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# The Relationship Between Screen Time Duration and Attention Ability in Early Childhood

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## Abstract

*This study aimed to investigate the relationship between screen time duration and attention and concentration abilities in early childhood. As digital device usage becomes increasingly prevalent among young children, concerns regarding its impact on cognitive development, particularly attentional control, have grown. Employing a quantitative correlational research design, this study involved 35 early childhood participants at Handayani Kindergarten, Makassar City, selected through purposive sampling. Data were collected using two primary instruments: a parent-reported screen time questionnaire to measure digital media exposure, and a direct classroom observation sheet to assess children's attention and concentration abilities during learning activities. The collected data were analyzed using Spearman Rank correlation. The findings revealed a statistically significant negative relationship between screen time duration and attention abilities, with a significance value of 0.045 (<0.05) and a correlation coefficient of -0.341. This indicates a low negative correlation, demonstrating that higher screen time duration is associated with lower attention and concentration abilities among young children. Consequently, excessive passive exposure to rapid digital stimulation may hinder sustained focus in non-digital learning environments. The study concludes that appropriate screen time management is crucial. It highlights the importance of active parental supervision, limiting excessive gadget use, and fostering collaborative efforts between parents and teachers to promote balanced developmental activities, such as active play and direct social interaction, to support optimal cognitive development and learning readiness.*

**Keywords**: screen time; attention ability; concentration; early childhood; gadget use

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## INTRODUCTION

The rapid development of digital technology has significantly transformed children's daily lives, including those of early childhood learners. Digital devices such as smartphones, tablets, televisions, and computers are now commonly used by young children for entertainment, communication, and educational purposes. The increasing accessibility of gadgets has contributed to greater exposure to digital media among children at increasingly younger ages. Consequently, concerns regarding the impact of screen time on children's development have become an important issue in the fields of education, psychology, and child development.

Screen time refers to the amount of time individuals spend using screen-based digital devices, including smartphones, tablets, televisions, and computers In early childhood, screen exposure has become increasingly common because digital devices are widely available within family environments. Many parents use gadgets as educational tools, entertainment media, or behavioral management strategies. Although digital technology may provide certain educational benefits, excessive and uncontrolled screen exposure during early childhood may negatively affect developmental outcomes.

Early childhood is a critical developmental stage characterized by rapid brain growth and cognitive development. During this period, children require active interaction with their environment, social communication, physical activity, and direct learning experiences to support optimal development. (Piaget, 1964) emphasized that children actively construct knowledge through exploration and interaction with their surroundings. According to cognitive development theory, learning occurs when children engage directly with objects, people, and experiences in meaningful contexts. Therefore, excessive passive exposure to digital devices may reduce opportunities for active exploration and experiential learning.

Similarly, (Vygotsky, 1978) highlighted the importance of social interaction in cognitive development. Children develop cognitive abilities through communication and collaborative interaction with adults and peers. Meaningful social engagement supports language development, self-regulation, and problem-solving skills. Excessive screen exposure without adequate social interaction may limit opportunities for children to develop these important cognitive and social abilities. The increasing use of gadgets among young children has become a global concern. The World Health Organization (WHO, 2020) recommends limiting sedentary screen time for children under five years old to support healthy development. Likewise, the American Academy of Pediatrics (American Academy of Pediatrics, 2020) recommends that parents monitor children's screen use, provide age-appropriate content, and encourage balanced activities involving physical play and direct interaction. These recommendations reflect growing awareness regarding the potential developmental risks associated with excessive screen exposure during early childhood.

One developmental aspect frequently associated with screen time is attention and concentration ability. Attention refers to the ability to selectively focus cognitive resources on specific stimuli or tasks, whereas concentration refers to the ability to maintain attention over time. Attention and concentration are fundamental components of learning readiness because they influence children's ability to follow instructions, complete tasks, engage in classroom activities, and

regulate behavior. Children with strong attentional abilities tend to participate more effectively in learning activities and demonstrate better academic readiness.

