



The Relationship Between the Duration of Device Use and the Cognitive Development of 6 Year Old Children at Sukaraya 04 State Elementary School in 2024

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Abstract: The high level of internet access among children aged 5 years and over in Indonesia with a percentage of 12.43%, the 3rd highest in the classification of internet use based on age after those aged 25 years and over in first place and those aged 19-24 years in second place. This research aims to determine the relationship between the duration of device use and cognitive development in 6 year old children at SDN Sukaraya 04 in 2024. This research design uses a cross-section technique with the entire population of 82 6 year old students at SDN Sukaraya 04 and their parents. The sampling technique was a total sampling of 82 students. Data were collected using primary data by distributing questionnaires with data analysis using univariate analysis and bivariate analysis using the chi square test. Based on the research results, it shows that there is a relationship between the duration of device use and the cognitive development of 6 year old children at SDN Sukaraya 04 in 2024 with a statistical p value of 0.002 ($\alpha < 0.05$) and the OR result was 6.026. Based on the research results, 21 respondents (47.7%) who used devices in the risk category experienced poor cognitive development. It is hoped that this research can be a guide for parents to pay more attention to the duration of device use for children aged 6 years so as not to interfere with cognitive development.

Key words: children, devices, cognitive, development

1. BACKGROUND

Children are unique individuals and each individual has different needs according to their stage of development (Ujang, 2016). Child growth and development involves various aspects, including physical, mental, emotional and social. According to the definition of the World Health Organization (WHO), children are individuals under the age of 18 years. The school period basically refers to the child's growth and development period which lasts from the age of 6 to 18 years (Nurita, 2021).

Cognitive development is a brain-based skill needed to perform tasks from simple to complex (KBBI, 2023). Some important cognitive abilities include reading such as processing and understanding written text. Learning, such as taking information and knowledge from experience, experience or research. Remembering is like storing and managing the information obtained. Logical reasoning, identifying patterns and relationships between ideas or concepts. Then pay attention, namely evaluating and dealing with existing situations and problems (Mukarromah 2017).

Cognitive development abilities in children refer to the way children think in understanding their surrounding environment, which ultimately increases their knowledge. (Khadijah 2016). The complex cognitive development system in humans involves the acquisition, storage, processing and transmission of information. It is important for children to receive special attention to their cognitive development from an early age. What they learn and master from childhood can influence their future development (Bangsawan etal, 2022).

At the age of 6 years, children experience an important and sensitive period of cognitive development. This period is the stage where they actively build an understanding of the world around them. Parents need to pay attention to factors that influence children's cognitive development, including nutrition, genetic factors, economic conditions and the surrounding environment. The use of gadgets is also an important aspect in the environment that can influence children's current cognitive development (Tatminingsih, 2019). Children are unique individuals and each individual has different needs according to their stage of development. Children's growth and development involves various aspects, including physical, mental, emotional and social (Bujuri, 2018).

According to the World Health Organization (WHO), children are individuals under 18 years of age. The school period basically refers to the period of a child's growth and development which lasts from the age of 6 years to 18 years. (Rahayu Z etal. 2022). Gadget means an electronic device that has a practical function. Making it more practical to use. Gadgets include various electronic devices that have special functions, such as computers, cellphones, games, and others, which are the devices most commonly used by society today. Excessive use of gadgets in elementary school age children can hinder the child's growth and development process (Ginting and Stiasih, 2022).

Based on data from the Central Statistics Agency in 2023, it appears that the percentage of the population aged 5 years and over who have accessed the internet, especially for the 5-12 year age group, data shows that around 12.43% of the population in this age group already has internet access .The 3rd highest after those aged 25 years and over with a percentage of 58.63% and those aged 19-24 years with a percentage of 14.69% in the classification of device use based on age. This figure shows that the use of gadgets among elementary school children is still quite high, illustrating their involvement in the digital era. This phenomenon has a significant impact, especially on children's cognitive development (BPS, 2023).

Parents need to take full account of the amount of time children spend using electronic devices, especially elementary school children, as excessive use can affect their development.

