Implementation of Operant Conditioning Method through Play Media to Reduce Screen Time in Children

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ABSTRACT

Excessive use of electronic media can negatively affect children's cognitive, socioemotional and relationship development with parents. This study aimed to reduce children's screen time through an operant conditioning method using play media. Using a quasi-experimental design, the study involved 10 children aged 4-6 years with screen time of more than 4 hours/day. Results showed a significant decrease in average screen time to 1 hour/day. The intervention included positive reinforcement (praise, rewards), negative reinforcement (reduced homework), and punishment (reduced playtime). Play activities such as puzzles, role play, and physical activities also improved children's social and cognitive skills. This method effectively reduces gadget dependency and strengthens the parent-child relationship, thus providing significant benefits to child development and family dynamics.

Keywords: Children, Operant conditioning, Play media, Screen time.

INTRODUCTION

In the current generation, children grow up surrounded by increasingly advanced and innovative technology. The explosion of technological devices makes technological media such as gadgets and television a difficult part to avoid being reached by children. When children are accustomed to the use of technology, the frequency of gadget use in children will increase rapidly and become increasingly difficult to control. The use of gadgets and television is referred to as screen time. Screen time refers to the use of any electronic media that has a screen that requires different levels of involvement of cognitive and physical aspects in its users penggunanya [1], [2], [3]. Screen time tends to start at a very early age. Based on Kominfo and UNICEF research on the behavior of children and adolescents in using the internet, it is known that 79.5% of internet users are children and adolescents. In Indonesia, the age of school children using gadgets has exceeded 3 hours per day. During this time, children use gadgets to access social media and play games [4]. In previous studies, it has been estimated that children spend most of their waking hours on activities with gadgets and television, and the estimated time spent is about 8 hours per day [5], [6], [7].

Screen time is a very highlighted issue nowadays. Electronic media has benefits where users can access it without limits. However, the freedom to use electronic media, especially in children, can have various negative impacts such as a decrease in children's cognitive abilities, causing health complaints in children, affecting children's language development, disturbing children's diet and sleep quality, reducing children's interest in doing physical activities both indoors and outdoors, affecting children's socio-emotional and mental health, and affecting the relationship between parents and children [8], [9], [10]. The results of research on the impact of screen time are further strengthened through previous research on the relationship between screen time and the psychological health of children and adolescents, which involved 40,337 samples of children aged 2-17 years in the United States. This research shows that the use of electronic media can reduce curiosity, affect children's self-control abilities, children become difficult to get along, children's emotional conditions become unstable, and children become difficult to concentrate [11]. Another study showed that children who use social media more than 5 hours per day, have a risk of experiencing online harassment, disturbed sleep quality, have a low level of confidence, and have a poor perception of their body shape [12].

In an effort to reduce the negative impact of screen time, the American Academy of Pediatrics (AAP) Guidelines recommend that children under 2 years of age are prohibited from spending time using electronic media such as gadgets and television, and children over 2 years of age need to be given limits in using electronic media, which is less than 2 hours per day [13]. Children less than 1 year old who use electronic media for more than 2 hours per day are more at risk for speech and language delays, as well as a lack of interest in communicating with peers and adults [14]. Efforts to reduce the negative impact of screen time on children require a consistent role from parents. On the contrary, many parents continue or reinforce screen time on their children. In a survey, 29% of the 1000 parents interviewed allowed their children under 2 years old to watch television on the grounds that watching television is good for the child's brain. Then, other parents admitted to not limiting screen time for their children by avoiding conflict and social isolation, and using electronic media to entertain or distract children [8].

Ironically, today many parents find electronic media an efficient way to distract their children. Parents feel that electronic media can be useful when in situations such as eating at a restaurant, doctor's waiting room, and in other situations that require their children to remain calm, thus reducing the need for parents to supervise their children [8]. Parents tend to give their children gadgets or let them watch television so that their children stop crying and interrupting their activities. Indirectly, this explains that parents make gadgets and television as reinforcement for children's negative behavior. Children will learn that by crying loudly and disturbing parents, they will get gadgets or television. Without intervention, this behavior will continue, the child will have an incessant desire to access electronic media, which will increase screen time in children and parents will find it increasingly difficult to control and reduce screen time in their children.