Attention abilities develop progressively during early childhood. Preschool-aged children gradually learn to focus on relevant stimuli while ignoring distractions within their environment. However, excessive digital stimulation may interfere with this developmental process. Digital media often provide rapid visual and auditory stimulation that may condition children to expect immediate entertainment and constant sensory input. As a result, children may experience difficulties maintaining sustained attention during non-digital learning activities such as listening to instructions, completing classroom tasks, or participating in group discussions. Several studies have reported negative associations between excessive screen time and children's cognitive development. (Madigan et al., 2019) found that prolonged screen exposure among preschool children was associated with developmental difficulties in communication, problem-solving, and attention domains. The researchers suggested that increased screen time may reduce opportunities for direct interaction and exploratory learning experiences that are essential for cognitive growth.

Recent studies in Indonesia have also examined the relationship between gadget use and attention-related outcomes among young children. (Hamdan et al., 2025) found a significant relationship between screen time duration and the risk of attention deficit hyperactivity disorder among children aged 3–6 years. Similarly, (Indah Ika Maya Ningtyas et al., 2024) reported a significant relationship between gadget use and the potential for attention deficit hyperactivity disorder among preschool children. These findings provide further evidence that the duration and intensity of digital media exposure are important factors to consider in relation to children's attentional development.

Similarly, (Radesky et al., 2015) explained that excessive mobile media use may interfere with children's self-regulation and attentional control. Children exposed to rapid digital stimulation may become more easily distracted and less capable of sustaining focus during learning activities. In addition, (Domingues-Montanari, 2017)reported that excessive screen exposure may contribute to psychological and behavioral difficulties, including problems related to attention and concentration. Furthermore, (McArthur et al., 2022) found that excessive screen exposure was related to behavioral and attentional difficulties among young children, particularly when gadget use occurred without parental supervision.

Despite increasing evidence regarding the negative impact of excessive screen time, some studies have reported mixed findings. Educational digital content accompanied by parental guidance may provide certain cognitive and educational benefits for children. Interactive educational applications may support language development, literacy skills, and creativity when used appropriately. Therefore, the influence of screen time on children's development may depend on several factors, including duration of use, content quality, parental supervision, and the balance between digital and non-digital activities. In addition, children's attention abilities are influenced by multiple environmental factors beyond screen exposure alone. Parenting style, sleep quality, nutrition, physical activity, emotional well-being, and learning environments also contribute to cognitive development. Consequently, the relationship between screen time and attention ability should be understood within broader developmental contexts.

Within early childhood education settings, attention and concentration

abilities are essential because they support children's engagement in classroom learning activities. Children with limited attention abilities may experience difficulties following instructions, completing tasks, maintaining participation, and regulating behavior during learning activities. Teachers frequently observe that children with excessive gadget exposure tend to become more easily distracted and less focused during classroom instruction. In Indonesia, the increasing availability of digital devices has contributed to greater screen exposure among young children. Previous studies conducted in Indonesia have examined the use of gadgets and its association with various aspects of early childhood development, including learning concentration, attention, and cognitive development (Fadillah & Rahman, 2023; Nabila & Hartati, 2023). However, further investigation is needed to examine the relationship between screen time duration and children's attention and concentration abilities within specific early childhood education settings. Therefore, this study focuses specifically on 35 early childhood children at Handayani Kindergarten, Paccerakkang District, Makassar City, using a screen time questionnaire and direct classroom observation of attention and concentration behaviors. The combination of reported screen time characteristics and direct observation of children's attentional performance provides a context-specific description of the relationship between digital media exposure and attention abilities in an early childhood education setting.

Therefore, this study aimed to investigate the relationship between screen time duration and attention and concentration abilities in early childhood. This study is important because attention ability is a fundamental component of children's learning readiness and cognitive development. Understanding the relationship between screen exposure and attentional development may provide valuable insights for parents, teachers, and educational practitioners regarding appropriate digital media use among young children. The findings of this study are expected to contribute theoretically and practically to the field of early childhood education. Theoretically, this study may enrich existing literature regarding the relationship between digital media exposure and cognitive development during early childhood. Practically, the findings may provide recommendations for parents and teachers regarding the importance of monitoring and limiting children's screen exposure while promoting balanced developmental activities involving direct interaction, active play, and social communication.