Elementary school children should not be allowed to use electronic devices for more than one hour every day (Anditiasari and Dewi, 2021)

This view is in line with the views of the American and Canadian pediatrician associations which emphasize the importance of managing the time of use of electronic devices in children (Hidayatim 2021). Exceeding the recommended time limit such as using a device for more than 2 hours a day can cause several negative impacts, including the tendency for children to become less physically active, more interested in their own electronic games, and less interested in socializing and making children lazy to study. The duration of playing with electronic devices between 30 and 60 minutes is considered optimal time for children (Sylvie, 2020).

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Based on data from the Central Statistics Agency (BPS) in 2021, the majority of children aged 5 years and over in Indonesia have used the internet, especially to access social media, which reached the highest percentage of 88.99%. Apart from that, as many as 66.13% of children in this age group use the internet to look for information or news. As many as 63.08% also access the internet for entertainment. Some children, namely 33.04%, use the internet for school assignments. A total of 16.25% of children use the internet to purchase goods/services, while 13.13% do so to search for information about goods/services.

2. THEORETICAL STUDY

Cognitive is interpreted as the psychological part of the child, including mental behavior related to the ability to consider, resolve events that occur, curiosity, process information, individual stability related to the knowledge he has (Nuryati & Darsinah, 2021). If an individual's cognitive development is increasingly superior, then he or she will be able and skilled in processing all the knowledge received. Cognitive development often depends on the child's level of activity in interacting with those around him (Mifroh, 2020).

One of the factors that can influence the cognitive development of early childhood is dependence on the habit of using gadgets. Continuous use of gadgets during infancy has a negative impact on them, both on their intelligence and personality. Children who continuously play with gadgets will become addicted to gadgets and will make it the main activity in their daily lives, so it cannot be denied that these children will play with Android gadgets more often than studying, and even these children will refuse to study at home and choose to play with their gadgets.

Every early childhood child has different cognitive development, which is influenced by various factors around them, such as the environment, parenting patterns, educational services, and many other aspects. Apart from that, experts add that the internet and gadgets have become new educational tools that provide great benefits in the modern era (Tatminingsih, 2019).

However, the existence of the internet and gadgets also has a negative impact which is a weakness in itself. The use of this media needs to be monitored carefully, considering its open nature to various content, including those that violate norms and decency. If internet and gadget users are wise adults, this risk is relatively smaller. However, this becomes more worrying if the users are children. Therefore, the role of parents and family in providing supervision, attention and safety measures is very important (Hidayati, 2021).

Excessive use of gadgets for children can certainly have effects that are feared to affect children's development, one of which is cognitive development in early childhood, according to Khadijah, cognitive is the ability to understand and show understanding of the nature, meaning or explanation of something, and something. Gadget technology is not only used to contact other people via SMS or telephone, but there are many applications available on gadgets such as WhatsApp, Instagram, Tiktok, Twitter, Facebook, and other social media applications that can facilitate a person's relationship with friends, relatives and people even far away via cyberspace (Suryansyah, 2019)

In line with current developments, many parents ignore their children's needs, growth and development by providing games that are not appropriate for young children on the grounds that their children will be quiet and not disturb their parents' activities (Latif et al., 2013) such as giving gadgets, this is very unexpected and not good, if it is like a competition then today's parents are not being sportsmanlike. Parents who give gadgets to their children are the same as lazy parents, because the actual use of gadgets is not for that.

3. RESEARCH METHODS

The research design used was observational analytic with a cross sectional approach. This research was carried out at SDN Sukaraya 04, Karang Bahagia District, Bekasi Regency. The population in this study were all 6 year old students at SDN Sukaraya 04 totaling 82 people and the parents of these students. The sampling technique in this study used total sampling so that the total sample was 82 people. The collection method is primary data. Primary data was obtained through distributing and filling out questionnaires by 6 year old student respondents at SDN Sukaraya 04. Respondents were asked to fill in the answers to the questions contained in the prepared questionnaire. Data analysis was carried out univariate and bivariate.

