

Frequency of electronic device use among school-aged children

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Abstract

As a result of rapid technological development, electronic devices have become an inseparable part of everyday life. Numerous studies show a significant increase in the frequency and duration of electronic device use among children and youth, pointing to potential negative consequences of excessive use. The aim of this study is to examine the frequency of electronic device use among early school-age children and to determine differences in usage based on place of residence and parental behaviors. The study involved 87 parents (68 mothers and 19 fathers) of first-grade primary school children. The research was conducted in Brčko District. Data collection on the frequency of electronic device use in children was done through a parent questionnaire consisting of 11 items, designed specifically for the purposes of the study. The research results indicate that 66.7% of first-grade elementary school children use electronic devices daily, with 94.3% of respondents using electronic devices for up to 3 hours per day. The most used devices among children are mobile phones and tablets (54%), followed by TV (46%), and even 42.5% of respondents own their own electronic device for use. Children who do not have established usage rules by parents tend to use electronic devices significantly more frequently and for longer durations, as do children from urban areas compared to those from rural/suburban areas. The results also showed that there were no statistically significant differences in the frequency and duration of device usage based on parental employment status. Based on the obtained results, it can be concluded that excessive use of electronic devices is present among early school-age children, and such results imply the need for parental education and prevention of long-term consequences on children's development.

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Introduction

The complexity of modern society and the contemporary fast-paced way of life imposes many challenges and dilemmas that parents face on a daily basis. Being a parent in the era of modern technology that involves daily exposure to various electronic devices has become one of the most challenging roles ever. One of the most difficult tasks is how to raise a child in the age of modern technology, while achieving the primary role of parents to provide the child with a safe and stimulating environment.

Research has shown that the most intensive development takes place in the earliest childhood, i.e. up to the age of three. It is believed that the first three years of a child's life are the most critical period for development and maturation of the brain, as well as the acquisition of speech and language skills (Cusick & Georgieff, 2016; Rajović, 2017). This period of life is a critical period of brain development, during which cognitive abilities in several domains occur and develop, such as attention, memory, executive and language functions. Therefore, exposing children to electronic devices at an early age can adversely affect their cognitive and socio-emotional development, as well as the overall development of the child. Since the use of digital technology and social media by children and young people is increasing every day, it is crucial to adopt an approach that would reduce the risks without limiting the benefits that digital technologies and social media offer. It is also important to bear in mind the rapid development of computer processors and predictions that the future 5G generation of mobile phones will be about 100 times faster than the current 4G, and about 20,000 times faster than the former 3G. International Telecommunication Unit stated that the Internet using population increased from 34% to 48% in the last 5 years (Echazarra, 2018).

From the above, it can be said that in the modern age, the use of digital technology and electronic devices has become inevitable, and so has its impact on the children development. For this reason, this paper aims to explore more closely the frequency of use of electronic devices in children of early school age.

Parenting in the Age of Modern Technology

Parenting is a demanding and challenging role, which involves not only satisfying the basic physiological needs of the child, but also stimulating the overall development of his personality. The main goal of parenting is to make the child a mature, independent, responsible, autonomous personality and a useful member of social community. Upbringing is a process that is of great importance for the development of personality, but also for the prosperity of a society. With upbringing, we direct, self-direct and build a personality with all the positive characteristics. The family is the first school in a child's life. In the family, the child acquires basic knowledge about people, interpersonal relationships, problems and life in general, and acquires the first experiences that he will apply later in life. Raising children in a family is one of the most difficult and responsible tasks of every family member. According to Potočnjak (1986, p.10): "The family is a segment of society, it is its living cell in which a child is conceived, and values are created, which it adopts and later transfers to the social community". Upbringing can be defined as a systematic teaching organized process that builds positive personality traits, attitudes, views on life, the world, character traits, moral, work and social values (Čatić, 2005). Upbringing is a complex and long-lasting process that has certain characteristics. There is a cause-and-effect relationship between the development of personality and the development of society. Personality cannot be educated outside society, just as society would not survive without personality education. The fundamental purpose of upbringing is

manifested in the development and building of a capable, diligent, humane person (Ćatić, 2005).