Therefore, this module was developed with the aim of reducing screen time in children by applying the operant conditioning method through play media. This method is used with the hope of being able to control screen time and children's behavior in using electronic media. Operant conditioning is a learning process in which behavior is reinforced or weakened through the consequences that follow the behavior. This concept was developed by B.F. Skinner. Operant conditioning consists of two main elements, namely Reinforcement and Punishment. Reinforcement is the process by which behavior is reinforced or increased due to positive consequences, consisting of Positive Reinforcement and Negative Reinforcement. Positive Reinforcement is reinforcement that is done by giving something pleasant after the expected behavior can be achieved. Meanwhile, Negative Reinforcement is the reinforcement of behavior by removing an unpleasant stimulus [15].

This is proven by previous research which states that with the results of the intervention of providing play therapy and the application of positive reinforcement, it shows that the subject can reduce the use of gadgets and help children undergo daily activities better. Positive reinforcement is very helpful for the success of efforts to reduce screen time in children, where this makes children more motivated because they get a reward for reducing gadget use. Positive reinforcement is effective in shaping the desired behavior, with reinforcement given continuously after the desired behavior occurs [16]. The application of operant conditioning method as an effort to reduce screen time in children can be done by involving play media. The use of play media is the application of learning principles that aim to create changes in problematic behavior by placing children in play situations [17], [18]. The application of play media helps overcome internal barriers and regulate emotions, with the aim of changing children's behavior to be more in line with what is expected. Play can be used to reduce screen time in children, by keeping them happy and gaining developmental benefits. Play strengthens children's emotional, cognitive and physical aspects, and can reduce dependence experienced by children [19]. As explained in previous studies, the application of play media can reduce anxiety, fear, sadness, stress, and addiction [4].

Research shows that play therapy can reduce smartphone addiction in children aged 8-10 years. Some types of play that are suitable for school-age children include media play with art, role play, playing with dolls, and drawing. Drawing activities will give children the opportunity to express themselves freely and have an effective therapeutic effect in overcoming addiction. Furthermore, research found that the application of play media is very effective in reducing smartphone use in elementary school-age children. As well as, based on other research shows that the application of play media using the traditional game of gobak sodor is proven effective in reducing children's habits in using gadgets. Then, the latest research explains that there is an effect

of providing play therapy on gadget addiction in elementary school students [4].

Screen time duration is an important factor to consider in toddlers. Analysis of five articles showed variations in the duration and measurement tools of screen time in toddlers. Most 18-month-old toddlers do not use screen time, but 22.4% use screen time for about 15.71 minutes per day [20]. Toddlers aged 24-30 months had an average screen time of more than 2 hours per day [21]. A total of 53 out of 100 toddlers aged 48-54 months were exposed to screen time for 1 hour every day [22]. Toddlers aged 2-5 years with speech delay use screen time of more than 1 hour to more than 2 hours per day with mother or caregiver assistance. Toddlers aged 3-5 years generally have a screen time of more than 30 minutes per day [22].

The role of parents is very influential on the negative impact of screen time on children [23]. Research shows that parents should be strict in supervising children's screen time and not allow them to use gadgets continuously. Giving gadgets to young children will make them more likely to experience more negative impacts [24]. Therefore, it is necessary to educate parents about the postural impact of using gadgets without screen time. Parents need to increase their tolerance for children's crying or disruptive behavior. Parents should realize that withholding screen and television use will lead to an increase in crying and disruptive behavior. Understanding that this is a process of eliminating negative behaviors, can help parents to tolerate the increase in behaviors. Once the intensity of the behavior reaches its peak, the crying and disruptive behavior will decrease. After a few cries without getting the gadget, the likelihood that the child will cry because they want to use the gadget will slowly decrease [8].

Excessive screen time that has no limits can have a negative impact on children's emotions, resulting in a lack of social interaction, such as often ignoring the surrounding environment and playing with gadgets more than their peers [25]. Also, there is a tendency for children to become irritable, defy parents, and show other aggressive attitudes, which have an impact on their lack of ability to control themselves [26]. Research found that there is a correlation between screen time duration and ADHD symptoms. Based on the research results and literature found, this study was prepared with the aim of reducing screen time in children by using the operant conditioning method through play media [27].

METHODS

This research is a type of quasi-experimental research with the research design used one group pre-test and post-test. The sampling technique used purposive sampling with predetermined characteristics. In this study there were two assessments, namely before and after treatment. The research design is described in table.1

Table I Research Design

Subjects	**Research Design Group**
Children aged 4-6 years gadget users	Quasi-experimentation

The selection of subjects was determined in accordance with the statement submitted by WHO and the American Academy of Pediatrics, that children aged 2-6 years at least have a screen time of no more than one hour per day. This is due to the importance of physical activity and adequate sleep, which can be disrupted by excessive gadget use [27].

