watching even when it was time for meals or school, indicating that they had trouble with transitions.

Discussion

The findings from this study align with what earlier research has shown about children and media effects. Much like other studies, this study found that media exposure could be helpful in some situations but also problematic when it became excessive or unstructured. Findings came across a similar pattern: passive viewing seemed to do little for children's cognitive growth. Yet when children used screens for activities that involved some form of learning, such as alphabet apps, animated stories, and simple educational games, parents described small improvements in letter recognition and number recall. This, again, aligns with Zhenya et al.'s (2024) observation when learning-focused activities replaced passive TV use.

Previously, Zhang et al. (2021) stated that educational content can support early academic skills. Our findings did not contradict that; if anything, they added a local example. Several children who used Bangla alphabet apps or counting games appeared to pick up basic literacy and numeracy a little faster than peers who mostly watched music videos or random YouTube content. And a large Bangladeshi household dataset by Islam (2023) reported that when mothers engaged with television, newspapers, or the internet, children were more likely to score "on track" in literacy-numeracy and socio-emotional domains. That broader pattern seems consistent with what we heard from parents: media itself is not the issue; the type and purpose matter.

This study added a few novel observations from Bangladesh's context. The findings from the interview argued that, in many rural areas, children watch cartoons during meals or late at night before sleeping. This mirrors Kundu et al.'s (2024) findings that a large share of young Bangladeshi children spend three to five hours daily on screens. The results also showed notable speech and social-engagement concerns: almost half of the children in our sample had delayed or regressive speech, and around one-third showed limited social interaction. In the previous studies, Kundu et al. (2024) suggested that delayed speech problems may be more common than previously thought. These arguments are quite similar to the findings of this study. Yet the picture is not entirely negative. The findings revealed that when children used digital storybooks, Bangla cartoons, or interactive rhymes, their vocabulary improved. A few parents described the same surprise when toddlers casually repeated words heard from internet videos. This suggests that

even non-targeted exposure may offer bilingual input that families might not otherwise access.

Executive function difficulties were particularly visible from this study's findings. These include shorter attention spans, trouble shifting from screens to daily routines, aggressive behavior, and low tolerance. These findings support the recommendations that Zhenya et al. (2024) suggested in their study. According to their study, children's daily routines should be assessed, including sleep, play, learning, and screen use, considered together rather than separately. In homes where parents limited screen use even slightly, children seemed calmer and more focused during play, according to parental descriptions.

Socio-emotional development in Bangladesh also carries a cultural dimension, and the MODEL framework must acknowledge. Many families live in shared or multi-generational households, and media is rarely a solitary activity by design. The study found that when parents or siblings watched with the child, sometimes pausing to explain a story or discuss what happened, children appeared to understand emotions better and engaged more with others. That observation lines up with work showing that parental mediation can significantly improve developmental outcomes.

Together, the results point to a middle ground. Screens are clearly shaping children's everyday learning in Bangladesh, but not in a single, predictable direction. What they watch, how long they stay with it, and whether an adult joins them make a noticeable difference. Many benefits noted by Islam (2023) appeared in our study as well, particularly for language development. But the concerns raised by Zhenya et al. (2024) were also evident. In the context of Bangladesh, the research provides a novel glimpse into how unintended exposures are incorporated into the daily habits of the family to be entertained in their mealtimes and late-night activities through the usage of mobile phones. Contrary to previous research efforts aimed at quantifying exposure to screens, the present effort recognizes the parental recognition of nuances in behavior to enrich the MODEL theory through its application.

Conclusion

This study shows a combined portrayal of how Bangladeshi children encounter screens in their daily lives. Some parents described small but noticeable gains in early literacy and numeracy when children watched

educational videos or when an adult sat with them. This echoes the kinds of positive effects noted by Cios et al. (2023) and Zhenya et al. (2024). But the same families also spoke about speech delays, irritability, and trouble settling down at night when screen use was long, unsupervised. This is very much in line with the concerns raised by Ponti (2023). One pattern that stood out in our context was the heavy use of mobile phones during meals and before sleep, which seemed to unsettle children's routines more than the content itself. If the UNESCO MODEL framework is to work here, it needs to reflect these everyday realities. For example, by supporting the development of Bengali language learning materials and encouraging families to set simple, workable media plans that match their own habits. With these adjustments, policymakers and teachers can draw on the helpful sides of digital media while reducing the downsides.

Limitations and Scope for Future Studies

There are some limitations to the findings of this research. The study relied on reports of parents about the children, which can cause bias. In addition, the population was relatively small, with an urban bias, which results in the generalizability of the research being limited (Madigan et al., 2023). As a cross-sectional study, this captures the views of the current moment rather than those over developmental levels. Thus, the causalities between exposure to media use and development cannot be established. The study may be affected by unobserved variables like parental stress, lack of playtime, etc. Longitudinal studies with repeated developmental assessments would allow stronger conclusions.

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