In addition to the above-mentioned tools and methods of family upbringing, parents also use different parenting styles. Based on the two dimensions of parenting (emotionality and control), a classification of four parenting behavioral styles has been made. *An authoritative parenting style* is a combination of emotional warmth and firm control. According to this style, the role of parents is not supervisory but advisory, and parents explain their requirements to the child, and through examples and advice give him an answer to why these requirements exist at all. A child raised in this style develops responsibility, social competencies and trust. *The authoritarian parenting style* is a combination of tight control and emotional coldness. Parents set high expectations and demands on the child with very little autonomy and not enough warmth and support. This type of parent often sets the rules, without explaining them. They are prone to punishment, often physical punishment if the child does not respect the rules. Children whose parents pursue an authoritarian parenting style are anxious, often change their mood, irritable, timid, low self-esteem and self-confidence. *The permissive parenting style* is a style in which the parents provide the child with great emotional warmth while not setting any control. The relationship between parents and children is based on the great emotional sensitivity of the parent towards the child, on the child's excessive freedom without setting boundaries, rules and generally without controlling behavior. The children of these parents are disobedient, rebellious and impulsive. *An indifferent parenting style* is also called neglectful. In such an upbringing, parents provide very little emotional warmth, low demands, do not set control or give support to children. Often these parents are emotionally distant, have mental problems, overwhelmed by the stress of life and have very little energy for their child. Children who are exposed to this parenting style exhibit many behavioral problems such as antisocial behavior, poor emotional self-control, and difficulties at school (Čudina-Obradović & Obradović, 2006). It is important for children to feel loved and accepted, but they also need to know and understand the rules of behavior. Such a combination of parental behavior and upbringing encourages the proper development of the child. Research has shown that an authoritarian parenting style has a positive effect on a child's intellectual and socio-emotional development (Berk, 2015).

Children who grow up with an adequate parenting style function cognitively and emotionally better, have good communication with their parents, better school achievements and a positive attitude towards school (Suzić, 2005). In modern society, permissive and neglectful styles of upbringing are increasingly present, with the media playing a significant role, as well as the modern way of life (Miliša, 2013). The increasing presence and use of modern technology puts the family under various pressures and puts many challenges in front of it, so sometimes the role of the family in the child's life is questioned (Ilišin, Marinović Bobinac, & Radin 2001).

Digital Technology and its Impact on Children's Development

Digital technology is a broad term, which refers to various types of electronic devices and applications, which use information in the form of codes (Sioshansi, 2019). The term digital technology refers to electronic devices such as computers, tablets, smartphones, video games, etc., to which children are exposed from an early age (Brown, 2011).

"Digital technology has already changed the world – as more children around the world have access to the internet, childhood is also changing" (UNICEF, 2017). Children grow up watching parents who use electronic devices excessively every day. Today, in 80% of families,

at least one parent has a job that requires the use of computers, while in their free time their use is excessive (Anđelić, Čekerevac & Dragović, 2014). Increasingly, digital technology is replacing the role of parents.

The fact is that children are becoming the biggest users of digital technology and electronic devices, and for this reason, their impact on children's development is increasingly being considered. Many studies show that the impact of digital technology on children's development has been a current topic for years, and that researchers themselves, as well as parents and other society members are actively interested in it. Numerous studies prove both positive and negative impacts of the use of electronic devices on children's development. According to many studies, there is an interrelationship between the use of digital technology in early preschool and the behavioral disorders that children develop over time (Poulain et al, 2018). Observations show that if a child spends more time in front of a screen in the most sensitive period of brain development instead of playing a real game, a smaller number of synapses in the brain is created, which results in developmental delays in various domains: speech - language, motor, socio - emotional and cognitive (Poulain et al. 2018).

Furthermore, researchers generally concur that children are overexposed to electronic devices, contrary to WHO guidelines. This is substantiated by a local study conducted by Madžar Čančar et al. (2024), which revealed that children are first exposed to electronic devices between the ages of 6 to 12 months, and that daily exposure to these devices does not align with international recommendations. Since the multiple impact of digital technology on children's development does not necessarily have an immediately visible effect, but can also be delayed (Anđelić, Čekerevac & Dragović, 2014), the need for developmental monitoring of children is increasingly urgent. How much and in what way will the use of electronic media affect children's development depend on when children are first exposed to devices, how they use them, how much time they spend using them, and the content they are exposed to and whether parents are exposed to them during their use.

Based on the abovementioned facts, the aim of the research is to examine the frequency of use of electronic devices among children of early school age, and to determine the differences in the use of electronic devices in relation to the area of residence and parental characteristics. Based on the results obtained, we will act to develop guidelines for raising the awareness of parents as primary models from which children learn and develop.

Methods

The research was conducted on a sample of 87 parents (68 mothers and 19 fathers) of primary school students from the Brčko District. The average chronological age of the children whose parents were included in the study was 6.91 ± 0.27 years. In relation to the area of residence, out of the total number of respondents, 43.7% live in an urban (city) environment, and 56.3% of respondents live in a suburban and/or rural environment. The majority of respondents were employed, 77% of them, and 23% of respondents were unemployed. The structure of the sample and its demographic characteristics is shown in detail in Table 1.