The table above shows that the subject before getting treatment will be measured the level of screen time and gadget habits of children. Likewise, after being given treatment, the level of screen time and gadget habits of children will be measured again which is useful to determine the effect of treatment on changes in children's behavior in gadget use and see if there is a decrease in the level of children's screen time.

The intervention method is carried out through several stages, including:

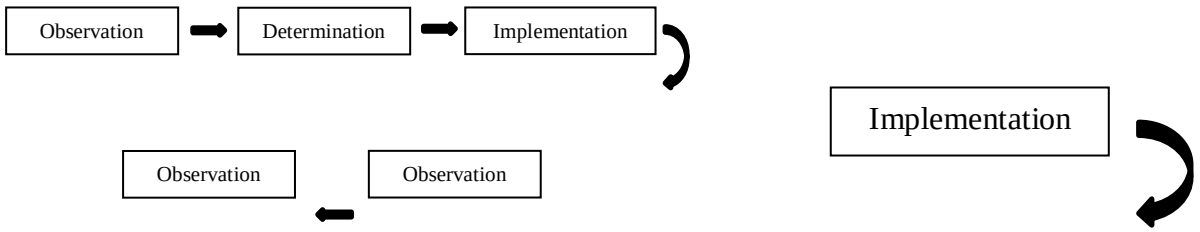

Figure 1. Stages of intervention method

The implementation of the operant conditioning method through learning therapy is carried out in 7 sessions. Each session was conducted in 7 full days consistently by parents. The play media include playing with objects such as puzzles and building blocks; Role play such as police-criminal, doctor-patient, and seller-buyer; Playing with art such as drawing children's goals or experiences, coloring, singing, dancing, or playing music; And playing with physical activities such as hide and seek, playing bicycles in the park, or playing ball. The application of operant conditioning methods carried out include: The application of positive reinforcement in the form of giving thumb stickers and praise for positive behavior that has been done by children, namely playing activities without looking for and using gadgets; Furthermore, the application of negative reinforcement in the form of reducing household chores when children play without using gadgets; And the application of punishment is carried out by reducing playing time when children use gadgets for more than 2 hours per day.

In applying the operant conditioning method through play, parents will be consistently present in each child's daily activities, increase familiarity with the child, and build stronger togetherness between parents and children. Parents and children will engage in several types of play, including art-themed play, object play, and role play. In each of these play activities, parents will implement the operant conditioning method, where when the child eliminates unwanted behavior (using gadgets), the parents will provide reinforcement in the form of giving a reward such as praise, gifts, or reducing tasks that the child does not like. Conversely, when the child brings up the unwanted behavior (using gadgets), the parents will provide punishment such as a reduction in play rations the next day, not getting their favorite food, and others.

The consequences of reinforcement can provide motivation for children to always do the behavior as desired or expected by parents, and the provision of punishment will provide consequences for children so as to weaken behavior that is not desired or not expected by parents. Parents should be aware that restraining the use of gadgets and television will lead to an increase in crying and disruptive behavior of the child. Understanding that this is a process of eliminating negative behaviors, can help parents to tolerate the increase in behaviors. Once the intensity of the behavior reaches its peak, the crying and disruptive behavior will decrease. After a few cries without getting the gadget, the likelihood that the child will cry for the gadget will slowly decrease [8]. Children's screen time was measured every day through the recording of daily report journals conducted by the parents of each child, and every day observations of intervention activities were also recorded in the parents' daily report journals. Then, on the last day, parental satisfaction related to the implementation of intervention activities will be measured through a questionnaire that has been prepared by the researcher.

RESULTS AND DISCUSSION

The subjects in this study amounted to 10 children, namely children aged 4-6 years gadget users with screen time more than 4 hours per day. The subjects included 6 children of the male gender and 4 children of the female gender.