4. RESULTS AND DISCUSSION

Based on data on students and students at SDN Sukaraya 04 in 2024 located in Kampung Sukamantri, RT.005/RW.005, Sukaraya Village, Karang Bahagia District, Bekasi Regency in 2024, with a total of 82 respondents, namely students and students in class 1 aged 6 years, with 53.7% of respondents fell into the risky device use category and as many as the non-risky category 46.3%, with the majority of respondents having good cognitive development at 68.3%.

The results of this study are presented through an analysis that illustrates the distribution of respondents and an evaluation to explore the impact of independent variables on related variables. The independent variable evaluated was the use of devices in children aged 6 years. Based on the results of the research that has been carried out, the researcher selected 6 year old grade 1 elementary school students at SDN Sukaraya 04 in 2024. From the results of the research, the results of the frequency distribution of cognitive development of children aged 6 years at SDN Sukaraya 04 in 2024 were as follows:

Table 1. Frequency Distribution Table of Cognitive Development of 6 Year Old Children at SDN Sukaraya 04 in 2024

Variabel	Frekuensi (F)	Persentase (%)
Not good	26	31,7 %
Good	56	68,7 %
Total	82	100 %

Source: Primary data for children aged 6 years at SDN Sukaraya 04 in 2024

Based on the frequency distribution table of cognitive development of school children, the results showed that of the 82 respondents with poor cognitive development, there were 26

respondents (31.7%) while there were 56 respondents with good cognitive development (68.3%). for grade 1 children aged 6 years as follows:

Table 2. Frequency Distribution of Duration of Device Use 6 Year Old Children at SDN Sukaraya 04

Variabel	Frekuensi(F)	Persentase (%)
Risk	44	53,7 %
Tidak Berisiko	38	46,3%
Total	82	100 %

Source: Primary data for children aged 6 years at SDN Sukaraya 04 in 2024

Based on the distribution of the frequency of device use among school children, the results showed that of the total of 82 respondents studied, the majority who used devices in the risk category were 44 people (53.7%), while the respondents who used devices in the non-risk category were 38 people (46.3%) .The results of bivariate analysis are intended to evaluate the relationship or interaction between the two variables under consideration. Statistical tests were carried out using the chi-square test with the help of SPSS software.

Table 3. Relationship between Duration of Device Use and Cognitive Development of 6 Year Old Children at SDN Sukaraya 04

Use of gadgets	Good		Not good		Total		P.value	OR 95% CI
	N	%	N	%	N	%		
Risky	23	52.3%	21	47.7%	44	100	0,002	6,026
Not risky	33	86.8%	5	13.2%	38	100%		
Total	56	68.3%	26	31.7%	82	100%		

Source: Primary data on children aged 6 years at SDN Sukaraya 04 in 2024

Based on analysis using the chi-square test, of the total 82 respondents involved, 21 respondents (47.7%) who used devices in the risk category experienced poor cognitive development, and 5 respondents (13.2%) who used devices that were not at risk and experience poor cognitive development.

From the results of statistical tests using the chi-square test, a p-value of 0.002 ($\alpha < 0.05$) was obtained, indicating that there is a relationship between the use of gadgets and the cognitive development of 6 year old children at SDN Sukaraya 04. In addition, from this analysis an OR value of 04 was obtained. 6.026, which means that children who use devices in the risk category

have a 6 times greater risk of experiencing poor cognitive development compared to children who do not use devices in the non-risk category.

Based on analysis using the chi-square test, of the total 82 respondents involved, there were 21 respondents (47.7%) who used devices in the risk category of experiencing poor cognitive development and 5 respondents (13.2%) who used devices not at risk of experiencing poor cognitive development. From the results of statistical tests using the chi-square test, a p-value of 0.002 ($\alpha < 0.05$) was obtained, which shows that there is a significant relationship between the duration of device use and children's cognitive development. In this context, the null hypothesis (H_0) which states that there is no relationship between device use and children's cognitive development is rejected. Meanwhile, the alternative hypothesis (H_a) which states that there is a relationship between the use of devices and children's cognitive development is accepted. Apart from that, from this analysis, an Odds Ratio (OR) value of 6.026 was obtained. This OR value shows that children who use devices in the risk category have a 6 times greater risk of experiencing poor cognitive development compared to children who are not exposed to devices with high intensity. Therefore, this finding confirms that the use of devices for a certain duration or intensity associated with a higher risk of children's cognitive development.