Table 1. Demographic characteristics of the sample

Variable		N	%
Kinship	Mother	68	78.2
	Father	19	21.8
Level of professional qualification	Elementary school	1	1.1
	High school	40	46.0
	Vocational education	6	6.9
	University	40	46.0
Employment status	Employed	67	77.0
	Unemployed	20	23.0
Area of residence	Urban environment	38	43.7
	Suburban/rural environment	49	56.3

For the research purposes, a questionnaire was made for parents about the frequency and habits of using electronic devices among children. The questionnaire consists of 11 closed-ended questions. The survey was conducted in February and March 2024. The questionnaire was distributed to the respondents in the form of paper and pencil, and all respondents gave prior consent to participate in the research with the obligation to ensure the confidentiality of personal data by the researchers.

The research data were processed by the methods of descriptive and inferential nonparametric statistics. To verify the set goal of the research, Fischer's exact test was used. The data was processed in IBM SPSS 26.0 (*Statistical Package for Social Sciences*).

Results

Table 2 shows the frequency of responses to the questionnaire on the frequency and habits of using electronic devices among children. The results on the variable of the child's first exposure to electronic devices show that almost 30% of children were exposed to electronic devices in the first year of life. By the age of two, another 29.9% of respondents were exposed to electronic devices, and by the age of three, another 34.5% of respondents. Thus, almost 95% of respondents were exposed to the use of electronic devices in the first three years of life.

The results also show that 66.7% of children, first-graders, use electronic devices on a daily basis. 12.6% of children use devices a little less often, several times a week, and 20.7% of children are allowed to use electronic devices only on weekends. On a daily basis, 94.3% of respondents use electronic devices for up to 3 hours, and 5.7% of respondents even longer than 3 hours a day. The most used devices among children are TV (46%), followed by mobile phone (37.9%) and tablet (12.6%), and as many as 42.5% of children own their own electronic device to use. Electronic devices are mostly used for the purpose of watching cartoons (46%) and playing games (39.1%), and only 9.2% of children use electronic devices for educational purposes. Among the respondents, there were also 2.3% of those who do not know for what purpose their children use electronic devices. Rules for the use of electronic devices are set in 80% of cases.

Table 2 also shows that 71.3% of parents believe that the use of electronic devices has a negative impact on their children's school achievement.

Table 2. Frequency and habits of using electronic devices

Variable	N	%	
The first exposure to electronic devices	0-6 months	6	6.9
	6-12 months	20	23.0
	12-24 months	26	29.9
	24-36 months	30	34.5
	older than 3 years	5	5.7
Frequency of electronic devices use	Every day	58	66.7
	2-3 times a week	11	12.6
	Only on weekends	18	20.7
Average use of electronic devices on a daily basis	Less than an hour	28	32.2
	1-3 hours	54	62.1
	3-5 hours	5	5.7
Which electronic device does a child use most often?	Mobile phone	33	37.9
	Tablet	11	12.6
	Computer	3	3.4
	TV	40	46.0
Does the child own their own electronic device?	Yes	37	42.5
	No	50	57.5
For what purpose does a child use an electronic device?	Playing games	34	39.1
	Watching a cartoon	40	46.0
	Chatting with friends	3	3.4
	Watching educational content	8	9.2
	I don't know	2	2.3
Are there set rules for the use of electronic devices?	Yes	80	92.0
	No	7	8.0
Do you think that the use of electronic devices has a negative impact on school achievement?	Yes	62	71.3
	No	25	28.7

Table 3 shows the differences in the time of first exposure to electronic devices compared to the employment status of the parents and the area of residence. Based on the frequency distribution of the time of the child's first exposure to devices, it can be observed that employed parents expose their children to electronic devices slightly earlier than unemployed parents, but the results of Fischer's exact test showed that these differences are not statistically significant ($p=0.253$). The results also showed that there was no statistically significant difference in the time of first exposure to electronic devices between children from urban and rural areas ($p=0.895$).