## METHOD

This study employed a quantitative approach using a correlational research design to examine the relationship between screen time and early childhood attention and concentration abilities. A quantitative approach was selected because the study focused on measuring variables objectively through numerical data and statistical analysis. The correlational design was considered appropriate because the research aimed to identify the degree of relationship between screen time and children's attention abilities without providing experimental treatment to the participants.

The study was conducted at Handayani Kindergarten, Paccerakkang District, Makassar City, Indonesia, involving 35 early childhood children as research participants. The participants were selected using purposive sampling techniques based on several specific criteria, including children within the early

childhood age range, active participation in classroom learning activities, and previous experience using digital devices such as smartphones, tablets, or televisions in their daily activities. The research instruments consisted of two main components, namely a screen time questionnaire for parents and an observation sheet for assessing children's battention and concentration abilities. The screen time questionnaire was completed by parents because they were considered the most appropriate informants regarding children's daily digital media use at home. The questionnaire collected information about the duration and frequency of screen use, types of digital devices used, types of accessed content, and parental supervision during gadget use.

Meanwhile, children's attention and concentration abilities were assessed through direct observation during classroom learning activities. The observation sheet included indicators such as children's ability to pay attention to teacher instructions, maintain focus during learning activities, complete assigned tasks, respond appropriately to teacher directions, and minimize distractions during classroom participation. Teachers were involved in the observation process because of their familiarity with children's classroom behavior and learning activities.

The screen time questionnaire was designed to identify children's gadget usage habits, including duration of use, frequency of use, types of digital devices used, types of accessed content, parental or adult supervision during gadget use, and behavioral tendencies related to gadget dependency. The questionnaire used ordinal-scale response categories adjusted to the characteristics of the respondents and research objectives.

Meanwhile, the observation sheet was used to assess children's attention and concentration abilities during classroom learning activities. The observation indicators included children's ability to pay attention to teacher instructions, maintain focus during learning activities, complete assigned tasks, respond appropriately to teacher directions, and minimize distractions during classroom participation. Observations were conducted directly during classroom learning sessions to obtain authentic behavioral data reflecting children's actual attentional performance in natural learning environments. Before being implemented in the study, the research instruments underwent content validation procedures to ensure the appropriateness of each indicator in measuring the intended constructs. Reliability testing was also conducted using Cronbach's Alpha to determine the internal consistency of the research instruments. The reliability analysis demonstrated that the instruments possessed acceptable reliability levels and were therefore suitable for use in the data collection process.

The research process began with a preparation stage involving problem identification, literature review, instrument development, and coordination with the school regarding the implementation of the study. During this stage, the researcher also prepared observation sheets and data collection formats that would be used throughout the research process. The next stage involved data collection through distribution of the screen time questionnaire to parents and direct observation of children's attention behaviors during classroom learning activities. Data collection involved both parents and teachers. Parents completed the screen time questionnaire based on their observations of their children's daily digital media use at home. The questionnaire focused on the duration, frequency, type of digital

device, accessed content, and parental supervision of screen use. Meanwhile, the researcher conducted direct observations of children's attention and concentration abilities during classroom learning activities, with the support of classroom teachers who were familiar with the children's daily learning behavior. The observation focused on children's ability to maintain attention, follow instructions, participate in learning activities, complete assigned tasks, and sustain focus despite distractions in the classroom. Simultaneously, the researcher conducted direct observations to document children's attention and concentration abilities during instructional activities.

The observation process focused on several major behavioral indicators, including children's ability to maintain attention while listening to teacher explanations, follow classroom instructions, participate actively in learning activities, and sustain focus despite environmental distractions within the classroom setting. All questionnaire responses and observation results were subsequently documented and transformed into numerical data for further statistical analysis. Data analysis was conducted using descriptive and inferential statistical techniques. Descriptive statistics were used to describe the levels of screen time and children's attention abilities through mean scores, frequencies, percentages, and score distributions. Prior to hypothesis testing, a normality test using the Shapiro-Wilk procedure was conducted to determine whether the research data were normally distributed.