The results of this study are in line with the findings of research conducted by Narumi and colleagues. Based on the research results, of the total 189 respondents who were subjects, 144 respondents (76.2%) showed good cognitive development and used devices. However, there were 16 respondents (8.5%) who used devices with high intensity and had questionable cognitive development, and 29 respondents (15.3%) showed abnormalities in cognitive development due to the duration of device use. Further analysis shows that there is a significant relationship between device use and cognitive development, with a p-value of 0.010, which is smaller than the significance threshold of 0.05. This indicates that the alternative hypothesis (H_a) is accepted, while the null hypothesis (H_0) is rejected. Therefore, it can be concluded that there is a significant relationship between the duration of device use and cognitive development in pre-school children in Babelan City Village. Researchers assume that parenting styles have an important role in supervising children's use of gadgets. If parents allow their children to use devices with high intensity, it is likely that these children will experience a decline in cognitive development compared to children their age. Therefore, it is necessary for parents to be aware in regulating and limiting their children's use of devices to ensure optimal cognitive development.

Intensive use of devices, exceeding 2 hours for children, has an impact on the tendency of children to become lazy about studying and prefer to spend time playing with devices rather than allocating time for learning activities and social interactions with their peers. Intensive participation in playing with gadgets also has the potential to make it difficult for children to focus on the learning process, because their minds tend to focus on the entertainment aspects presented by the gadget.

According to Derry in his book entitled "When Your Little One Plays with Gadgets", he believes that excessive use of gadgets can affect cognitive development because of its effect on children's brain development. This is caused by excessive production of the hormone dopamine, which can interfere with the maturity of the prefrontal cortex function. The function of the prefrontal cortex, as the part of the brain involved in regulating self-control. planning and decision making are very important in the process of children's cognitive development. Excessive use of gadgets can disrupt the balance of production of the hormone dopamine, which in turn can affect the function of the prefrontal cortex. This imbalance can result in impairments in impulse control, attention, and other cognitive functions in children

Therefore, the influence of excessive use of gadgets on children's cognitive development can be significant, considering that cognition is very dependent on the maturity and optimal function of the brain. Children will tend to lose interest in learning and reduce social interaction with peers and the surrounding environment. When they do not receive adequate supervision from their parents, children can fall into excessive use of gadgets, and can even access inappropriate and potentially negative sites.

5. CONCLUSION AND SUGGESTIONS

In order to provide direct conclusions and without too much explanation, the conclusions from the research results of the relationship between the duration of device use and the cognitive development of 6 year old children at SDN Sukaraya 04 with 82 respondents are as follows:

- a. Based on the results of this analysis, from a total of 82 respondents studied, the majority of SDN Sukaraya 04 students aged 6 years had good cognitive development with a total of 56 children (68.3%).
- b. There are 44 students (53.7%) at SDN Sukaraya 04 aged 6 who use devices in the risk category

- c. There is a relationship between the duration of device use and the cognitive development of 6 year old children at SDN Sukaraya 04 in 2024. The p-value was obtained at 0.002 ($\alpha < 0.05$) and an Odds Ratio (OR) value of 6.026 (1984-18.306).

This study highlights a significant relationship between the duration of risky device use and the cognitive development of 6 year old children at SDN Sukaraya 04. Researchers suggest integrating a more proactive approach in managing children's device use time, by providing reasonable time limits and combining appropriate activities. enrich children's cognitive development in everyday life, while paying attention to research limitations and directions for further research.