Table 3. Differences in the time of first exposure to electronic devices

Variable	First exposure to electronic devices					Total	Fischer's exact test	p	
	0-6 months	6-12 months	12-24 months	24-36 months	36+ months				
Parents' employment status	Employed	N 6 % 9.0%	18 26.9%	18 26.9%	21 31.3%	4 6.0%	67 100.0%	5,024	0,253
	Unemployed	N 0 % 0.0%	2 10.0%	8 40.0%	9 45.0%	1 5.0%	20 100.0%		
Area of residence	Urban area	N 3 % 7.9%	8 21.1%	10 26.3%	14 36.8%	3 7.9%	38 100.0%	1,328	0,895
	Suburban or rural area	N 3 % 6.1%	12 24.5%	16 32.7%	16 32.7%	2 4.1%	49 100.0%		

The results presented in Table 4 show that there were no statistically significant differences in the frequency of use of electronic devices among children in relation to the employment status of their parents ($p=0.590$), area of residence ($p=0.352$) and the existence of parental rules on the use of devices ($p=0.271$). Although it can be observed that children who do not have rules set by their parents are more likely to use electronic devices, no statistically significant differences were recorded in relation to the group of children who had rules of use set, which needs to be examined in more detail due to the unevenness in the size of subsample groups. Statistically significant differences in the frequency of device use were found in relation to the parents' perception of the negative impact of device use on children's school achievements ($p=0.040$). That is, children of parents who believe that electronic devices have a negative impact on school achievement statistically significantly less often use electronic devices, compared to the group of children whose parents do not recognize the negative impact of electronic devices, which implies the importance of educating parents.

Table 4. Differences in the frequency of use of electronic devices

Variable	The frequency of use of electronic devices			Total	Fischer's exact test	p	
	every day	2-3 times a week	only on weekends				
Parents' employment status	Employed	N 44 % 65.7%	10 14.9%	13 19.4%	67 100.0%	1,330	0,590
	Unemployed	N 14 % 70.0%	1 5.0%	5 25.0%	20 100.0%		
Area of residence	Urban area	N 25 % 65.8%	3 7.9%	10 26.3%	38 100.0%	2,171	0,352
	Suburban or rural area	N 33 % 67.3%	8 16.3%	8 16.3%	49 100.0%		
Existence of rules on the use of electronic devices	Yes	N 51 % 63.7%	11 13.8%	18 22.5%	80 100.0%	2,583	0,271
	No	N 7 % 100.0%	0 0.0%	0 0.0%	7 100.0%		
Negative impact on school achievement	Yes	N 38 % 61.3%	7 11.3%	17 27.4%	62 100.0%	6,563	0,040
	No	N 20 % 80.0%	4 16.0%	1 4.0%	25 100.0%		

Table 5 shows the results of the Fischer's exact test for the purpose of determining differences in daily use of electronic devices among respondents. The results showed that there was no statistically significant difference in the average time of daily use of electronic devices among children in relation to the employment status of parents ($p=0.912$) and parents' perception of the negative impact of device use on school achievement ($p=0.855$). Statistically significant differences were registered in relation to the area of residence (0.027), and the existence of rules on the use of electronic devices (0.019). Children from urban areas use electronic devices on a daily basis significantly longer than children living in suburban or rural areas. Also, children who do not have rules set by their parents use electronic devices on a daily basis for much longer, but in this case, it is necessary to pay attention to the unevenness in the size of subsample groups and examine the results in more detail.

Table 5. Differences in the daily use of electronic devices

Variable	Average use of electronic devices on a daily basis			Total	Fischer's exact test	p		
	<1 hour	1-3 hours	3-5 hours					
Parents' employment status	Employed	N	21	42	4	0,241	0,912	
		%	31.3%	62.7%	6.0%			100.0%
	Unemployed	N	7	12	1			20
		%	35.0%	60.0%	5.0%			
Area of residence	Urban area	N	10	23	5	6,948	0,027	
		%	26.3%	60.5%	13.2%			100.0%
	Suburban or rural area	N	18	31	0			49
		%	36.7%	63.3%	0.0%			
Existence of rules on the use of electronic devices	Yes	N	28	49	3	7,506	0,019	
		%	35.0%	61.3%	3.8%			100.0%
	No	N	0	5	2			7
		%	0.0%	71.4%	28.6%			
Negative impact on school achievement	Yes	N	21	37	4	0,509	0,855	
		%	33.9%	59.7%	6.5%			100.0%
	No	N	7	17	1			25
		%	28.0%	68.0%	4.0%			

Discussion

The results of this study have shown that school-aged children use electronic devices too frequently and for extended periods on a daily basis. These findings are not surprising, as with the advancement of digital technology, the use of electronic devices has become an inevitable aspect of life. However, it is essential to consider these results from the perspective of both the positive and negative impacts of technology on child development.