Table Ii Screen time comparison results before and after treatment

Ranks				
		N	Mean Rank	Sum of Ranks
Post_Test - Pre_Test	Negative Ranks	10[a]	5,50	55,00

	Positive Ranks	0[b]	,00	,00
	Ties	0[c]		
	Total	10		

Table Iii Wilcoxon statistical test results

Test Statistics[a]	
Z	-2,814[b]
Asymp. Sig. (2-tailed)	,005

Based on the table above, it is known that the data is in the negative rank with a Mean value of 5.5 and Sum of Ranks of 55. This shows that, there is a decrease in the subject group before and after treatment, namely the provision of interventions in the form of applying operant conditioning methods through play media, to reduce screen time in children, which is 55%. Then, the statistics table shows a Z value of -2.814 with an Asymp Sig value of 0.005. Based on the Wilcoxon test rules, if the significance value is <0.05, it means that there is a significant difference in the subject's behavior measured between before and after treatment. Based on these rules, it can be concluded that there is a significant difference in children's screen time before and after the intervention of applying the operant conditioning method through play media. The Z value (-) indicates that the score on the subject after being given the treatment is lower than before being given the treatment.

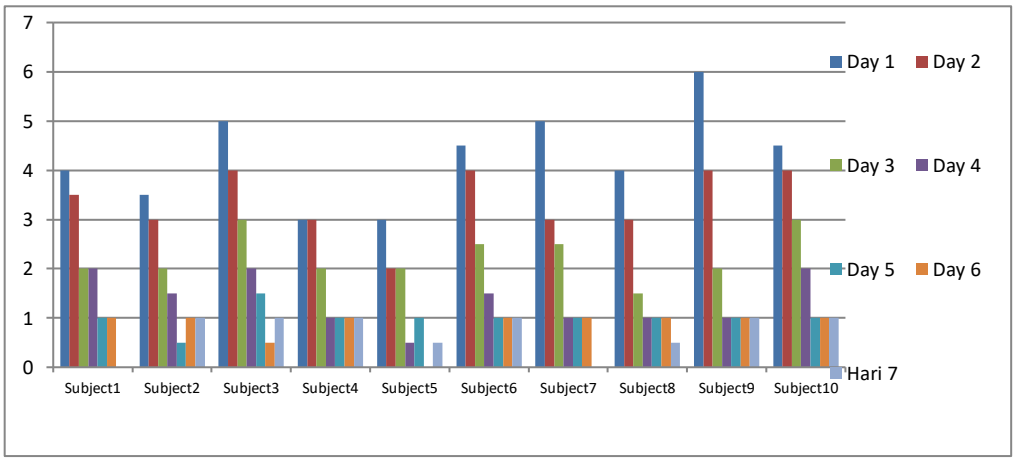

Figure 2. Changes in children's screen time during the treatment

Based on the chart above, it shows that there is a decrease in screen time in each child. Before being treated, the average child's screen time was above 4 hours per day. Then after being given treatment, namely intervention by applying the operant conditioning method through play media, it is known that there is a decrease in children's screen time to an average of 1 hour per day. Although in some children there was an increase in screen time compared to the previous day towards the end of the intervention, but overall each child used gadgets for less than 2 hours per day. In line with the statement conveyed by WHO, which has recommended a screen time limit for children under 5 years of age of at least no more than one hour per day [28]. Children's activities when using gadgets are generally playing games, watching YouTube, or learning online. This is evidenced in a study that found that most children use gadgets to play games, watch songs, dance, and watch cartoons [29]. These results explain that there is a significant decrease in screen time in each child after being given treatment in the form of intervention in the application of operant conditioning methods through play media to reduce screen time in children.

On the results of the daily journal report on the observation of children's activities during the implementation of intervention activities, the conclusion of the results is obtained in the form of :

Table Iv Observation results of children's screen time and activities during the treatment