## RESULTS

This study aimed to examine the relationship between screen time and attention abilities among early childhood children at Handayani Kindergarten, Paccerakkang District, Makassar City. Data were collected from 35 participants through questionnaires and classroom observations. The collected data were analyzed using descriptive statistics and Spearman Rank correlation analysis.

### Descriptive Statistics

The descriptive analysis showed that most children had moderate levels of screen exposure. Meanwhile, children's attention and concentration abilities were generally categorized as moderate to good. The findings indicate that digital device use has become part of children's daily activities, although differences in attentional performance were still observed during classroom learning activities.

**Table 1.** Descriptive Statistics of Research Variables

| *Variable* | *N* | *Minimum* | *Maximum* | *Mean* |
|---|---|---|---|---|
| Screen Time | 35 | 8 | 19 | 13.11 |
| Attention Ability | 35 | 10 | 23 | 17.26 |

### Reliability Test

Reliability analysis was conducted using Cronbach's Alpha to determine the internal consistency of the research instruments. The results showed that both instruments possessed acceptable reliability levels and were suitable for data collection.

**Table 2.** Reliability Test Results

| *Variable* | *Cronbach's Alpha* | *Interpretation* |
|---|---|---|
| Screen Time | 0.781 | Reliable |
| Attention Ability | 0.804 | Reliable |

### Normality Test

A normality test using the Shapiro-Wilk procedure was conducted before hypothesis testing. The results indicated that one variable was not normally distributed; therefore, non-parametric statistical analysis was applied.

**Table 3.** Normality Test Results

| *Variable* | *Sig.* | *Interpretation* |
|---|---|---|
| Screen Time | 0.041 | Not Normal |
| Attention Ability | 0.217 | Normal |

### Correlation Analysis

The relationship between screen time and attention ability was analyzed using Spearman Rank correlation analysis. The findings revealed a statistically significant negative relationship between the variables.

**Table 4.** Spearman Rank Correlation Analysis

| *Variables* | *Correlation Coefficient* | *Sig.* |
|---|---|---|
| Screen Time and Attention Ability | -0.341 | 0.045 |

The correlation coefficient (-0.341) indicated a low negative relationship, meaning that higher screen time tended to be associated with lower attention and concentration abilities among early childhood children. These findings indicate that higher screen time duration is associated with lower attentional performance during classroom learning activities.

## DISCUSSION

### The Correlation of Screen Time Among Early Childhood Children at Handayani Kindergarten

The findings of this study showed that most early childhood children at Handayani Kindergarten, Paccerakkang District, Makassar City experienced moderate levels of screen exposure. Based on the descriptive analysis, children were frequently exposed to digital devices such as smartphones, tablets, and televisions in their daily activities. Smartphones were identified as the most commonly used devices because they were easily accessible within family environments. Several children used digital devices for entertainment purposes, including watching videos and playing games, while others accessed educational content with parental assistance. However, classroom observations and questionnaire results indicated that some children used gadgets without consistent adult supervision. This condition may increase children's screen exposure duration and reduce opportunities for direct social interaction and active play.

The increasing use of digital devices among young children reflects current

technological developments and changing parenting practices. Digital media are often used by parents as entertainment tools or behavioral management strategies. Similar findings were reported by (Rideout, 2021), who explained that screen exposure among young children has increased significantly due to the widespread availability of mobile devices within households. Although digital technology may provide educational benefits when appropriately supervised, excessive screen exposure during early childhood may influence several aspects of child development, including attention and concentration abilities. Therefore, balanced gadget use remains important to support healthy developmental experiences among young children.