Many authors disagree on whether the use of electronic devices by children has a positive or negative impact. It is important to point out that if the recommendations on the time limit of the World Health Organization (WHO), the adequacy of the content, and parental supervision are respected, there are numerous positive impacts that should not be ignored. With the help of digital technology and the use of electronic devices, new information, current issues, and events in the world can be obtained. It has also been proven through numerous studies that children learn with the help of electronic devices. Certain experimental studies highlight the positive

effects of the use of electronic devices and certain applications that promote cognitive development. Specifically, in these studies, a positive effect was observed in the field of attention, visual processing, executive functions, immediately after using a certain application (Anderson, 2017). Children have a greater interest and therefore success after reading electronic books on a tablet (Courage, 2021). In children at an early age, e-books can have a stimulating effect on vocabulary and reading comprehension (Cerniglia, 2020). In one experimental study involving two groups of children, ages 4, one group of children were exposed to different age-appropriate educational apps on an iPod, while another group of children were exposed to fun apps on the same device. After three months, there was a positive impact on literacy and math skills in children who were exposed to educational applications (Anderson, 2017).

On the other hand, the results of some studies show that higher exposure to screens can be an initial factor that leads to developmental delays. As negative consequences of the use of electronic devices, headaches, loss of sleep, fatigue, blurred vision, aggressiveness, muscle and bone dysfunction are cited (Theodoto, 2010). One important factor that can affect cognition and learning ability is the time when a child is first exposed to electronic devices (Supanitayanon, Trairatvorakul & Chonchaiya, 2020). The results of our research on the variable of the child's first exposure to electronic devices (TV, phone and tablet) show worrying data indicating that almost 95% of respondents were exposed to the use of electronic devices in the first three years of life (30% of children in the first year of life, 29.9% by the age of two, and 34.5% by the age of three).

In one longitudinal study, a correlation was observed between longer screen time spent with poorer performance on a questionnaire that monitored developmental progress in five domains by age. The results showed that the group of children aged 24 and 36 months, who were exposed to screens, achieved lower results. Also, studies that looked at the association between screen use and children's executive functions suggest that longer screen time may be associated with poorer executive functions in preschool children. At an early developmental age, television content is generally incomprehensible and inappropriate, and as such has a negative impact on language development and executive functions (Anderson & Subrahmanyam, 2017). Exposure to screens at the age of two is associated with difficulties of self-regulation in preschool age, and behavioral difficulties, isolation and aggression at school age (Ferreira, 2020).

A parent's approach can determine how the impact of screens will affect a child's development. Excessive use of electronic devices, exposure to inappropriate content and lack of parents' authority are more likely to have a negative impact. Conversely, parental consistency, supportive parental relationships, and the appropriateness of content such as educational programs, can contribute to positive outcomes (Hill et al, 2016). According to all research, non-compliance with time limits recommended by leading state organizations is closely related to negative impacts on child development. The existence of structural changes in the brain, specifically in the parts related to language, executive and academic skills, has been observed as a consequence of excessive exposure to screens in preschool children. In short, the virtual world is filled with numerous dangers such as manipulation, addiction, and general deterioration of health (Miliša 2013).

A key limitation of this study is its small sample size, which is not representative of the general population and limits the ability to generalize the findings. Additionally, the sample shows an imbalance between employed and unemployed parents, which could affect screen time

patterns, warranting further investigation. Another concern is the potential lack of objectivity in parental responses, as parents may adjust their answers based on perceived expectations. To address these issues, future research should use larger, more balanced samples and refine questionnaires to capture more precise data on screen time and media use.

Conclusion

The conducted research showed that there were no statistically significant differences in the frequency of use of electronic devices among children in relation to the employment status of their parents, place of residence and the existence of parental rules on the use of devices. Also, although based on the frequencies shown, it could be observed that children who do not have rules set by their parents are more likely to use electronic devices, no statistically significant differences were found in relation to the group of children who were set rules of use. Statistically significant differences in the frequency of device use were found in relation to the parents' perception of the negative impact of device use on children's school achievement.

Based on the presented research results, it is concluded that it is very important to act in the direction of raising awareness of parents about the impact of digital technology and the use of electronic devices on the development of children, as well as the amount of time spent using electronic devices and the types of content to which children are exposed. It is of utmost importance that parents take responsibility for the use of electronic devices in children, and thus create a family with clear attitudes, boundaries and rules, that is, a family that will ensure a carefree childhood. Keeping in mind that the use of electronic devices also offers significant benefits if it is limited in time and age-appropriate content, and controlled by parents, further research is needed with the aim of obtaining scientific knowledge, based on which it will be possible to create interventions with the aim of reducing negative impacts.

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