No.	Subjects	Conclusion of Activity Observation Results
1.	Subject 1	The child became more focused on the activity and increased enthusiasm when playing with parents, the child became more cooperative when asked to reduce or not play gadgets. In the game of objects with puzzles, children are very happy and like the game, so they want to be given more challenges.
2.	Subject 2	The child shows great interest when playing with objects using building blocks. The child becomes more interactive and forgets to play gadgets. This game also increases children's creativity in arranging blocks into a tall tower building.
3.	Subject 3	Children love role play and often invite their siblings to play together. Children become more active, creative and imaginative in playing and creating scenarios in role play.
4.	Subject 4	The child shows great interest in playing with objects using puzzles, so he/she becomes very focused, calm and always wants to complete it on his/her own. Through this game, the child can improve his problem-solving skills well.
5.	Subject 5	Children are very excited when doing physical activity games playing trampoline and soccer. Through these games, children become very energetic and forget about time, especially on their gadgets. So parents feel that games like this are very suitable to help children reduce screen time.
6.	Subject 6	Children feel happy when invited to play physical activities in the form of playing bicycles in the park. This is because children really like when invited to play in the park. Through this game, the closeness between parents and children can be established very well.
7.	Subject 7	Children love art games such as drawing and dancing. Children become more excited and their creativity is well honed. The child is very excited, especially when dancing to his/her mother's movements. The child enjoys being free from household activities such as helping mom put things away when she is not playing gadgets on that day.
8.	Subject 8	Children are very happy when invited to play physical games such as searching for treasure. Apart from being able to get treasure, the excitement of looking for treasure with their father is something that children really like. Praise and appreciation given by the child's parents reinforce the behavior of not using gadgets.
9.	Subject 9	Children really like the role play of doctors and patients. Children become very creative and imaginative in acting out their character as a doctor. Through this game, the child's ability to communicate is also well improved. Children love the praise and appreciation given by parents when they are able to play well and leave their gadgets.
10.	Subject 10	Children are very enthusiastic when playing with art using musical instruments. Especially because children really like the piano. In addition to sharpening children's skills using musical instruments, this game also helps children avoid excessive use of gadgets. Children love it when they are given thumb stickers every time they finish playing.

Based on the conclusion of these observations, it is known that each child likes and has an interest in certain games. Through these games, children's abilities in various fields can be well honed. This also helps the development of children of the same age to be effectively passed. And the relationship between parents and

children can also be strengthened through the intervention method. Therefore, based on the results of these activities, it can be concluded that through play media it can reduce screen time in children, by shifting the focus and attention of children related to gadgets to playing with parents in a fun way.

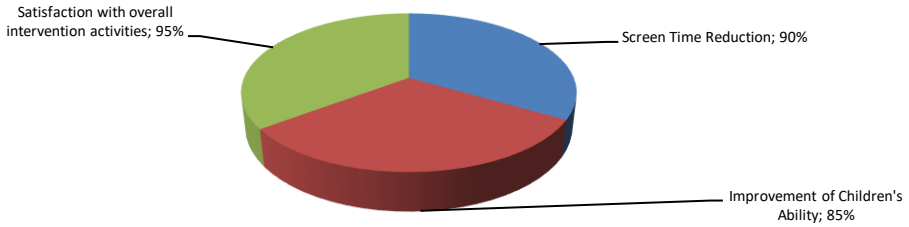

Figure 3. Parent satisfaction level

Furthermore, based on the results of the parent satisfaction questionnaire related to the intervention activities carried out, the results were obtained in the form of 90% of parents of children reporting that there was a significant decrease in children's screen time, and this was a satisfaction that could be felt by every parent of the child. Then, 85% of people reported that there was an increase in children's social skills and children's communication skills to the people around the child. Also, 95% of parents were satisfied with the implementation of the intervention activities. Parents agreed that this method was able to reduce conflicts between parents and children regarding reducing screen time. Parents felt relieved that their children's dependence on gadgets could be overcome using a more positive and fun method.

DISCUSSION

Over the past 20 years, the daily duration of screen time in children has increased, while the age of first exposure has decreased. Today, the range of available devices and their uses has grown rapidly [30]. Screen time refers to the use of any electronic media that has a screen that requires different levels of involvement of cognitive and physical aspects in its users [1], [2], [3]. Based on data from the Indonesian Child Protection Commission (2020), as many as 55% of children have spent time watching YouTube. This data is then reinforced by another survey which shows that as many as 61% of children spend time watching YouTube. Children aged 5-6 years are in the highest position in the order of gadget users, with a total percentage of 47.7%. This is followed by children aged 1-4 years with 25.9% and babies under 1 year old with 3.5%.

Recent research shows that the variety, accessibility, and time use of televisions, computers, cell phones, tablets, game consoles, and other digital devices have increased rapidly over the past decade and among children and adolescents [31]. Although the American Academy of Pediatrics has limited the use of screen time in children under two years of age and has set time limits for children over two years of age, the use and exposure to screen time has increased significantly among children and adolescents [32]. The results of the previous study showed that there was low compliance of children with the recommendations for screen time use overall. The low compliance was 13.9% in children and 4.8% in adolescents [33]. Operant conditioning is a theory that examines a reinforcement consisting of a reward and punishment system. The consequences of the reinforcement provided can motivate children to always do the behavior as desired or expected by parents, and the provision of punishment will provide consequences for children so as to weaken unwanted or unexpected behavior by parents [34]. Thus, through the application of this method, unwanted child behavior can be eliminated, and bring new behavior as expected. In this case, the behavior is reducing screen time. Skinner theoretically believed that operant behavior should involve responses that can be easily repeated. This is to maintain the consistency of the response that parents must give to children, when the desired behavior has been elicited or performed.