The Correlation of Attention and Concentration Ability Among Early Childhood Children at Handayani Kindergarten the results of classroom observations demonstrated that children's attention and concentration abilities generally ranged from moderate to good categories. Several children were able to focus on teacher instructions, participate actively in classroom activities, and complete assigned tasks independently. However, differences in attentional performance were still observed among participants. Some children demonstrated difficulties maintaining sustained attention during instructional activities. These children appeared more easily distracted by classroom stimuli, required repeated instructions from teachers, and showed lower persistence when completing learning tasks. In contrast, children with better attentional performance tended to participate more actively and maintain focus throughout learning sessions.

Attention and concentration abilities are important aspects of early childhood cognitive development because they support learning readiness and classroom participation. According to Piaget (1964), children develop cognitive abilities through active exploration and interaction with their environment. Activities involving direct learning experiences, communication, and social engagement contribute to the development of attentional control during early childhood. Similarly, Vygotsky (1978) emphasized that cognitive development is strongly influenced by social interaction and guided learning experiences. Children develop self-regulation and attentional abilities through communication and collaborative interaction with adults and peers. Therefore, supportive learning environments play an important role in strengthening children's concentration and attention during classroom activities.

**The Correlation Between Screen Time and Attention Ability in Early Childhood**

The main findings of this study revealed a significant negative correlation between screen time and attention abilities among early childhood children at Handayani Kindergarten. The Spearman Rank correlation analysis showed a significance value below 0.05, indicating that the correlation between the variables was statistically significant. The correlation coefficient demonstrated a low negative correlation, meaning that children with higher screen exposure tended to demonstrate lower attention and concentration abilities during classroom learning activities. These findings are consistent with previous studies examining the impact of excessive screen exposure on children's cognitive development. Madigan et al. (2019) reported that prolonged screen time among preschool children was associated with developmental difficulties in communication, attention, and problem-solving domains. Similarly, Radesky et al. (2020) explained that excessive

mobile media use may interfere with children's attentional control and self regulation abilities.

The findings of the present study are also supported by several studies conducted in Indonesia. (Hamdan et al., 2025) and (Indah Ika Maya Ningtyas et al., 2024) reported significant associations between screen or gadget use and attention-related problems among preschool children. (Martin et al., 2024) further demonstrated the relevance of screen time as a developmental factor among young children in the Indonesian context. In addition, (Marini et al., 2024) reported that excessive gadget use may be associated with reduced concentration among children aged 5–6 years. These findings strengthen the interpretation that screen exposure is one factor that may be associated with differences in children's attentional performance.

One possible explanation for these findings is that prolonged exposure to rapidly changing digital stimulation may influence children's ability to sustain attention during non-digital activities. Children who frequently use gadgets may become accustomed to instant visual and auditory stimulation, making it more difficult for them to maintain focus during classroom learning activities that require sustained concentration. In addition, excessive screen exposure may reduce opportunities for children to engage in physical play, direct social interaction, and exploratory learning activities. According to Piaget's cognitive development theory (Piaget, 1964), children learn most effectively through active experiences and interaction with their environment. Excessive passive engagement with digital devices may therefore limit opportunities for cognitive stimulation that supports attentional development.

The findings also support Vygotsky's sociocultural theory (Vygotsky, 1978), which emphasizes the importance of communication and social interaction. in cognitive development. Children who spend excessive time using gadgets individually may experience reduced opportunities for collaborative interaction and guided learning experiences that support attention and self-regulation skills. Furthermore, the findings are aligned with recommendations from the World Health Organization (WHO, 2020) and the American Academy of Pediatrics (AAP, 2020), which emphasize limiting screen exposure among young children. These organizations recommend balanced developmental activities involving active play, adequate sleep, direct social interaction, and supervised digital media use to support healthy cognitive and behavioral development.

Although the correlation strength found in this study was categorized as low, the findings suggest that screen time remains an important factor associated with children's attention abilities. However, attentional development is influenced by multiple factors beyond screen exposure alone, including parenting style, classroom environment, emotional well-being, sleep quality, and learning stimulation. The relationship identified in this study should also be interpreted in the context of other factors that may contribute to children's attention and concentration abilities. Parenting style, for example, may influence how children regulate their behavior, follow instructions, and manage their attention. Similarly, adequate sleep is important for children's cognitive functioning and may affect their ability to sustain attention during classroom activities. Other factors, such as the quality of the learning environment, emotional well-being, physical activity, and the amount of direct interaction with parents and teachers, may also contribute to children's attentional performance. However, these factors were not directly

measured in the present study. Therefore, the observed negative correlation should not be interpreted as evidence that screen time alone determines children's attention abilities. Rather, screen time duration may be one of several factors associated with differences in children's attentional performance.