REFERENCE

- Anditiasari, N., & Dewi, N. R. (2021). Analisis Teori Perkembangan Kognitif Piaget Pada Anak Usia 11 Tahun Di Brebes. *Jurnal Matematika Dan Pendidikan Matematika*, Volume 6 N, 97-108.
- Bangsawan, I., Ridwan, dan Naelul, F. (2022). Pengaruh Gadget Terhadap Perkembangan Kognitif Anak Usia Dini. *Jurnal Pendidikan Anak Vol 8 No 1*.
- BPS. (2021). Survey Ekonomi Sosial Nasional (Susenas). <https://www.bps.go.id/id>.
- BPS. (2023). Persentase Penduduk Usia 5 Tahun Ke Atas Yang Pernah Mengakses Internet Dalam 3 Bulan Terakhir Menurut Kelompok Umur (Persen).” <https://www.bps.go.id/id/statistics-table/2/ODQwIzI=/persentase-penduduk-usia-5-tahun-ke-atas-yang-pernah-mengakses-internet-dalam-3-bulan-terakhir-menurut-kelompok-umur.html>
- Bujuri, D. A. (2018). Analisis Perkembangan Kognitif Anak Usia Dasar dan Implikasinya dalam Kegiatan Belajar Mengajar. *LITERASI (Jurnal Ilmu Pendidikan)*, 9(1), 37. [https://doi.org/10.21927/literasi.2018.9\(1\).37-50](https://doi.org/10.21927/literasi.2018.9(1).37-50)
- Ginting, Ade Krisna, and Liana Riski Stiasih. (2022). Hubungan Penggunaan Gadget Dengan Perkembangan Psikososial Anak Di SDN Karang Baru 04 Kabupaten Bekasi. *Viva Medika :Jurnal Kesehatan, Kebidanan dan Keperawatan*16(1):22–29.
- Hidayati, N. (2021). Pengaruh Penggunaan Internet Terhadap Perkembangan Kognitif Anak Usia Sekolah Dasar Di Desa Panca Mukti Kecamatan Pondok Kelapa Bengkulu Tengah. IAIN Bengkulu.
- IV Di SDIT Al-Madina Purworejo. *Jurnal Paris Langkis*:114–24.
- KBBI. (2024). Kognitif. <https://kbbi.kemdikbud.go.id/entri/kognitif>
- Khadijah. (2016). *Pengembangan Kognitif Anak Usia Dini*. Medan: Perdana Publishing.

- Miranti, P., & Putri, L. D. (2021). Waspada dampak penggunaan gadget terhadap perkembangan sosial anak usia dini. *Jendela PLS*, 6(1), 58–66. <http://jurnal.unsil.ac.id/index.php/jpls/article/view/3205>
- Mukarromah, T. (2019). Dampak Penggunaan Gadget Pada Perkembangan Sosial Anak Usia Dini Di Dusun Setia Bumi Kecamatan Seputih Banyak. In *Skripsi. institut agama islam negeri metro*.
- Nurita, D.A. (2021). Peran Penggunaan Gawai Pada Perkembangan Kognitif Anak Usia Dini (Analisis Systematic Literature Review). *Skripsi thesis*, IAIN Purwokerto.
- Rahayu Z, Sri Putri, MitaFani Tri Mutya, Rahmi, and Riska Muliati. (2022). Pengaruh Gadget Terhadap Tumbuh Kembang Anak Pada Masa Early Childhood. *Psyche165Journal*15(4):140–45.
- Safitri,S.F., Suyoto & Nurhidayati. (2021). Pengaruh Kemandirian Belajar Peserta Didik Dan Latar Belakang Pendidikan Orang Tua Terhadap Hasil Belajar Kelas
- Sylvie. (2020).*Monograf:Fenomena Kecanduan Gadget Pada Anak Usia Dini*. Surabaya: Cipta Media Nusantara.
- Tatminingsih, S. (2019). Kemampuan Sosial Emosional Anak Usia Dini di Nusa Tenggara Barat. *Jurnal Obsesi :Jurnal Pendidikan Anak Usia Dini*, 3(2), 484. <https://doi.org/10.31004/obsesi.v3i2.170>
- Ujang Khiyarusoleh. (2016). Konsep Dasar Perkembangan Kognitif Pada Anak Menurut Jean Piaget. *Dialektika*, VOL. 5 NO., 1–10.