The application of the operant conditioning method as an effort to reduce screen time in children can be done by involving play media. The use of play media is the application of learning principles that aim to create changes in problematic behavior by placing children in play situations [17]. The application of play media

helps overcome internal barriers and regulate emotions, with the aim of changing children's behavior to be more in line with what is expected. Play media can be used to reduce screen time in children, by keeping them happy and getting developmental benefits. Play will strengthen children's emotional, cognitive and physical aspects, and can reduce dependence experienced by children [35]. As explained in previous research, the application of play media can reduce anxiety, fear, sadness, stress, and addiction [4].

Based on the results of the research that has been conducted, the operant conditioning method through play media is proven to have an effect in reducing screen time in children. This can be seen from the significant decrease in children's average daily screen time, from 4 hours per day to 1 hour per day. The application of positive reinforcement in the form of thumb stickers, praise, and positive appreciation as a form of motivation given by parents to children, significantly affects children's motivation to reduce screen time. Also, punishment in the form of reduced play time also has a disciplinary effect on children to help children understand and comply with the screen time limits that have been set.

Through this intervention, it can not only help children reduce screen time, but also help improve children's social and cognitive behavior. Observations showed that children became more creative, cooperative and engaged in social interactions. The play media that the children liked and were interested in included puzzle play, role play, playing musical instruments, and outdoor play such as playing bicycle and playing ball. Through these games, it helps improve children's critical thinking, problem solving, creativity, imaginative and social skills. This is in line with previous research which states that the use of play media can increase effectiveness, attract attention, provide fun, and is easy for children and parents to follow and understand. Because play is a means of learning that can provide children with experiences that support the development of their potential [36]. When playing, children will express their desires, thoughts, and feelings, explore the surrounding environment, establish social relationships, and develop social, cognitive, spiritual, moral, and emotional abilities simultaneously [37].

Parental satisfaction with the intervention can be summarized as very high. This is known based on the results of the questionnaires completed by the parents, which showed that most parents reported a significant decrease in screen time and an increase in children's social interaction. In addition, this intervention method also helped reduce conflicts between parents and children, regarding screen time and children's gadget use habits. Thus, parents felt the added benefit of the intervention to the family dynamics. Thus, through this intervention method, negative impacts on children's development can be prevented and addressed properly. It is well known that children who overuse gadgets tend to experience more intense emotional reactions, may become rebellious, and feel disturbed if parents try to take away or stop their gadget use. This is one of the possible conflicts that can occur between parents and children [38].

The family environment is the core and closest part of the child's life and daily life. So it cannot be denied that the family environment, especially parents, will greatly influence children's behavior in accessing electronic media. Therefore, the role of proper parenting is very important to be carried out and implemented by parents. Through play media, the relationship between parents and children will develop. Direct interaction between parents and children will create much better stimulation to reduce children's dependence on gadget use [39].

CONCLUSIONS

The implementation of operant conditioning method through play media shows positive results in reducing screen time in children. The application of positive and negative reinforcement, as well as punishment, can consistently shape the desired behavior and help reduce excessive gadget use in children. Through this intervention, it is known to be able to help improve children's social and cognitive skills, as well as provide benefits to parents in managing and controlling their children's screen time.

ACKNOWLEDGMENT

Additional research can be conducted to develop and optimize the operant conditioning method through play media as an effort to reduce screen time in children, such as developing more specific intervention techniques. Variations of activities in the operant conditioning method through play media can be the focus of further

research. For example, determining the most effective types of punishments and rewards as well as games that are most favorable and beneficial for children to reduce the amount of time they use when using gadgets or television. Then, conduct continuous measurement. Long-term studies to find out how effective this intervention module design is in the long run. Further research should further explore the changes in children's behavior for several months to a year after the intervention is completed, to find out whether the changes last for a long time or are only temporary.

Finally, the effect on additional developmental aspects. This could include examining how the intervention affects children's social, emotional and cognitive development. Further research could be conducted to determine whether reducing screen time in children can have a positive impact on children's social interaction skills, emotion regulation, and academic achievement. Further research could provide a deeper and more comprehensive insight into the application of operant conditioning through play in reducing children's screen time. This will enable the development of more efficient and adaptive solutions according to the needs of children and their families.

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