Overall, the findings of this study indicate that higher screen time duration is associated with lower attentional performance during classroom learning activities.

**Challenges for Teachers and Parents in Managing Children's Screen Time**

The findings of this study also indicate several challenges faced by teachers and parents in managing children's screen exposure during early childhood. One of the major challenges is the increasing accessibility of digital devices within children's daily environments. Smartphones and tablets have become common household devices, making it difficult for parents to completely limit children's exposure to digital media.

Parents often use gadgets as practical tools to entertain children or maintain children's behavior during daily activities. In some situations, digital devices are used to calm children when parents are occupied with work or household responsibilities. As a result, children may become increasingly dependent on gadgets as a primary source of entertainment and stimulation. Teachers also experience challenges in maintaining children's attention during classroom learning activities. Several children who are frequently exposed to digital media may demonstrate shorter attention spans and become more easily distracted during instructional sessions. Teachers may therefore need to provide more varied, interactive, and engaging learning activities to sustain children's focus and participation in classroom learning.

Another challenge involves balancing the positive and negative impacts of digital technology. Although educational digital content may support learning experiences, excessive and unsupervised gadget use may negatively affect children's social interaction, physical activity, and attentional development. Consequently, parents and teachers must work collaboratively to establish appropriate screen time limits and encourage children to participate in activities that support cognitive and social development. In addition, parental awareness regarding appropriate screen time management remains an important issue.

Some parents may not fully understand the developmental impact of excessive screen exposure during early childhood. Therefore, educational institutions may play an important role in providing guidance and education for parents regarding healthy digital media practices for young children.

Overall, the findings suggest that managing children's screen exposure requires collaboration between parents, teachers, and educational institutions. Balanced digital use accompanied by supervision, active interaction, and meaningful learning experiences may help support healthier cognitive and attentional development among early childhood children.

This study has several limitations that should be considered when interpreting the findings. First, screen time data were obtained through a parent-reported questionnaire. Although parents are considered the most appropriate informants regarding children's digital media use at home, the reported duration may still be influenced by recall or estimation bias. Second, the study involved a relatively small sample of 35 children from one early childhood education

institution, which may limit the generalizability of the findings to other populations and educational settings. Future studies may involve larger and more diverse samples and may combine parent-reported screen time with more objective measures of digital media use, such as device-based screen time records.

## CONCLUSION

This study examined the correlation between screen time and attention abilities among early childhood children at Handayani Kindergarten, Paccerakkang District, Makassar City. The findings showed that most children experienced moderate levels of screen exposure through smartphones, tablets, and televisions in their daily activities. In addition, children's attention and concentration abilities were generally categorized as moderate to good, although several children demonstrated difficulties maintaining focus during classroom learning activities.

The main findings revealed a significant negative correlation between screen time and attention abilities. Children with higher levels of screen exposure tended to demonstrate lower attention and concentration during classroom activities. These findings support previous studies indicating that excessive screen exposure may influence children's cognitive and attentional development during early childhood.

The study also identified challenges faced by parents and teachers in managing children's gadget use. The increasing accessibility of digital devices makes supervision more difficult, while teachers experience challenges in maintaining children's focus and participation during learning activities. Therefore, collaboration between parents and teachers is important to support balanced digital media use among young children.

Overall, this study emphasizes the importance of appropriate screen time management during early childhood. Balanced activities involving direct interaction, active play, and supervised digital media use are essential to support children's attention development and learning readiness. Future studies are recommended to involve larger samples and additional developmental variables to obtain more comprehensive findings regarding the impact of screen exposure on early childhood development.

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